RECLAMATION

Managing Water in the West

Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206): Contract Between the U.S. Bureau of Reclamation and the El Dorado County Water Agency, Subcontract Between the El Dorado County Water Agency and the El Dorado Irrigation District, and Subcontract Between the El Dorado County Water Agency and the Georgetown Divide Public Utility District

Final Environmental Impact Statement

Estimated Total Costs Associated with Developing the DEIS/EIR and Final EIS: $2,475,773

U.S. Department of Interior
Bureau of Reclamation
Mid-Pacific Region

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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.

Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206): Contract Between the U.S. Bureau of Reclamation and the El Dorado County Water Agency, Subcontract Between the El Dorado County Water Agency and the El Dorado Irrigation District, and Subcontract Between the El Dorado County Water Agency and the Georgetown Divide Public Utility District

Final Environmental Impact Statement

El Dorado County, California

***Final EIS Lead Agency*:** U.S. Department of the Interior, Bureau of Reclamation (Reclamation)

ABSTRACT

This proposed action is intended to implement those parts of Public Law 101514 (P.L. 101-514), Section 206, pertaining specifically to the El Dorado County Water Agency (EDCWA) and the need for new water supply entitlements for El Dorado County. Under this new contract, up to 15,000 acre-feet per annum (AFA) of Central Valley Project (CVP) Municipal and Industrial (M&I) water would be made available to EDCWA for diversion from Folsom Reservoir, or from an exchange on the American River upstream from Folsom Reservoir. The contract would provide water that would serve existing and future M&I water needs in El Dorado County, establish and preserve entitlements to divert the water in accordance with State Water Resources Control Board (SWRCB) and Reclamation requirements, and provide new water supplies that would justify future construction, operation, and maintenance of new facilities to convey and treat the diverted water. Direct, indirect, and cumulative impacts on the physical, natural, and socioeconomic environment of the region resulting from the proposed action and alternatives are addressed in the Environmental Impact Statement (EIS).

This Final EIS is prepared in compliance with the National Environmental Policy Act (NEPA) and Reclamation NEPA procedures. A Draft EIS/Environmental Impact Report (EIR) was circulated for public review and comment in July 2009 in accordance with both NEPA requirements and requirements of the California Environmental Quality Act (CEQA) and CEQA guidelines. Written comments received on the Draft EIS/EIR during the public review period and written responses to those comments are included in this Final EIS. A Final EIR was

certified in January of 2011 by EDCWA to fulfill California state requirements for environmental review. Both the Draft EIS/EIR and the Final EIR are incorporated by reference in this Final EIS. Reclamation intends to adopt this Final EIS to satisfy the requirements of NEPA under P.L. 101-514 to execute a CVP Water Service Contract with EDCWA, as described in this EIS.

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(Included separately Technical Appendices)

Appendix A: Draft EIS/EIR Comment Letters and Responses to Comments.

Appendix B: ECORP 2016 CALSIM II Modeling Technical Memorandum

Appendix C: 2009 Draft EIS/EIR

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

In 1990, the U.S. Congress passed Public Law 101-514 (P.L. 101-514).[1] Section 206 (b) of P.L. 101-514 directs the U.S. Secretary of the Interior and U.S. Bureau of Reclamation (Reclamation) to enter into a long-term Central Valley Project (CVP) Municipal and Industrial (M&I) water service contract with the El Dorado County Water Agency (EDCWA). Under this contract, up to 15,000 acre-feet annually (AFA) of CVP water would be provided to EDCWA to meet the long-term water supply needs of El Dorado County. Water made available under this contract would be diverted from Folsom Lake or for exchange upstream on the American River or its tributaries,

The Proposed Action addressed in this Final Environmental Impact Statement (Final EIS) is the execution of a new long-term (40-year) CVP M&I water service contract between EDCWA and the Reclamation. EDCWA is the state “lead agency” for purposes of compliance with the California Environmental Quality Act (CEQA) (Cal. Pub. Resources Code § 21000 et seq.). Reclamation is the federal lead agency for purposes of compliance with the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.).

At the time that P.L.101-514 was passed, Congress acknowledged that El Dorado County would continue to grow and that new water supplies would be required well into the future. Since the law’s passage, this assumption has borne out with increasing population growth and increased demand for new and reliable water supplies. The P.L. 101-514 contract for EDCWA is recognized “…as the first phase of a contracting program to meet the long-term water supply needs of …El Dorado [County].” EDCWA, along with its member units, have continued to pursue various water supply acquisition and demand reduction initiatives concurrently with this new CVP water service contract.

ES.2 BACKGROUND

ES.2.1 Overview of P.L. 101-514 Environmental Review Process to Date

On August 17, 2009, Reclamation and EDCWA released the *P.L. 101-514 Reclamation/EDCWA CVP Water Supply Contracts Draft Environmental Impact Statement/Environmental Impact Report* (Draft EIS/EIR) for public review and comment. Reclamation received written public comments on the Draft EIS/EIR during the extended public comment period which ended on

1 P.L. 101-514 was a part of the Energy and Water Development Appropriations Act of 1991, H.R. 5019, Conference Report H101-235, filed October 15, 1990, passed October 20, 1990, and signed into law, November 4, 1990.

December 31, 2009. EDCWA and Reclamation also facilitated public forums during that time to solicit oral comments on the Draft EIS/EIR.

In January of 2011, EDCWA published a Final EIR for P.L. 101-514. With publication of the subsequent Notice of Determination, EDCWA fulfilled its CEQA obligation with respect to the Proposed Action. Preparation of this Final EIS was initiated by Reclamation in late 2015 and is intended to help fulfill Reclamation's NEPA obligation for the Proposed Action and thus allow both agencies to move toward execution of the proposed contract. This Final EIS presents copies of all Draft EIS/EIR comment letters received during public comment period and written responses to those comments. These letters and responses to comments are contained in Appendix A of this Final EIS.

Since passage of P.L.101-514 in 1990, numerous events occurred that affected or have been a part of the contracting process. These events are discussed in detail in Chapter 1 of this Final EIS and are summarized below.

ES.2.2 Events Leading to Publication of the Draft EIS/EIR

P.L. 101-514 recognizes the need for EDCWA and Reclamation to prepare jointly environmental documentation to fulfill environmental review requirements of the NEPA and CEQA. To initiate this process, a Notice of Preparation (NOP) for the joint Draft EIS/EIR was prepared in April 1993 and circulated for public review as required by CEQA. At that time, the Notice of Intent (NOI) was published in the Federal Register (Vol. 58, No. 90, May 12, 1993) in compliance with NEPA. Following completion of the project scoping process in early 1994, activity related to preparation of the 2009 Draft EIS/EIR slowed due to a number of factors not directly associated with the P.L. 101-514 review process.

The environmental review for the EDCWA P.L. 101-514 CVP Water Service Contract was reinitiated with circulation of a revised NOP and NOI published in July 1998 (1998 NOP/NOI), following the adoption of an updated General Plan for El Dorado County by the County Board of Supervisors in 1996. During the NOI/NOP public review period, two public scoping sessions were held in August 1998 to solicit public comment formally. Appendix B of the 2009 Draft EIS/EIR includes the 1998 NOP/NOI materials and responses.

While the environmental review of the proposed action experienced substantial delays noted above, Reclamation's planning and operations hydrologic modeling tool was being further revised with cooperative assistance from the California Department of Water Resources (DWR). PROSIM 2000 was revised and superseded by the CALSIM II model which now represents the industry standard for coordinated CVP/SWP operational planning. The CALSIM II model, along with the compatible Reclamation environmental models, was used to analyze potential environmental and socio-economic impacts in the 2009 Draft EIS/EIR.

Early in 2006, as Reclamation and EDCWA were set to reinitiate the environmental review process, one remaining technical issue was to ensure that the proposed CALSIM II hydrologic modeling was consistent with the CALSIM II simulations used in the CVP-Operational Criteria and Plan (OCAP) update in 2004. This confirmation of model consistency was received during the summer of 2006 with the proviso that no official endorsement of the model or its assumptions could be made by Reclamation, since ongoing CVP-OCAP litigation was pending at that time. The 2009 Draft EIS/EIR used key CALSIM II and related environmental modeling assumptions that supported the revised August and October 2008 Biological Assessments (BAs) prepared by Reclamation, pursuant to ESA Section 7, on the current CVP-OCAP. Certain assumptions, however, were incorporated relating to new project actions that were initiated since the completion of Reclamation's modeling that were different from those used in the final BA. Those assumptions and their implications are detailed in Subchapter 5.3.3, CALSIM II Simulations, of the 2009 Draft EIS/EIR.

In September 2006, with the El Dorado County planning documents and Reclamation operational tools updated, the environmental review process for P.L. 101-514 was reinitiated. A third NOI and NOP were deemed necessary due to the elapsed time from the last noticing in 1998. The NOI and NOP were prepared and re-circulated, with the comment period closing on October 16, 2006. Two Public Scoping Meetings were held in September 2006, one in Placerville and one in Greenwood (in the Georgetown Divide area). Public comment and response to the NOI and NOP were taken at the meetings, and by mail through October 16, 2006. Appendix C of the 2009 Draft EIS/EIR contains the NOP and NOI, comments on the NOP, and various public and agency notification documents.

ES.2.3 Events Leading to Publication of the Final EIR

On August 17, 2009, Reclamation and EDCWA released the P.L. 101-514 Reclamation/EDCWA CVP Water Supply Contracts Draft EIS/EIR for public review and comment. The Draft EIS/EIR identified nine alternatives to implement those parts of P.L. 101-514, Section 206, pertaining specifically to EDCWA and the need for new water supply entitlements for El Dorado County. Reclamation and EDCWA held public meetings to receive oral and written comments on the Draft EIS/EIR on the following dates: September 16, 2009, City of Folsom Community Center, Folsom, Sacramento County, California; and September 15, 2009, El Dorado Hills Fire Department, El Dorado Hills, El Dorado County, California. No written or oral comments were made at those meetings.

The comment period on the Draft EIS/EIR closed on October 16, 2009, and was subsequently extended by Reclamation to December 31, 2009. Several federal, state, and local agencies, as well as non-profit organizations, submitted written comments.

The Final EIR was completed and certified and Findings of Fact adopted by the EDCWA Board of Directors on January 17, 2011. The Final EIR provided written responses to all comments received on the Draft EIS/EIR during the comment period. The Final EIR also contained text changes to the Draft EIS/EIR made in response to comments and for the purpose of minor editorial corrections. The Final EIR contained a summary of environmental impacts associated with the Proposed Project, a list of commenters, all comments received on the Draft EIS/EIR during the public comment period, and the responses to those comments. The Draft EIS/EIR and Technical Appendices from the Draft EIS/EIR were included as part of the Final EIR as was a Mitigation Monitoring and Reporting Program.

The statute of limitations for legal challenges to the Final EIR as prescribed under CEQA expired in 2011 with no challenges being filed.

Although, as noted above, the draft environmental document for this project was a joint Draft EIS/EIR prepared pursuant to both CEQA and NEPA, the Final EIR was completed by EDCWA as a CEQA-only document. EDCWA proceeded with the Final EIR in advance of the NEPA Final EIS because EDCWA was in a position to satisfy its obligation for environmental review under CEQA before Reclamation was in a position to finalize its NEPA compliance. The Final EIR recognizes that Reclamation must prepare its own NEPA-only Final EIS before Reclamation can take action entering into such a contract with EDCWA. Reclamation chose not to proceed with a joint Final EIS/EIR with EDCWA due, in large part, to several pending federal actions that had bearing on P.L. 101-514. These actions are detailed in Section 1.1.4 and summarized below.

ES.2.4 Recent Federal Actions Relevant to P.L. 101-514

A number of federal actions have occurred since publication of the 2009 Draft EIS/EIR that have a direct bearing on the Proposed Action and analysis and conclusions presented in the Draft EIS/EIR. These are discussed in detail in Chapter 1 of this Final EIS and are summarized below.

ESA Section 7 Consultation for Long-Term Operation of the CVP in Coordination with the State Water Project

On June 30, 2004, the USFWS issued a Biological Opinion (BiOp) based on Reclamation's BA for "Long-Term Central Valley Project and State Water Project Operations Criteria and Plan" (hereinafter referred to as CVP/SWP OCAP). On February 16, 2005, the USFWS issued an amended BiOp that superseded their initial 2004 OCAP BiOp. The 2005 OCAP BiOp concluded that the coordinated operation of the SWP and CVP, including the proposed future actions, would not jeopardize the continued existence of the federally-listed threatened Delta smelt.

On October 22, 2004, the National Marine Fisheries Service (NMFS) Southwest Regional Office issued a BiOp to Reclamation and DWR on the effects of the proposed CVP/SWP OCAP that concluded with a no-jeopardy opinion for federally-listed endangered and threatened Chinook salmon and steelhead and a no-adverse modification opinion for designated critical habitat of those species. The NMFS 2004 BiOp was also based on Reclamation's 2004 BA.

Both USFWS and NMFS BiOps were litigated and subsequently invalidated by the court. Reclamation reinitiated consultation and completed a revised BA in August 2008 as a basis for re-consultation with the USFWS and NMFS on the CVP/SWP OCAP. The 2008 BA proposed to operate the CVP to deliver water under the proposed contract. The USFWS issued its BiOp for the threatened Delta smelt (*Hypomesus transpacificus*) in December 2008. NMFS issued its BiOp for endangered winter-run Chinook salmon (*Oncorhynchus tshawytscha)*, threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha)*, threatened Central Valley steelhead (*Oncorhynchus mykiss*), threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*), and Southern Resident killer whale (*Orcinus orca*) in June 2009.

The USFWS and NMFS BiOps determined that the continued operation of the CVP and SWP as described in the 2008 BA would likely jeopardize the continued existence of Delta smelt, some salmonids, and green sturgeon and adversely modify their critical habitats. In their respective BiOps, both USFWS and NMFS recommended Reasonable and Prudent Alternatives (RPAs) that, if implemented, would avoid jeopardy.

The USFWS 2008 BiOp and NMFS 2009 BiOp were subsequently litigated. Ultimately, the court upheld both BiOps on ESA grounds, but found that Reclamation violated NEPA by failing to prepare an EIS on its operation of the CVP under the BiOps. Reclamation subsequently cured that deficiency and prepared an EIS in 2015.

USFWS Provisional BiOp for the P.L. 101-514 Proposed Action (June 2010)

On June 9, 2010, Reclamation received a provisional BiOp from the USFWS for the P.L. 101-514 Contract. At issue for the BiOp were the potential effects of the proposed contract diversions on the endangered Pine Hill ceanothus (*Ceanothus roderickii)*, Pine Hill flannelbush (*Fremontodendron decumbens*), Stebbins morning glory (*Calystegia stebbinsii*), and El Dorado bedstraw (*Galium californicum* ssp. *sierrae*) and the threatened Layne's butterweed (*Packera layneae*), plants found on gabbro-derived soils, and threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California red-legged frog (*Rana draytonii*) and Delta smelt (*Hypomesus transpacificus*).

With respect to Delta smelt, the USFWS 2010 letter of concurrence for P.L 101-514 defers to the USFWS 2008 OCAP BiOp that evaluated the proposed 15,000 AFA diversion under P.L. 101-514. USFWS determined no further evaluation was needed.

With respect to the future construction of diversion facilities to serve GDPUD water users, the USFWS 2010 letter of concurrence requires that further consultation be conducted prior to approval of these facilities to determine potential jeopardy to Layne's butterweed and California red-legged frog.

For impacts within EID's consolidated place of use for CVP water, USFWS found no jeopardy of species resulting from diversions to EID that do not exceed 7,500 AFA. However, the BiOp states that, "the Service [USFWS] is concerned that the execution of any future contracts by Reclamation that provide for the delivery of additional water within EID's CVP POU [Place of Use] have the potential to enable this shift in water [referring to the use of water from Sly Park reservoir to serve uses in areas outside of the CVP POU] and may result in effects to listed species outside of the CVP CPOU [Consolidated Place of Use]." As a result, USFWS determined that water diversions to EID in excess of 7,500 AFA would require additional analysis and consultation with USFWS.

The USFWS 2010 letter of concurrence determined that proposed diversions to EID were not likely to affect California red-legged frog or valley elderberry longhorn beetle within EID's CVP CPOU.

With regard to Pine Hill ceanothus, Pine Hill flannelbush, Stebbins morning glory, El Dorado bedstraw and Layne's butterweed, the USFWS 2010 letter of concurrence states that previous BiOps in 2006 and 2009 analyzed the potential effects on these species and it is not necessary to reanalyze the effects of the proposed action. If, however, the conditions contained in the USFWS 2009 BiOp pertaining to modification of the CVP CPOU are not implemented, additional consultation would be needed to include conservation measures to offset the loss of gabbro plants and their habitat.

NMFS Letter of Concurrence (2014)

To complete its obligation under Section 7 of the ESA for the Proposed Action, Reclamation prepared a BA for NMFS based on updated modeling assumptions. Reclamation completed the BA in December 2011 evaluating effects on federally listed species (anadromous fish species) or their designated critical habitat in the project area. The BA was prepared in accordance with legal requirements set forth under regulations defined in Section 7 of the ESA (50 CFR 402; 16 U.S.C. 1536 [c]) to assure that the proposed action does not jeopardize the continued existence of any Federally threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat. The BA also served to ensure appropriate integration and consistency with the ongoing re-consultation on the CVP/SWP OCAP.

The 2011 BA focused on those water bodies that serve as habitat, migration corridors, and water sources for federally listed fish species and their critical habitats. The primary water bodies addressed in the BA included Folsom Reservoir, the lower American River (LAR) from Nimbus Dam to the confluence with the Sacramento River, the Sacramento River (both upstream and downstream from its confluence with the American River), Shasta and Trinity reservoirs, and the Sacramento San Joaquin River Delta. More specifically, it was reasoned that effects of the proposed contracting action are most likely to influence anadromous species which may be present, at various times, within the LAR and Sacramento River. Six federally-protected fish species were identified as potentially occurring in the "Action Area." Under the ESA, "Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." (50 CFR § 402.02).

The six federally-listed species addressed in the BA are: Central Valley spring-run Chinook salmon, California Central Valley steelhead, Sacramento River winter-run Chinook salmon, Delta smelt, Southern DPS green sturgeon, and Southern Resident DPS killer whale. Critical habitat has been designated within the Action Area for Central Valley spring-run Chinook salmon and California Central Valley steelhead.

In addition, Essential Fish Habitat (EFH) within the area potentially affected by the project has been designated by NMFS for Central Valley fall-/late fall-run Chinook salmon pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

After reviewing the current status of the federally-listed species included in the BA and based upon the best available hydrologic modeling output, the current status of the species, the environmental baseline for the action area, the effects of the Proposed Action, and the acknowledged cumulative effects, Reclamation concluded that the proposed action, as defined, may affect, but is not likely to adversely affect, the species addressed in the BA, and is not likely to destroy or adversely modify designated critical habitat.

The BA determined that the Proposed Action would have no effect on Delta smelt, Southern DPS green sturgeon, or Southern Resident DPS killer whale. The BA also determined that the Proposed Action may affect, but is not likely to adversely affect, the critical habitat for Central Valley spring-run Chinook salmon, Central Valley steelhead, and Sacramento River winter-run Chinook salmon or EFH for Central Valley fall-/late fall-run Chinook salmon.

The BA found that no incidental take of any of the above species is expected to occur as a direct result of the Proposed Action, nor is the Proposed Action expected to jeopardize the continued existence of any federally listed species. The conclusions presented in the BA were reached, based on the hydrologic modeling (i.e., CALSIM II and related water temperature modeling) undertaken and the fundamental characteristics of the proposed action, as defined in the BA.

In response to Reclamation's Section 7 consultation request, NMFS provided to Reclamation a letter dated June 2, 2014 stating their concurrence with the effect determinations presented in the Reclamation's December 2011 BA. Specifically, the letter states:

> NMFS has received the information necessary to initiate consultation on federally listed anadromous fish species and their designated critical habitat within the action area. Based on

> our review of the material provided and the best scientific and commercial information currently available, NMFS concurs with Reclamation's determination that the proposed project may affect, but is not likely to adversely affect, the threatened California Central Valley steelhead DPS, threatened Central Valley spring-run Chinook salmon ESU, endangered Sacramento River winter-run Chinook salmon ESU, designated critical habitat of the California Central Valley steelhead DPS, and designated critical habitat of the Central Valley spring-run Chinook salmon ESU.

Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final EIS (January 2016)

In compliance with the decision of the U.S. Ninth Circuit Court of Appeals, Reclamation completed *the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft EIS* (referred to herein as the LTO DEIS) and circulated it for public review and comment in July 2015. Upon receipt of public comments, a Final EIS was completed and the Record of Decision (ROD) signed by Reclamation in January 2016.

The LTO Final EIS evaluated long-term potential direct, indirect, and cumulative impacts on the environment that could result from operation of the CVP and SWP with implementation of RPAs provided in the 2008 USFWS BiOp and the 2009 NMFS BiOp. The EIS documents Reclamation's analysis of the effects of modifications to the coordinated long-term operation of the CVP and SWP that are likely to avoid jeopardy to listed species and destruction or adverse modification of designated critical habitat.

Appendix 5B of the LTO DEIS (Reclamation 2015) describes a sensitivity analysis on EDCWA's P.L. 101-514 water service contract. The sensitivity analysis includes system operations (CALSIM II) and temperature (HEC-5Q) model runs. The discussion of the sensitivity analysis concludes "addition of these demands did not show sensitivity to the rest of the CVP and SWP system."[2] The analysis found reservoir storage changes in Shasta, Trinity and Oroville that were "minor and not substantial to the system."[3] Folsom Reservoir storage levels showed a 3 percent difference when averaged by water year type and month, with monthly differences as high as 6 percent in August of Critical Dry years. Lower American River water temperatures were found to show improvement overall with the inclusion of these water contracts. Temperature threshold exceedances show 1 percent to 2 percent differences with the inclusion of the contracts.

These updated modeling results support the water temperature conclusions in the P.L. 101-514 Draft EIS/EIR, which states that "Modeling results confirm that the long-term average water temperatures …would remain virtually unchanged, relative to the Base Condition during all

[2] 2015 LTO DEIS, Appendix 5B, page 5B-1.

[3] 2015 LTO DEIS, Appendix 5B, page 5B-2.

months of the September through March adult immigration period. Therefore, changes in water temperature… would be a less than significant impact…"[4]

On August 2, 2016 Reclamation and the California Department of Water Resources submitted a letter to USFWS requesting the reinitiation of Section 7 consultation on the Coordinated Long-Term Operation of the CVP and SWP. According to the letter, the request is based on "new information related to multiple years of drought and recent data demonstrating low Delta smelt populations and new information available and expected to become available as a result of ongoing work through collaborative science processes."

Pursuant to the ESA, Reclamation submitted a final BA for the Reinitiation of Consultation on the Long term Operations (ROC on LTO) on January 31, 2019. The BA included the proposed action (15,000 AFA) in the modeling analysis. The U.S. Fish and Wildlife Service and National Marine Fisheries Service are currently evaluating the proposed action and working to issue two fully coordinated biological opinions by mid-June. Both timeframes are consistent with the October 2018 Presidential Memorandum on Promoting the Reliable Supply and Delivery of Water in the West. Reclamation is also developing an Environmental Impact Statement (EIS) for the ROC on LTO pursuant to the National Environmental Policy Act. The current high-level schedule is a public draft EIS available in June 2019, final EIS in November 2019, and Record of Decision in December 2019.

ES.2.4 P.L. 101-514 ROLE IN REGIONAL PLANNING EFFORTS

Since the early to mid-1990s, the new anticipated CVP water service contract authorized by P.L.101-514 has been acknowledged by Reclamation, resource agencies, local and regional water purveyors, and environmental interest groups. As noted previously, P.L.101-514, in its entirety, authorized three new CVP water service contracts. Reclamation has completed the necessary NEPA and Fish & Wildlife Coordination Act environmental documentation, supporting consultations required under the federal Endangered Species Act and National Historic Preservation Act, and fully executed two of those water service contracts with SCWA and SJWD and a subcontract with the City of Folsom through SCWA. All of these actions were completed in 1999.

The landmark Sacramento Area Water Forum Agreement and accompanying EIR, also completed in 1999, acknowledged the EDCWA contract in its future cumulative condition PROSIM hydrologic modeling. All of the purveyor-specific agreements developed within the Water Forum Agreement were based on a future condition hydrology that assumed, in part, diversions of 50,000 AFA (constrained by Reclamation's normal CVP allocation shortage policy) of new CVP water

[4] P.L. 101-514 Draft EIS/EIR, Chapter 5, page 5-75.

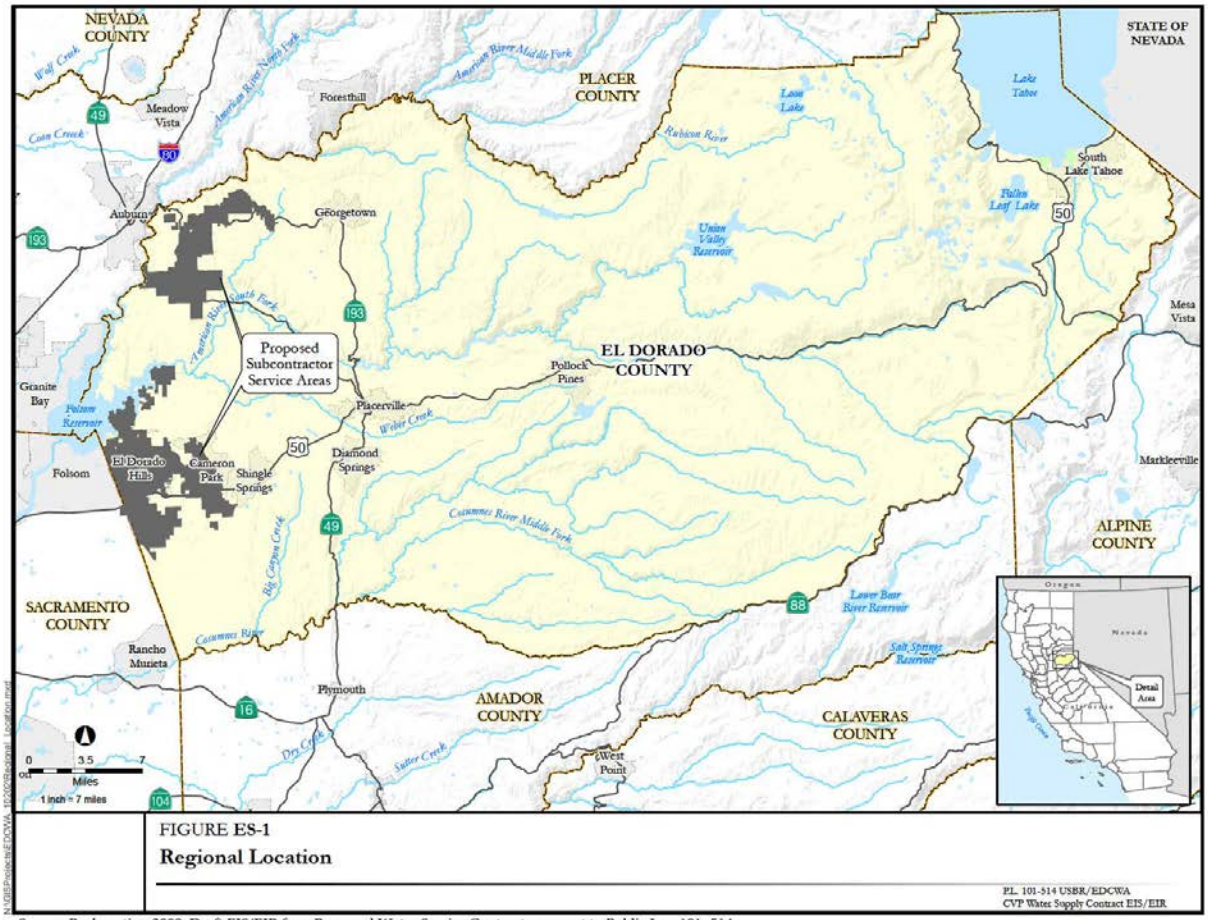
from the American River system under the P.L.101-514 legislation (i.e., 35,000 AFA to the SCWA, which included 13,000 AFA to the San Juan Suburban Water District and 15,000 AFA to EDCWA).

Since that time, various federal actions have included, and continue to include the new CVP water service contract for EDCWA in their hydrologic modeling and associated environmental documentation. These have included, but are not limited to, the Reclamation/PCWA American River Pump Station Project, Sacramento River Water Reliability Study, Freeport Regional Water Supply Project, Environmental Water Account, Yuba Accord, and long-term Warren Act contracts for the City of Roseville, Sacramento Suburban Water District (formerly, Northridge Water District) and El Dorado Irrigation District. As noted above, future diversions under P.L. 101-514 were also accounted for in the Final EIS and January 2016 ROD for Coordinated Long-Term Operation of the CVP and SWP, and the current modeling for the 2019 BA for the ROC on LTO.

In summary, not only is the new CVP water service contract for EDCWA assumed to be a part of the regional future cumulative hydrologic condition, it has also been included in each of the hydrological modeling simulations that have supported the environmental documents for these various federal actions/projects. The collaborative work of the Sacramento Area Water Forum in developing a new flow management standard for the lower American River known as the *Lower American River Flow Management Standard* (or LAR FMS), also includes or accounts for the new CVP water service contract for EDCWA as contained in the base hydrology from the Water Forum Agreement.

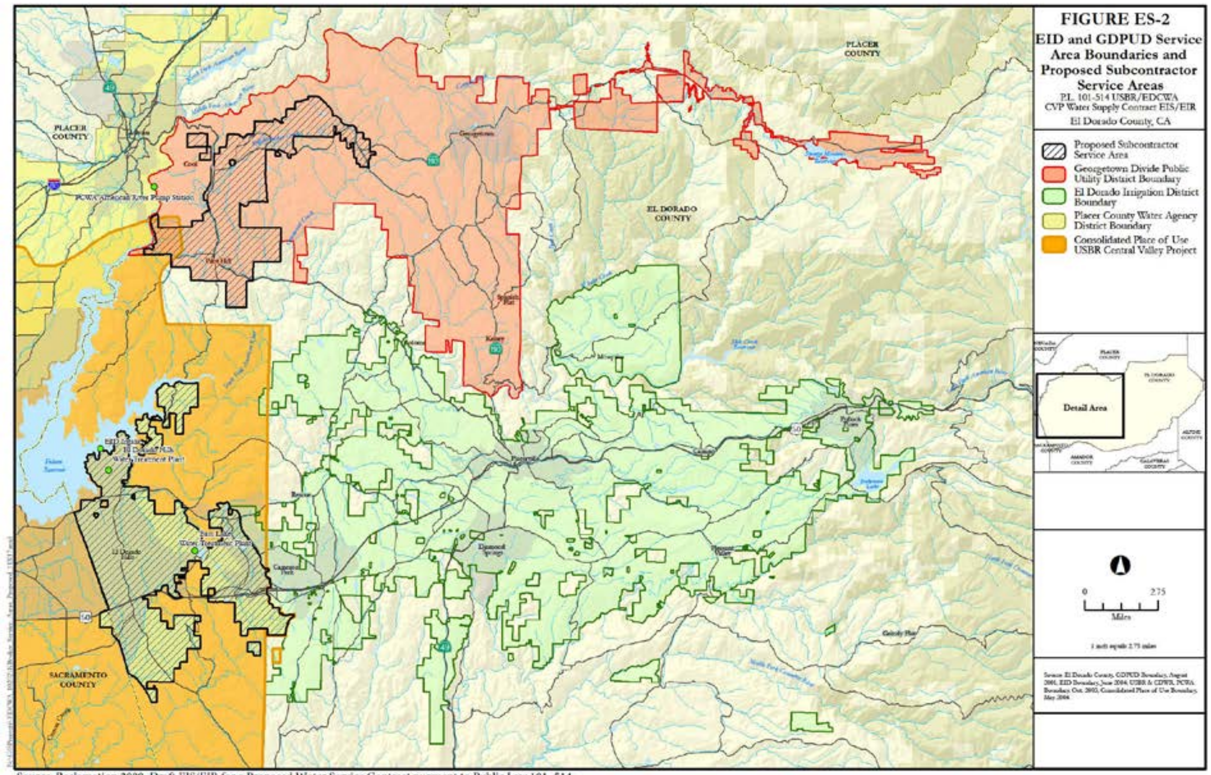
ES.3 PURPOSE AND NEED

The purpose of Section 206(b) of P.L. 101-514 is to help meet the long-term water needs of El Dorado County. As a recognized initial phase in a long-term contracting program for EDCWA, P.L. 101-514 was appropriate at the time it was passed in 1990 and, with the passage of time, has become increasingly more important to EDCWA. The purpose of the Proposed Action is to acquire a new water supply through the new CVP water service contract authorized by P.L.101-514 in order to meet planned growth within El Dorado County.



Source: Reclamation 2009. Draft EIS/EIR for a Proposed Water Service Contract pursuant to Public Law 101–514.

Figure ES-1 Regional Location



Source: Reclamation 2009. Draft EIS/EIR for a Proposed Water Service Contract pursuant to Public Law 101–514.

Figure ES-2 EID and GDPUD Service Area Boundaries and Proposed Subcontractor Service Area

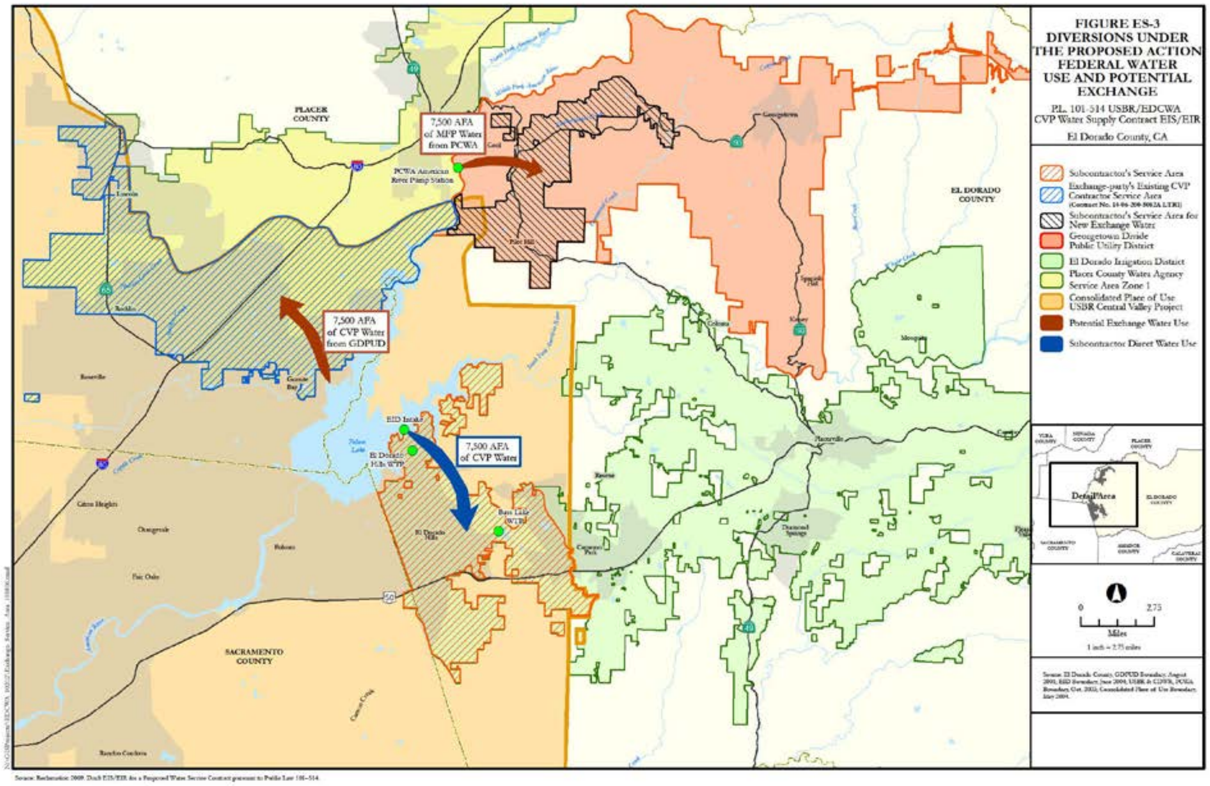


Figure ES--3 Diversions Under the Proposed Action Federal Water Use and Potential Exchange

For this Final EIS, the discussion concerning projected future water needs for EID and GDPUD presented in the 2009 DEIS/EIR was updated. As detailed in Section 2.4.3, this Final EIS presents updated demand calculations used in verifying the water needs of EID to 2050, the time horizon used by Reclamation in its most recent water needs assessment pertinent to EID. Total anticipated M&I needs are 49,257 AF, including 7,484 AF of projected distribution system losses. Total residential demand, at 33,805 AFA, makes up the majority of EID's anticipated future M&I demands (i.e., almost 70 percent). El Dorado County General Plan data supports the M&I WNA with a projected El Dorado County Western Slope need of approximately 57,000 AFA assuming no effect of climate change and 69,000 AFA considering projected effects of climate change at buildout (including associated system losses and unaccounted for beneficial uses). [5]

As detailed in Section 2.5.3 of this Final EIS, future water needs of GDPUD are based on land use projections presented in the approved El Dorado County General Plan. The future total water demand for the existing GDPUD service area at buildout is anticipated to be approximately 20,687 AFA. [6] This could result in a District-wide shortfall, or "need", of approximately 11,200 AFA without the P.L. 101-514 contract water. Of this anticipated future demand, agricultural demand is estimated to be 10,866 (53 percent) with M&I demand at 9,821 AFA (47 percent). This M&I demand exceeds the proposed contract amount. By 2030, M&I demand is preliminarily estimated to be 4,223 AFA, near the 10 percent margin required by Reclamation to provide the full contract allocation under Reclamation contracting provisions.

ES.4 PROPOSED ACTION AND ALTERNATIVES

As noted, nine alternatives were evaluated in the 2009 DEIS/EIR. These alternatives were determined using a comprehensive alternative identification and screening process conducted as part of Draft EIS/EIR preparation. As a joint NEPA/CEQA document, certain terminology and vernacular had to be reconciled for the Draft EIS/EIR. For the purposes of this Final EIS, the terminology and presentation of the "alternatives" focuses on NEPA requirements.

Through application of the Screening Criteria and completion of the alternative screening process described in Section 3.5.5, the following alternatives were carried forward for detailed analysis in this EIS (their numbering sequences are consistent with those presented in the 2009 Draft EIS/EIR and are retained throughout the remainder of this Final EIS):

- Alternative 1A – No Action Alternative[7]

5 EDCWA, November 2014. 2014 West Slope Update Water Resources Development and Management Plan, Table 5-7.

6 El Dorado County Water Agency – *Water Resources Development and Management Plan 2014 West Slope Update,* November 2014. Table 7-4.

7 NEPA defines the "no action" alternative as the most likely future condition that could be expected to occur in the absence of the project. (American Rivers v. Federal Energy Regulatory Commission, 187

- Alternative 2A (Preferred) – Proposed Action Water Diversion (7,500 AF each to EID and GDPUD)
- Alternative 2B – Proposed Action Water Diversion (15,000 AF to EID)
- Alternative 2C – Proposed Action Water Diversion (4,000 AF to EID and 11,000 AF to GDPUD)
- Alternative 3 – Water Transfer Alternative
- Alternative 4A – Reduced Diversion Alternative (12,500 AFA)
- Alternative 4B – Reduced Diversion Alternative (10,000 AFA)
- Alternative 4C – Reduced Diversion Alternative (7,500 AFA)

ES.4.1 Proposed Action (Alternative 2: Scenarios A-C))

The Proposed Action, **Water Diversion Alternatives,** for this Final EIS would implement those parts of Public Law 101-514 (P.L. 101-514), Section 206, pertaining specifically to EDCWA and the need for new water supply entitlements for El Dorado County. Under with execution of the proposed new water services contract, up to 15,000 acre-feet per annum (AFA) of CVP M&I water would be made available to EDCWA for diversion from Folsom Reservoir or from an exchange on the American River upstream from Folsom Reservoir. The contract would provide water that would serve existing and future M&I water needs in El Dorado County, establish and preserve entitlements to divert the water in accordance with State Water Board (SWB) and Reclamation requirements, and provide new water supplies that would justify future construction, operation, and maintenance of new facilities to convey and treat the diverted water. The Draft EIS/EIR identified and evaluated nine alternatives to the Proposed Action in keeping with CEQA and/or NEPA requirements for the consideration of project alternatives.

Under the Proposed Action, EDCWA would make up to 15,000 AFA of CVP water available to two of its member districts ("subcontractors") along the western slopes of El Dorado County, El Dorado Irrigation District (EID) and Georgetown Divide Public Utility District (GDPUD), for use within specified areas within their respective service areas. Figures ES-1 and ES-2 show the regional location of the Proposed Action and the EID and GDPUD service area boundaries, respectively. Figure ES-3 illustrates how diversions are proposed to be allocated between the two member districts.

P.L. 101-514 does not specify how much of the up to 15,000 AFA would be allocated to each of the two EDCWA member districts that will receive this new water. For purposes of this EIS several alternative diversion scenarios were developed to best address the range of potential hydrologic conditions and variances that would accrue with differing allocations. This alternatives analysis was undertaken to provide a more thorough environmental review and to address potential

F.3d 1186, 1199 (9th Cir. 1999) ("American Rivers"); see also 42 U.S.C. § 4332 (2)(c)(iii); 40 C.F.R. § 1502.14) demand differences between EID and GDPUD in light of the realities involving current and anticipated future growth in these areas. The diversion scenarios for the alternatives that are encompasses by the Proposed Action include:

- Alternative 2A (Preferred) – Proposed Action – (7,500 AF each to EID and GDPUD)
- Alternative 2B – Proposed Action – (15,000 AF to EID)
- Alternative 2C – Proposed Action – (4,000 AF to EID and 11,000 AF to GDPUD)

Each of the Proposed Action scenarios represent individual alternatives that offered variations of how the Proposed Action would or could be implemented with full consideration of the maximum coverage necessary for environmental review and disclosure purposes. The Preferred Alternative is Alternative 2A. As noted, these variations in allocation apportionment were necessary given the possibility that either EID or GDPUD could, depending on actual realized growth in the County, experience water needs in the future that could surpass the other. To maintain the maximum beneficial use of this new CVP M&I water allocation, wide flexibility in apportionment between the purveyors was considered not only prudent, but necessary.

All yearly requested quantities of this new CVP water would be made by EDCWA, on behalf of its member agencies; deliveries to EID and GDPUD may vary from year to year, based on anticipated need by each district. EDCWA would hold the master contract with Reclamation, with EID and GDPUD holding subcontracts with EDCWA. Reclamation would review and approve the subcontracts. Such an arrangement would allow EDCWA discretion to determine initial allocations between EID and GDPUD and to make modifications to the allocations over time as long as the apportioned quantities stayed within the environmental bounds set by the alternative diversion scenarios addressed in this document. These contracts would be long-term (40-year) CVP water service contracts, subject to all of the same provisions and periodic adjustments authorized under Reclamation Law as the other CVP water service contracts.

Diversions by EID would occur at their existing water supply intake on the south arm of Folsom Reservoir (currently being considered for expansion). No new facilities would be required by EID to divert this new water supply at Folsom Reservoir. Water would be conveyed (pumped) to its existing El Dorado Hills Water Treatment Plant (WTP) under current pumping capacity for treatment and subsequent distribution. In the future, it may also be possible and necessary for EID to pump this water further upslope to a new WTP at Bass Lake. Additional conveyance, pumping capacity, related appurtenances, and a new WTP would be required if EID were to extend service from this new contract further up into its service area.

The facility and infrastructure requirements for GDPUD are markedly different than for EID. Since GDPUD holds no direct point of access (or diversion) from Folsom Reservoir, it would be compelled to negotiate a separate exchange agreement with an upstream purveyor, which also holds current CVP diversion rights from Folsom Reservoir. Under this scenario, GDPUD would exchange its new CVP contract water with this purveyor for a water supply (likely a water right) more readily accessible to them at some upstream location.

The Placer County Water Agency (PCWA) and GDPUD have developed a Draft Memorandum of Understanding for cost sharing of the American River Pump Station construction, which could serve as the new point of diversion for GDPUD under an exchange. Under this scenario, GDPUD would take new water obtained from PCWA at the American River Pump Station on the North Fork American River in exchange for relinquishing a portion of its CVP allocation at Folsom Reservoir (where PCWA has historically diverted CVP water). It is presumed that the likely source of PCWA exchange water would be from its Middle Fork Project (MFP) water rights, which are available along the North Fork American River as it passes the American River Pump Station; the actual quantities negotiated in any such exchange would consider long-term water availability and any differences in institutional reliability (e.g., Reclamation Water Shortage Policy provisions).

For GDPUD to physically acquire the new exchanged water, it would first have to ratify both an exchange agreement as well as the cost-sharing agreement for the American River Pump Station with PCWA. Additionally, it would be necessary for GDPUD to install the necessary pumping equipment at the American River Pump Station and build conveyance facilities from the southern shoreline of the American River Pump Station location, out of the American River canyon, to its service area.

Under each of Alternatives 2A through 2C, the Proposed Action scenario alternatives, varying quantities would be allocated to EID and GDPUD, as discussed previously. The mechanisms of diversion, conveyance, treatment and end-user delivery would be identical under each of the alternatives, the only variation being the quantities assigned to EID and GDPUD. EDCWA would hold the master contract with Reclamation under each of these alternatives.

ES.4.2 No Action Alternative (Alternative 1A)

Under NEPA, the **No Action Alternative** must contemplate the resulting environmental impacts of not going forward with the proposed federal action. Where the choice of “no action” by a federal Lead Agency could result in predictable actions by others, this consequence of the “no action” alternative should be included in the analysis. "No action" in such cases would mean the proposed activity would not take place and the resulting environmental effects from taking no action would be compared with the effects of approving the Proposed Action. Under CEQA, the No-Project Alternative must also be analyzed (see CEQA Guidelines § 15126.6(e)). This requirement encourages a Lead Agency to compare the environmental effects of approving a proposed project with the effects of not approving it. Unlike the No-Action Alternative, the No-Project Alternative generally assumes that the land area or current environment would remain in its existing state. This is typically prefaced by the continuation of current plans, available infrastructure, and community services. While the No Project Alternative is considered in the

DEIS/EIR in keeping with CEQA requirements, it is not included in this FEIS for reasons presented above.

Under the No Action Alternative for this FEIS, the proposed CVP water service contract between Reclamation and EDCWA would not be executed. In the absence of a new CVP water supply for EDCWA, it is reasonable to expect that both EID and GDPUD would seek alternative supplies. In keeping with NEPA requirements, taking no action on the proposed contract would not restrict either purveyor from seeking alternative non-federal actions to meet their long-term needs. Accordingly, it would be possible and likely for both EID and GDPUD to still pursue and acquire a new water supply from a non-federal entity and without requiring a federal nexus. Hydrologically, a new water right transfer or assignment would be possible, similar to the assumed conditions that would occur under the Water Transfer Alternative. Again, the total quantities requested would be similar with Alternatives 2A through 2C, the various Proposed Action scenarios (i.e., up to 15,000 AFA); the only difference being that it would not be this new CVP water supply.

ES.4.3 Water Transfer Alternative (Alternative 3)

Under Alternative 3, the **Water Transfer Alternative**, both EID and GDPUD would seek an alternative water supply to the new CVP water contracts. It is assumed in this EIS that a water right transfer would be possible somewhere within the American River basin. Hydrologically, the quantities under any transfer would be the same as the Proposed Action (i.e., up to 15,000 AFA total), however, there may be long-term variances in delivery allocations depending on the specific nature of the water right transfer.

ES.4.4 Reduced Diversion Alternative (Alternative 4: Scenarios A-C)

Under Alternatives 4A through 4C, the **Reduced Diversion Alternatives**, the total amount of the water that could be diverted under the proposed water service contract would be reduced from "up to 15,000 AFA" to variations of decreasing quantity. In other words, diversions would be reduced by increasing increments of 2,500 AFA. For purposes of analysis in this EIS, it is assumed that water diverted under these alternatives would be allocated evenly to EID and GDPUD. All other conditions associated with diversion, delivery, and treatment would be identical with Alternatives 2A through 2C, the various Proposed Action scenarios.

ES.5 IMPACT ANALYSIS

Information and analysis presented in Chapter 4 (Affected Environment and Environmental Consequences) of this Final EIS provide a description of resource features of the regional and local study area that may be affected by implementation of the Proposed Action and Alternatives. The affected environment/environmental consequences descriptions are divided into two categories. The first category includes all resources that may be *directly* affected by future water diversions made under the Proposed Action or Alternatives. This category is referred to as: **Direct Impacts – Study Area**. The second category includes all resources that could be *indirectly* affected by future development and construction that could be served by water made available to EDCWA subcontractors (EID and GDPUD) by the Proposed Action or Alternatives. This category is referred to as: **Indirect Impacts – Subcontractor Service Areas**.

Resources included in the Direct Impact-Study Area evaluation include resources occurring in locations directly affected by potential changes in hydrology (e.g., instream flows, reservoir storage, water surface elevations, etc.) due to future diversions under the Proposed Action. The resources potentially affected directly, therefore, are referred to as diversion-related resources.

Resources included in the Indirect Impact – Subcontractor Service Areas category are resources occurring in locations in the EID and GDPUD service areas where the water made available under the Proposed Action could be used to serve future planned development. These resources are referred to herein as non-diversion related resources. Resource information provided for non-diversion-related resources is based on the best available information and is intended to describe historical, existing, and where appropriate, anticipated future conditions. This information was obtained through literature review, agency correspondence and consultations.

ES.5.1 Direct Impacts – Study Area

As a new CVP water service contracting action, the primary focus of the environmental and socioeconomic analyses for the Draft EIS/EIR and this Final EIS is directed towards potential changes in CVP/SWP coordinated hydrology. This included a detailed assessment of the reservoirs, rivers, Sacramento-San Joaquin River Delta, and associated operations and constraints that make up the CVP/SWP. No new facilities are proposed; therefore, none was contemplated or evaluated under this EIS. Any new facilities selected and ultimately required to implement the P.L.101-514 water contract would be subject to future and separate environmental review processes. At this time, no adequate or currently applicable information exists that would provide the framework for such an assessment.

For the Draft EIS/EIR, project-level direct impact determinations pertained only to the potential changes in CVP/SWP and system-related hydrology. This was accomplished using the highly precise Reclamation planning and operational mass balance, reservoir routing model, CALSIM II. Along with Reclamation’s other supporting environmental models (e.g., Reservoir Water Temperature Models, River Water Temperature Models, and Early Life-Stage Salmon Mortality Models) and their Long-Term Gen hydropower generation and capacity model, extensive modeling output was generated based on hindcast 72-year historic hydrology. The CALSIM II mass-balance hydrologic reservoir routing model was used to evaluate the CVP/SWP reservoirs and waterways.

To verify evaluations presented in the Draft EIS/EIR and to more fully understand the Proposed Action's effect on diversion-related resources, additional CALSIM II modeling was conducted by ECORP Consulting, Inc. (ECORP 2016). The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives. The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

In keeping with NEPA requirements, this Final EIS addresses the potential impact of the Proposed Action by comparing the effects of that action to the effects of the No Action Alternative. In relation to the evaluation of "diversion-related" direct impacts, however, that comparison is moot in most instances because annual diversion of up to 15,000 acre-feet from the American River and/or Folsom Reservoir would occur under both the No Action Alternative and the Proposed Action. Therefore, no distinction can be made between either alternative relative to potential impacts on various diversion-related resources.

ES.5.2 Indirect Impacts – Subcontractor Service Areas

Program-level analyses in this Final EIS were conducted for potential impacts on resources not directly affected by proposed diversions. The potential impact of future development within the Subcontractor Service Areas, for example, are addressed programmatically. This new development includes various facilities, activities, land uses within the Subcontractor Service Areas that could be provided water under P.L. 101-514 that are typically part of development activities within urban and rural areas. The impact of such activities was adequately analyzed in the adopted El Dorado County General Plan Update and EIR, upon which the Draft EIS/EIR and this Final EIS rely. A detailed analysis of those activities, land uses, and resources is not repeated in this Final EIS.

ES.5.3 Cumulative Impacts of the Proposed Action and Alternatives

Cumulative impacts are defined in CEQ Regulations (40 CFR 1508.7 and 1508.25) as follows:

> "Cumulative impact" is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Reclamation has completed several environmental documents that definitively illustrate, through CALSIM II modeling, the anticipated future cumulative impacts associated with operation of the integrated CVP/SWP. The *Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement* (LTO EIS) dated January 2016 is the best and most recent example currently available. The LTO EIS evaluates the potential cumulative effect of long-term operation of the CVP and SWP on each of the water-related resources addressed in this Final EIS, i.e., Water Supply, Hydropower, Fisheries and Aquatic Resources, Terrestrial Resources, and Recreational Resources.

The LTO EIS presents a comprehensive listing of past, present, and reasonably foreseeable future actions relevant to assessing the cumulative impact of diversion-related actions within the CVP/SWP system. In keeping with CEQ regulations and requirements, this Final EIS uses and relies upon the hydrologic modeling output and future cumulative impacts analysis contained in the LTO EIS. The LTO EIS in its entirety is herein incorporated by reference into this Final EIS.

For CVP/SWP system-wide hydrological effects, Reclamation, NMFS, USFWS, and other relevant public trust resource agencies have ratified the hydrological modeling framework with which to simulate system-wide potential impacts under a future cumulative condition. Future demand assumptions, along with anticipated CVP/SWP operations and projected regulatory controls, have been agreed to and incorporated into the modeling construct used to analyze potential effects of the long-term CVP and SWP operating criteria and procedures (OCAP). As described previously, that modeling construct is the CALSIM II model.

ES.5.4 2016 CALSIM II Model Verification Process – "Alternate Basis of Comparison"

To more fully understand the proposed action's contribution to cumulative impact conditions presented in the LTO EIS, additional modeling was conducted by ECORP Consulting, Inc. (ECORP 2016). This modeling effort is described in detail in Section 4.1.5 of this Final EIS.

In keeping with NEPA requirements, this Final EIS addresses the potential impact of the Proposed Action by comparing the effects of the Proposed Action to the effects of the No Action Alternative. In relation to the evaluation of "diversion-related" direct impacts, however, that comparison is moot in most instances because annual diversion of up to 15,000 acre-feet from the American River and/or Folsom Reservoir would occur under both the No Action Alternative and the Proposed Action. Therefore, no distinction can be made between these alternatives relative to potential impacts on various diversion-related resources.

While not required under by NEPA, CALSIM II modeling runs were conducted for the Proposed Action and Alternatives using an "Alternate Basis of Comparison." This evaluation is provided for informational purposes only and compares the potential direct effects of the Proposed Action and Alternatives (including the No Action Alternative) with conditions likely to occur during the 40-year term of the contract without the additional diversion of up to 15,000 AF/yr that would occur under the Proposed Action and No Action Alternative.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. The results of this modeling effort verified the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

ES.6 ENVIRONMENTAL ISSUES OVERVIEW

The potential resources and issues addressed in the Draft EIS/EIR and this Final EIS were identified through a series of public involvement engagements regarding the Proposed Action. A series of informal sessions with various stakeholder groups and agencies was conducted by EDCWA as part of the early project scoping process. The results of this earlier process are reported in the Preliminary Project Scoping Task Report: CVP Water Services Contract. As noted previously, a subsequent NOP/NOI process was initiated in 1998 and, again, most recently in the fall of 2006. All processes generated public comment and helped shape the scope of the Draft EIS/EIR and this Final EIS.

The specific affected environments for each resource area are described in the separate subsections of this chapter pertaining to those individual resources. The Affected Environment discussions describe those natural, social, cultural, and physical features upon which the alternatives for this action were evaluated. Resources that could be directly affected by the proposed water diversions are:

- Water Supply
- Hydropower Generation
- Flood Control
- Water Quality
- Fisheries
- Riparian Biological Resources
- Water-related Recreation
- Water-related Cultural Resources

Resources within the subcontractor service areas that could be affected indirectly by future development served by water made available by the Proposed Action or Alternatives include:

- Land Use
- Air Quality

- Noise
- Geology, Soils, Mineral Resources, and Paleontological Resources
- Recreation
- Visual Resources
- Cultural Resources
- Terrestrial and Wildlife Resources

As noted above, the primary environmental focus (at least in terms of project-level specificity) was on the hydrology of the CVP/SWP, including the Sacramento-San Joaquin River Delta and all associated system operations, constraints, and institutional agreements. Typical of contracting actions of this nature, environmental issues and concerns associated with water-related resources include, but are not limited to the following:

- Reduced reservoir end-of-month storages
- Reduced reservoir water surface elevations
- Reduced littoral habitat in reservoirs
- Reduced flow releases from dams
- Reduced instream flows
- Elevated instream water temperatures
- Reduced frequency in meeting certain regulatory standards
- Elevated early life stage salmon mortality
- Reduced Delta outflow
- Increased X2 position (the two parts per thousand, near bottom, isohaline line)

From an aquatic resource perspective, key issues addressed in this EIS include the potential for the alternatives to significantly affect aquatic species of primary management concern that inhabit reservoirs and rivers affected by the operation of the CVP and SWP. Of particular concern are those federally and state-listed endangered and/or threatened species of fish, which include:

Chinook salmon (*Oncorhynchus tshawytscha*);

- Sacramento River Winter-Run Chinook salmon (Ecologically Significant Unit) ESU (Endangered);
- Central Valley Spring-Run Chinook salmon ESU (Threatened);
- Central Valley Spring-Run Chinook salmon Designated Critical Habitat;
- Central Valley Fall and Late-Fall Run Chinook salmon Essential Fish Habitat; Central Valley steelhead (*Oncorhynchus mykiss*);
- Central Valley steelhead (Distinct Population Segment) DPS (Threatened);
- California Central Valley steelhead Designated Critical Habitat; Delta smelt, (*Hypomesus transpacificus*) (Threatened); and Green sturgeon *(Acipenser medirostris)* southern DPS

(Threatened).

Other fish species recognized as being of management concern included striped bass, splittail, and American shad. For these species and their habitat conditions, reservoir releases, downstream river flows, water temperatures, X2 position, and, in the case of Chinook salmon, early life stage mortality estimates were used by the generated modeling output to evaluate potential impacts.

Riparian habitats, primarily along the lower American and Sacramento rivers are host to a variety of sensitive wildlife species and were also evaluated in this EIS. These included modeled hydrological changes to river flows and their relationships to near-shore vegetative growth (e.g., cottonwoods) and important backwater ponds and marshes along the riparian corridor along with the potential for their recharge.

Both water supply and hydropower impacts represented potential economic effects, rather than environmental impacts. CALSIM II modeling provided the modeling output required to assess potential impacts on CVP/SWP contractor delivery allocations both north and south of the Delta covering both M&I and Agricultural (Ag) contractors, and also included area-specific allocations to the local purveyors who participated in the Water Forum Agreement. Long-Term Gen modeling output was used to evaluate potential impacts on CVP hydropower generation and capacity at load center, potential effects on Western Area Power Administration (WAPA) preference customers, and assess pumping power requirements for diverters from Folsom Reservoir. Potential flood control and water quality impacts were assessed using modeled data to determine the magnitude of hydrologic changes in reservoir releases and river flows. As a new diversion focused action, it was intuitive that its potential effects on flood control, especially as they may pertain to system-wide reservoir empty space requirements would be beneficial.

Water-related recreational and cultural impacts relied upon reservoir water surface elevation and river flow data to evaluate potential effects on water enhanced recreational activities and facilities, as well as the potential impacts on near-shore or submerged cultural resources within project area waterbodies.

The analysis of the indirect impact of the Proposed Action and Alternatives on non-diversion related resources primarily addresses the result of providing a new water supply within the service areas of the two water subcontractors: EID and GDPUD. Reclamation, EDCWA and both EID and GDPUD are not involved in land use planning; these entities hold no authority or control over any land use decision-making matters. This is rightfully the responsibility of El Dorado County (within the project area) through actions, projects, ordinances and policies approved by the El Dorado County Board of Supervisors. While a range of planning documents, master plans, specific plans, and resource planning documents are available and interactively used, the primary guidance document for in-County resources and community functions such as land use, housing, traffic, growth and utility services is the El Dorado County General Plan. Environmental impacts associated with the implementation of the General Plan were thoroughly addressed in the El Dorado County General Plan EIR prepared by the County in 2004 and subjected to subsequent analysis and consideration as a result of the El Dorado County General Plan litigation in 2005. Accordingly, this EIS does not attempt to re-evaluate those same impact analyses covered by the General Plan EIR, which was ultimately the subject of a litigation settlement and is now legally unassailable. This EIS also considers recent planning and environmental documentation prepared by El Dorado County addressing a targeted General Plan amendment and update to the County's zoning ordinance (El Dorado County 2014).

Notwithstanding the existence of the El Dorado County General Plan, its supporting EIR, as well as the many associated policies and plans, this EIS identifies and discusses the relevant portions of these documents and references special projects implemented by the County to protect, enhance, and, otherwise conserve the natural resources of the County. Where relevant, this EIS notes the significant impact determinations made in these other documents and acknowledges those conclusions.

Growth-inducing impacts were addressed through the General Plan assumptions and provisions for planned future growth within the County. The nexus between water supply availability, current and future demands, and planned or anticipated population growth and associated urban/rural development was identified and discussed. Generalized discussions of this nexus, within the context of the County's General Plan provisions, were evaluated; however, it was impracticable to attempt to assign a specific increment of effect between this water supply and the multi-faceted resource driven alternatives of the General Plan and the broad range of effects they presented.

An important distinction between the Draft EIS/EIR and this Final EIS in relation to growth inducement is that, as a CEQA/NEPA joint document, the Draft EIS/EIR addressed the effect of the Proposed Action relative to the "no project alternative," as required by CEQA. This Final EIS, as a NEPA-only document, compares the effect of the Proposed Action and Alternatives to the effect of the No Action Alternative on future growth to determine whether there exists a potential for significant impact. Because the level of growth anticipated under the No Action Alternative is comparable or greater than that expected under the Proposed Action and Alternatives, the impact due to growth inducement is considered likely to result in minimal effects.

Lastly, since completion of the Draft EIS/EIR in 2009, the body of knowledge related to climate change and research into the phenomenon has increased substantially. Nevertheless, the discussion of climate change in the Draft EIS/EIR is included in this Final EIS by reference to provide background and context for assessing how climate change could affect future impacts of the Proposed Action and Alternatives on diversion-related resources. This Final EIS does not attempt to update or supplement the Draft EIS/EIR to include all pertinent information, data and research that has become available since completion of the Draft EIS/EIR. Instead, this Final EIS relies on results of recent CALSIM II model runs to reflect the potential effects of the Proposed Action and Alternatives in light of expected future conditions likely to result from climate change. Future changes due to climate change included in the CALSIM II are based on the best available information to date as described in Appendix 5A, Section C: CalSim II and DSM2 Modeling Results in the LTO FEIS (Reclamation 2015).

ES.7 SUMMARY OF SPECIFIC POTENTIAL IMPACTS

This summary, provides an overview of the analysis contained in Chapters 4 and 5 of this Final EIS. For most impacts, there is little, if any, distinction between alternatives. This is due to several factors. First, the total project increment was 15,000 AFA; by CVP/SWP system operational standards this represented a small, almost indiscernible hydrological change. Second, the CALSIM II model, while extremely precise in its ability to quantify simulated changes in hydrology could not, in most instances, reflect notable changes in monthly system hydrology based on a 15,000 AFA diversion (even when the analysis forced the 15,000 AF into three months). Third, each of the Reduced Diversion Alternatives, all with increments less than 15,000 AFA revealed no changes (both between each other and, relative to the base condition). Fourth, the Water Transfer Alternative, by definition, assumed a diversion of equal quantity with Alternatives 2A through 2C (the Proposed Action scenarios) differing only in the possible entitlement type; therefore, hydrologically, its impacts under CALSIM II were no different than those of Alternatives 2A through 2C. And fifth, the same conditions applied for the No-Action Alternative which assumed again, that without a new CVP water contract, EDCWA would seek an alternative supply allocation. CALSIM II could not detect or differentiate any changes under this alternative with those of Alternatives 2A through 2C.

Contrary to larger Reclamation projects where, significant variation can occur between alternatives (not only in facility location, design, capacity, and function, but also in terms of the quantities of water under consideration), these conditions simply did not exist for this action and environmental review.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Public Law 101-514

In 1990, Congress passed Public Law 101-514 (P.L. 101-514),[8] which directed the U.S. Secretary of the Interior and U.S. Bureau of Reclamation (Reclamation) to enter into a long-term Central Valley Project (CVP) water service contract with the El Dorado County Water Agency (EDCWA). Under this contract, up to 15,000 acre-feet annually (AFA) of CVP water would be provided to EDCWA. The contract would provide water to serve municipal and industrial (M&I) water needs in El Dorado County and establish and preserve rights to divert the water in accordance with State Water Board (SWB) and Reclamation requirements. EDCWA would make this water available for use by two of its member districts in the western portion of El Dorado County, the El Dorado Irrigation District (EID) and the Georgetown Divide Public Utility District (GDPUD). Various options for diversion and delivery of this new water supply are fully described in Chapter 3.0 (Alternatives Including the Proposed Action and Project Description) of this Final Environmental Impact Statement (Final EIS).

Section 206 (b) of P.L. 101-514 authorizes a new CVP contract for EDCWA, Sacramento County Water Agency, and San Juan Suburban Water District. Section 206 (b)(1)(B) specifically addresses EDCWA's allocation under the law. Section 206(b)(1) in its entirety reads as follows:

> The Secretary of the Interior is authorized and directed to enter into the following contracts: (A) a municipal and industrial water supply contract with the Sacramento County Water Agency, not to exceed 22,000 acre-feet annually, to meet the immediate needs of Sacramento County and a municipal and industrial water supply contract with the San Juan Suburban Water District, not to exceed 13,000 acre-feet annually, for diversion from Folsom Lake, with annual quantities delivered under these contracts to be determined by the Secretary based upon the quantity of water actually needed within the Sacramento County Water Agency service area and San Juan Suburban Water District after considering reasonable efforts to: (i) promote full utilization of existing water entitlements within Sacramento County, (ii) implement water conservation and metering programs within the areas served by the contract, and (iii) implement programs to maximize to the extent feasible conjunctive use of surface water and groundwater; and <u>(B) a municipal and industrial water supply contract with the El Dorado</u>

8 P.L. 101-514 was a part of the Energy and Water Development Appropriations Act of 1991, H.R. 5019, Conference Report H101-235, filed October 15, 1990, passed October 20, 1990, and signed into law, November 4, 1990.

> County Water Agency, not to exceed 15,000 acre-feet annually, for diversion from Folsom Lake or for exchange upstream on the American River or its tributaries, considering reasonable efforts to implement water conservation programs within areas to be served by the contracts. The contracts required by this subsection are intended as the first phase of a contracting program to meet the long-term water supply needs of Sacramento and El Dorado Counties. The Secretary shall promptly initiate the necessary analysis for the long-term water supply contracts. The Secretary may include in these contracts terms and conditions to ensure that the contracts may be amended in any respect required to meet the Secretary's obligations under applicable State law and the Federal environmental laws. [Emphasis Added]

At the time that P.L.101-514 was passed, Congress acknowledged that El Dorado County would continue to grow and that new water supplies would be required well into the future. Since the law's passage, this assumption has borne out with increasing population growth and increased demand for new and reliable water supplies. The P.L. 101-514 contract for EDCWA is recognized "…as the first phase of a contracting program to meet the long-term water supply needs of …El Dorado [County]." EDCWA, along with its member units, have continued to pursue various water supply acquisition and demand reduction initiatives concurrently with this new CVP water service contract.

Since passage of P.L.101-514 in 1990, numerous events occurred that affected or have been a part of the contracting process. These events are discussed in the following sections.

1.1.2 Events Leading to Publication of the Draft EIS/EIR

P.L. 101-514 recognizes the need for EDCWA and Reclamation to prepare jointly environmental documentation to fulfill environmental review requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). To meet this requirement, a Draft Environmental Impact Statement/Environmental Impact Report (Draft EIS/EIR) was prepared and circulated for public review in December 2009. A Final EIR was completed and certified in 2011, thus fulfilling EDCWA's CEQA obligation for environmental review of the P.L. 101-514 contract. This Final EIS was prepared to help fulfill Reclamation's NEPA environmental review obligation.

A Notice of Preparation (NOP) for the joint Draft EIS/EIR was prepared in April 1993 and circulated for public review as required by CEQA. At that time, the Notice of Intent (NOI) was published in the Federal Register (Vol. 58, No. 90, May 12, 1993) in compliance with NEPA. After public circulation of the 1993 NOP and NOI, a series of informal scoping sessions with various stakeholder groups and agencies was conducted by EDCWA and its environmental consultant as part of the early project scoping process. The 1993 NOP and NOI, results of scoping sessions, and a report compiling the results of the 1993 NOP and NOI processes and scoping sessions were included in Appendix A in the 2009 Draft EIS/EIR.

Following completion of the project scoping process in early 1994, activity related to preparation of the 2009 Draft EIS/EIR slowed. This slowdown in preparation was due, in part, to the renewed focus on the acquisition of new water rights for EID under the proposed "El Dorado Project". The El Dorado Project, as it was referred to in prior environmental documentation, was EID's proposed acquisition of Federal Energy Regulatory Commission (FERC) Project No. 184 from Pacific Gas and Electric Company (PG&E), and the acquisition by EID of a water right permit for 17,000 AFA of water diverted through Project 184 facilities for consumptive use purposes. Additionally, at that time, the proponents of the P.L. 101-514 contract decided to wait to complete environmental review for EDCWA's action until the Sacramento County P.L. 101-514 EIS/EIR and contract were complete.[9] Several processes, including an analysis of potential indirect effects on species in the EID Service Area, were required by the U.S. Fish & Wildlife Service (USFWS) as part of the Section 7 consultation requirements under the federal Endangered Species Act (ESA); this was a new requirement, at that time, of the USFWS under Section 7 related to new water supply projects. With the uncertainty surrounding this new process, it took several years for the Sacramento County Water Agency (SCWA), San Juan Water District (SJWD), City of Folsom, and USFWS to develop an appropriate framework with which to undertake the service area analysis related to the new CVP water supply contract. Also during this period of time, Reclamation's long-standing planning and operations hydrologic model for the coordinated CVP/SWP, PROSIM, was being revised to later become known as PROSIM 2000 resulting in additional delays in the environmental review process.

The environmental review for the EDCWA P.L. 101-514 CVP Water Service Contract was reinitiated with circulation of a revised NOP and NOI published in July 1998 (1998 NOP/NOI), following the adoption of an updated General Plan for El Dorado County by the County Board of Supervisors in 1996. During the NOI/NOP public review period, two public scoping sessions were held in August 1998 to solicit public comment formally. Appendix B of the 2009 Draft EIS/EIR includes the 1998 NOP/NOI materials and responses.

Local planning processes that affected the course of 2009 Draft EIS/EIR preparation were detailed in the Draft EIS/EIR. These processes, primarily the El Dorado County General Plan Update in 1996 and the passage of "Measure Y" (a voter initiative to address county-wide transportation issues) in November 1998 were particularly important to the impact assessment carried out under CEQA that evaluated the project's indirect impact on resources within areas that would be served water made available by the proposed contract. The General Plan Update and Measure "Y" are discussed in detail in Section 1 of the 2009 Draft EIS/EIR.

While the environmental review of the proposed action experienced substantial delays due to factors discussed above, Reclamation's planning and operations hydrologic modeling tool was

9 The EIS/EIR for CVP water supply contracts under P.L. 101-514 for Sacramento County agencies was completed in April 1999, and the contracts with Sacramento County, San Juan Water District, and the City of Folsom were executed in early 1999.

being further revised with cooperative assistance from the California Department of Water Resources (DWR). PROSIM 2000 was revised and superseded by the CALSIM II model which now represents the industry standard for coordinated CVP/SWP operational planning. The CALSIM II model, along with the compatible Reclamation environmental models, was used to analyze potential environmental and socio-economic impacts in the 2009 Draft EIS/EIR.

Early in 2006, as Reclamation and EDCWA were set to reinitiate the environmental review process, one remaining technical issue was to ensure that the proposed CALSIM II hydrologic modeling was consistent with the CALSIM II simulations used in the CVP-Operational Criteria and Plan (OCAP) update in 2004. This confirmation of model consistency was received during the summer of 2006 with the proviso that no official endorsement of the model or its assumptions could be made by Reclamation, since ongoing CVP-OCAP litigation was pending at that time. The 2009 Draft EIS/EIR used key CALSIM II and related environmental modeling assumptions that supported the revised August and October 2008 Biological Assessments (BAs) prepared by Reclamation, pursuant to ESA Section 7, on the current CVP-OCAP. Certain assumptions, however, were incorporated relating to new project actions that were initiated since the completion of Reclamation's modeling that were different from those used in the final BA. Those assumptions and their implications are detailed in Subchapter 5.3.3, CALSIM II Simulations, of the 2009 Draft EIS/EIR.

In September 2006, with the El Dorado County planning documents and Reclamation operational tools updated, the environmental review process for P.L. 101-514 was reinitiated. A third NOI and NOP were deemed necessary due to the elapsed time from the last noticing in 1998. The NOI and NOP were prepared and re-circulated, with the comment period closing on October 16, 2006. Two Public Scoping Meetings were held in September 2006, one in Placerville and one in Greenwood (in the Georgetown Divide area). Public comment and response to the NOI and NOP were taken at the meetings, and by mail through October 16, 2006. Appendix C of the 2009 Draft EIS/EIR contains the NOP and NOI, comments on the NOP, and various public and agency notification documents.

1.1.3 Events Leading to Publication of the Final EIR

On August 17, 2009, Reclamation and EDCWA released the P.L. 101-514 Reclamation/EDCWA CVP Water Supply Contracts Draft EIS/EIR for public review and comment. The Draft EIS/EIR identified nine alternatives to implement those parts of P.L. 101-514, Section 206, pertaining specifically to EDCWA and the need for new water supply entitlements for El Dorado County. Reclamation and EDCWA held public meetings to receive oral and written comments on the Draft EIS/EIR on the following dates: September 16, 2009, City of Folsom Community Center, Folsom, Sacramento County, California; and September 15, 2009, El Dorado Hills Fire Department, El Dorado Hills, El Dorado County, California. No written or oral comments were made at those meetings.

The comment period on the Draft EIS/EIR closed on October 16, 2009, and was subsequently extended by Reclamation to December 31, 2009. Several federal, state, and local agencies, as well as non-profit organizations, submitted written comments.

The Final EIR was completed and certified and Findings of Fact adopted by the EDCWA Board of Directors on January 17, 2011. The Final EIR provided written responses to all comments received on the Draft EIS/EIR during the comment period. The Final EIR also contained text changes to the Draft EIS/EIR made in response to comments and for the purpose of minor editorial corrections. The Final EIR contained a summary of environmental impacts associated with the Proposed Project, a list of commenters, all comments received on the Draft EIS/EIR during the public comment period, and the responses to those comments. The Draft EIS/EIR and Technical Appendices from the Draft EIS/EIR were included as part of the Final EIR as was a Mitigation Monitoring and Reporting Plan.

The statute of limitations for legal challenges to the Final EIR as prescribed under CEQA expired in 2011 with no challenges being filed.

Although, as noted above, the draft environmental document for this project was a joint Draft EIS/EIR prepared pursuant to both CEQA and NEPA, the Final EIR was completed by EDCWA as a CEQA-only document. EDCWA proceeded with the Final EIR in advance of the NEPA Final EIS because EDCWA was in a position to satisfy its obligation for environmental review under CEQA before Reclamation was in a position to finalize its NEPA compliance. The Final EIR recognizes that Reclamation must prepare its own NEPA-only Final EIS before Reclamation can take action entering into such a contract with EDCWA. Reclamation chose not to proceed with a joint Final EIS/EIR with EDCWA due, in large part, to several pending federal actions that had bearing on P.L. 101-514. These actions are described in Section 1.1.4, Recent Federal Actions Relevant to P.L. 101-514.

1.1.4 Recent Federal Actions Relevant to P.L. 101-514

This subsection provides descriptions of federal actions that have occurred since publication of the 2009 Draft EIS/EIR that have a direct bearing on the Proposed Action and analysis and conclusions presented in the Draft EIS/EIR. As such, these federal actions were taken into consideration in the preparation of this Final EIS.

1.1.4.1 ESA Section 7 Consultation for Long-Term Operation of the CVP in Coordination with the State Water Project

Chapter 10 of the Draft EIS/EIR describes in detail the consultation and coordination activities undertaken as part of the environmental review process up to the time the Draft EIS/EIR was completed.

On June 30, 2004, the USFWS issued a Biological Opinion (BiOp) based on Reclamation's BA for "Long-Term Central Valley Project and State Water Project Operations Criteria and Plan" (hereinafter referred to as CVP/SWP OCAP). On February 16, 2005, the USFWS issued an amended BiOp that superseded their initial 2004 OCAP BiOp. The 2005 OCAP BiOp concluded that the coordinated operation of the SWP and CVP, including the proposed future actions, would not jeopardize the continued existence of the federally-listed threatened Delta smelt.

On October 22, 2004, the National Marine Fisheries Service (NMFS) Southwest Regional Office issued a BiOp to Reclamation and DWR on the effects of the proposed CVP/SWP OCAP that concluded with a no-jeopardy opinion for federally-listed endangered and threatened Chinook salmon and steelhead and a no-adverse modification opinion for designated critical habitat of those species. The NMFS 2004 BiOp was also based on Reclamation's 2004 BA. Both USFWS and NMFS BiOps were litigated and subsequently invalidated by the court.

Reclamation reinitiated consultation and completed a revised BA in August 2008 as a basis for re-consultation with the USFWS and NMFS on the CVP/SWP OCAP. The 2008 BA proposed to operate the CVP to deliver water under the proposed contract. The USFWS issued its BiOp for the threatened Delta smelt (*Hypomesus transpacificus*) in December 2008. NMFS issued its BiOp for endangered winter-run Chinook salmon (*Oncorhynchus tshawytscha)*, threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha)*, threatened Central Valley steelhead (*Oncorhynchus mykiss*), threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*), and Southern Resident killer whale (*Orcinus orca*) in June 2009.

The USFWS and NMFS BiOps determined that the continued operation of the CVP and SWP as described in the 2008 BA would likely jeopardize the continued existence of Delta smelt, some salmonids, and green sturgeon and adversely modify their critical habitats. In their respective BiOps, both USFWS and NMFS recommended Reasonable and Prudent Alternatives (RPAs) that, if implemented, would avoid jeopardy.

The USFWS 2008 BiOp and NMFS 2009 BiOp were subsequently litigated. Ultimately, the court upheld both BiOps on ESA grounds, but found that Reclamation violated NEPA by failing to prepare an EIS on operation of the CVP under the two BiOps.

A detailed account of the Section 7 consultation history and court rulings associated with the USFWS 2008 BiOp and NMFS 2009 BiOp is included in Section 1.2.3.2 of the *Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft EIS*.

1.1.4.2 USFWS Provisional BiOp for the P.L. 101-514 Proposed Action (June 2010)

Chapter 10 of the 2009 Draft EIS/EIR describes in detail the consultation and coordination activities undertaken as part of the environmental review process up to the time the Draft EIS/EIR was completed.

On June 9, 2010, Reclamation received a provisional BiOp from the USFWS for the P.L. 101-514 Contract. At issue for the BiOp were the potential effects of the proposed contract diversions on the endangered Pine Hill ceanothus (*Ceanothus roderickii)*, Pine Hill flannelbush (*Fremontodendron decumbens*), Stebbins morning glory (*Calystegia stebbinsii*), and El Dorado bedstraw (*Galium californicum* ssp. *sierrae*) and the threatened Layne's butterweed (*Packera layneae*), plants found on gabbro-derived soils, and threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California red-legged frog (*Rana draytonii*) and Delta smelt (*Hypomesus transpacificus*).

With respect to Delta smelt, the USFWS 2010 letter of concurrence for P.L 101-514 defers to the USFWS 2008 OCAP BiOp that evaluated the proposed 15,000 AFA diversion under P.L. 101-514. USFWS determined no further evaluation was needed.

With respect to the future construction of diversion facilities to serve GDPUD water users, the USFWS 2010 letter of concurrence requires that further consultation be conducted prior to approval of these facilities to determine potential jeopardy to Layne's butterweed and California red-legged frog.

For impacts within EID's consolidated place of use for CVP water, USFWS found no jeopardy of species resulting from diversions to EID that do not exceed 7,500 AFA. However, the BiOp states that, "the Service [USFWS] is concerned that the execution of any future contracts by Reclamation that provide for the delivery of additional water within EID's CVP POU [Place of Use] have the potential to enable this shift in water [referring to the use of water from Sly Park reservoir to serve uses in areas outside of the CVP POU] and may result in effects to listed species outside of the CVP CPOU [Consolidated Place of Use]." As a result, USFWS determined that water diversions to EID in excess of 7,500 AFA would require additional analysis and consultation with USFWS.

The USFWS 2010 letter of concurrence determined that proposed diversions to EID were not likely to affect California red-legged frog or valley elderberry longhorn beetle within EID's CVP CPOU.

With regard to Pine Hill ceanothus, Pine Hill flannelbush, Stebbins morning glory, El Dorado bedstraw and Layne's butterweed, the USFWS 2010 letter of concurrence states that previous BiOps in 2006 and 2009 analyzed the potential effects on these species and it is not necessary to reanalyze the effects of the proposed action. If, however, the conditions contained in the USFWS 2009 BiOp pertaining to modification of the CVP CPOU are not implemented, additional consultation would be needed to include conservation measures to offset the loss of gabbro plants and their habitat.

1.1.4.3 NMFS Letter of Concurrence (2014)

To complete its obligation under Section 7 of the ESA for the Proposed Action, Reclamation prepared a BA for NMFS based on updated modeling assumptions. Reclamation completed the

BA in December 2011 evaluating effects on federally listed species (anadromous fish species) or their designated critical habitat in the project area. The BA was prepared in accordance with legal requirements set forth under regulations defined in Section 7 of the ESA (50 CFR 402; 16 U.S.C. 1536 [c]) to assure that the proposed action does not jeopardize the continued existence of any Federally threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat. The BA also served to ensure appropriate integration and consistency with the ongoing re-consultation on the CVP/SWP OCAP.

The 2011 BA focused on those water bodies that serve as habitat, migration corridors, and water sources for federally listed fish species and their critical habitats. The primary water bodies addressed in the BA included Folsom Reservoir, the lower American River (LAR) from Nimbus Dam to the confluence with the Sacramento River, the Sacramento River (both upstream and downstream from its confluence with the American River), Shasta and Trinity reservoirs, and the Sacramento San Joaquin River Delta. More specifically, it was reasoned that effects of the proposed contracting action are most likely to influence anadromous species which may be present, at various times, within the LAR and Sacramento River. Six federally-protected fish species were identified as potentially occurring in the “Action Area.” Under the ESA, “Action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” (50 CFR § 402.02).

The six federally-listed species addressed in the BA are: Central Valley spring-run Chinook salmon, California Central Valley steelhead, Sacramento River winter-run Chinook salmon, Delta smelt, Southern DPS green sturgeon, and Southern Resident DPS killer whale. Critical habitat has been designated within the Action Area for Central Valley spring-run Chinook salmon and California Central Valley steelhead.

In addition, Essential Fish Habitat (EFH) within the area potentially affected by the project has been designated by NMFS for Central Valley fall-/late fall-run Chinook salmon pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

After reviewing the current status of the federally-listed species included in the BA and based upon the best available hydrologic modeling output, the current status of the species, the environmental baseline for the action area, the effects of the Proposed Action, and the acknowledged cumulative effects, Reclamation concluded that the proposed action, as defined, may affect, but is not likely to adversely affect, the species addressed in the BA, and is not likely to destroy or adversely modify designated critical habitat.

The BA determined that the Proposed Action would have no effect on Delta smelt, Southern DPS green sturgeon, or Southern Resident DPS killer whale.

The BA also determined that the Proposed Action may affect, but is not likely to adversely affect, the critical habitat for Central Valley spring-run Chinook salmon, Central Valley steelhead, and

Sacramento River winter-run Chinook salmon or EFH for Central Valley fall-/late fall-run Chinook salmon.

The BA found that no incidental take of any of the above species is expected to occur as a direct result of the Proposed Action, nor is the Proposed Action expected to jeopardize the continued existence of any federally listed species. The conclusions presented in the BA were reached, based on the hydrologic modeling (i.e., CALSIM II and related water temperature modeling) undertaken and the fundamental characteristics of the proposed action, as defined in the BA.

In response to Reclamation's Section 7 consultation request, NMFS provided to Reclamation a letter dated June 2, 2014 stating their concurrence with the effect determinations presented in the Reclamation's December 2011 BA. Specifically, the letter states:

> NMFS has received the information necessary to initiate consultation on federally listed anadromous fish species and their designated critical habitat within the action area. Based on our review of the material provided and the best scientific and commercial information currently available, NMFS concurs with Reclamation's determination that the proposed project may affect, but is not likely to adversely affect, the threatened California Central Valley steelhead DPS, threatened Central Valley spring-run Chinook salmon ESU, endangered Sacramento River winter-run Chinook salmon ESU, designated critical habitat of the California Central Valley steelhead DPS, and designated critical habitat of the Central Valley spring-run Chinook salmon ESU.

1.1.4.4 Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final EIS (January 2016)

In compliance with the decision of the U.S. Ninth Circuit Court of Appeals, Reclamation completed *the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Draft EIS* (referred to herein as the LTO DEIS) and circulated it for public review and comment in July 2015. Upon receipt of public comments, a Final EIS was completed and the Record of Decision (ROD) signed by Reclamation in January 2016.

The LTO Final EIS evaluated long-term potential direct, indirect, and cumulative impacts on the environment that could result from operation of the CVP and SWP with implementation of RPA's provided in the 2008 USFWS BiOp and the 2009 NMFS BiOp. The EIS documents Reclamation's analysis of the effects of modifications to the coordinated long-term operation of the CVP and SWP that are likely to avoid jeopardy to listed species and destruction or adverse modification of designated critical habitat.

Appendix 5B of the LTO DEIS (Reclamation 2015) describes a sensitivity analysis on EDCWA's P.L. 101-514 water service contract. The sensitivity analysis includes system operations (CALSIM II) and temperature (HEC-5Q) model runs. The discussion of the sensitivity analysis concludes "addition of these demands did not show sensitivity to the rest of the CVP and SWP system."[10] The analysis found reservoir storage changes in Shasta, Trinity and Oroville that were "minor and not substantial to the system."[11] Folsom Reservoir storage levels showed a 3 percent difference when averaged by water year type and month, with monthly differences as high as 6 percent in August of Critical Dry years. Lower American River water temperatures were found to show improvement overall with the inclusion of these water contracts. Temperature threshold exceedances show 1 percent to 2 percent differences with the inclusion of the contracts.

These updated modeling results support the water temperature conclusions in the P.L. 101-514 Draft EIS/EIR, which states that "Modeling results confirm that the long-term average water temperatures …would remain virtually unchanged, relative to the Base Condition during all months of the September through March adult immigration period. Therefore, changes in water temperature… would be a less than significant impact…"[12]

1.2 ACKNOWLEDGEMENT OF P.L. 101-514 IN REGIONAL PLANNING EFFORTS

Since the early to mid-1990s, the new anticipated CVP water service contract authorized by P.L.101-514 has been acknowledged by Reclamation, resource agencies, local and regional water purveyors, and environmental interest groups. As noted previously, P.L.101-514, in its entirety, authorized three new CVP water service contracts. Reclamation has completed the necessary NEPA and Fish & Wildlife Coordination Act environmental documentation, supporting consultations required under the federal Endangered Species Act and National Historic Preservation Act, and fully executed two of those water service contracts with SCWA and SJWD and a subcontract with the City of Folsom through the SCWA. All of these actions were completed in 1999.

The landmark Sacramento Area Water Forum Agreement and accompanying EIR, also completed in 1999, acknowledged the EDCWA contract in its future cumulative condition PROSIM hydrologic modeling. All of the purveyor-specific agreements developed within the Water Forum Agreement were based on a future condition hydrology that assumed, in part, diversions of 50,000 AFA (constrained by Reclamation's normal CVP allocation shortage policy) of new CVP water from the American River system under the P.L.101-514 legislation (i.e., 35,000 AFA to the SCWA, which included 13,000 AFA to the San Juan Suburban Water District and 15,000 AFA to EDCWA).

Since that time, various federal actions have included, and continue to include the new CVP water service contract for EDCWA in their hydrologic modeling and associated environmental documentation. These have included, but are not limited to, the Reclamation/PCWA American

10 2015 LTO DEIS, Appendix 5B, page 5B-1.

11 2015 LTO DEIS, Appendix 5B, page 5B-2.

12 P.L. 101-514 Draft EIS/EIR, Chapter 5, page 5-75.

River Pump Station Project, Sacramento River Water Reliability Study, Freeport Regional Water Supply Project, Environmental Water Account, Yuba Accord, and long-term Warren Act contracts for the City of Roseville, Sacramento Suburban Water District (formerly, Northridge Water District) and El Dorado Irrigation District. As noted above, future diversions under P.L. 101-514 were also accounted for in the Final EIS and January 2016 ROD for Coordinated Long-Term Operation of the CVP and SWP.

On August 2, 2016 Reclamation and the California Department of Water Resources submitted a letter to the USFWS requesting the reinitiation of Section 7 consultation on the Coordinated Long-Term Operation of the CVP and SWP. According to the letter, the request is based on "new information related to multiple years of drought and recent data demonstrating low Delta smelt populations and new information available and expected to become available as a result of ongoing work through collaborative science processes."

In summary, not only is the new CVP water service contract for EDCWA assumed to be a part of the regional future cumulative hydrologic condition, it has also been included in each of the hydrological modeling simulations that have supported the environmental documents for these various federal actions/projects. The collaborative work of the Sacramento Area Water Forum in developing a new flow management standard for the lower American River known as the *Lower American River Flow Management Standard* (or LAR FMS), also includes or accounts for the new CVP water service contract for EDCWA as contained in the base hydrology from the Water Forum Agreement.

1.3 FOCUS OF THE FINAL EIS

On August 17, 2009, Reclamation and EDCWA released the P.L. 101-514 Reclamation/EDCWA CVP Water Supply Contracts Draft EIS/EIR for public review and comment. The Draft EIS/EIR identified nine alternatives to implement those parts of P.L. 101-514, Section 206, pertaining specifically to EDCWA and the need for new water supply entitlements for El Dorado County. Reclamation and EDCWA held public meetings to receive oral and written comments on the Draft EIS/EIR on the following dates: September 16, 2009, City of Folsom Community Center, Folsom, Sacramento County, California; and September 15, 2009, El Dorado Hills Fire Department, El Dorado Hills, El Dorado County, California. No written or oral comments were made at those meetings.

The comment period on the Draft EIS/EIR closed on October 16, 2009, and was subsequently extended by Reclamation to December 31, 2009. Several federal, state, and local agencies, as well as non-profit organizations, submitted written comments. All comment letters received within the extended public comment period and written records or oral comment received in the public forums listed above are presented in Appendix A of this Final EIS.

The focus of this Final EIS is to present responses to public comments on the Draft EIS/EIR. These responses to comments are contained in Appendix A. This Final EIS also reiterates or summarizes pertinent information and analysis presented in the Draft EIS/EIR. Where appropriate, new information and analysis is presented in the Final EIS to update, supplement and/or validate the information and analysis presented in the Draft EIS/EIR in keeping with NEPA requirements.

It is important to note that the impact analysis presented in the Draft EIS/EIR was necessarily conducted to meet both NEPA and CEQA requirements for such assessments. As is discussed in greater detail in Chapter 4 (Affected Environment and Environmental Consequences) of this Final EIS, the impact assessments presented herein are focused on determinations made in the Draft EIS/EIR that were in keeping with federal requirements, not state requirements. This distinction primarily relates to determining impact based on a comparison of project effects to effects anticipated to occur under the “No Action Alternative” as required by NEPA as opposed to determining impact by comparing project effects to current environmental conditions as they exist at the time of commencement of the environmental review.

1.4 CONTENT AND ORGANIZATION OF THE FINAL EIS

This Final EIS is organized by chapter. Appendices are included to provide the reader with access to analysis, documentation, and correspondences in support of the Final EIS. The contents of this Final EIS are organized as follows:

- **Executive Summary**: This section provides an overview of the content, analysis and conclusions presented in the Final EIS.
- **Table of Contents, List of Figures and Tables, Index, List of Abbreviations**
- **Chapter 1: Introduction**, contains discussions of project background, key events leading to publication of the Final EIS, P.L. 101-514’s place in regional planning efforts, focus of the Final EIS, and contents and organization of the Final EIS.
- **Chapter 2: Purpose and Need**, addresses the need for the Proposed Action and the methods used to determine that need.
- **Chapter 3: Description of the Proposed Action and Alternatives**, defines the Proposed Action, No Action Alternative, and alternatives to Proposed Action selected for evaluation. The process for screening alternatives for further review is also described.
- **Chapter 4: Affected Environment and Environmental Consequences**, describes resources directly and indirectly affected by the Proposed Action and Alternatives. Chapter 3 presents the analysis of potential effects of the Proposed Action and Alternatives on those resources. The impacts assessment is separated into two categories; Direct Diversion-related Impacts and Indirect Service Area Impacts. Each resource category is prefaced by an Introduction to Analysis subchapter, which describes the methodology, key assumptions, and approach used in the preceding resource impact discussions.

- **Chapter 5: Cumulative Impact**, describes the framework, assumptions and approach for evaluating the cumulative impact of the Proposed Action and Alternatives, and presents the results of that evaluation.
- **Chapter 6: NEPA-Required Reviews**, contains several reviews required for an EIS under NEPA and relevant to the Proposed Action. These include: Significant Irreversible and Irretrievable Resources; Growth Inducement; Climate Change; Environmental Justice; and Indian Trust Assets.
- **Chapter 7: Consultation/Coordination and Applicable Laws**, describes the consultation and coordination activities undertaken as part of the preparation of the 2009 Draft EIS/EIR, the 2011 Final Environmental Impact Report (FEIR) and this Final EIS. The chapter also lists federal laws, executive orders, state laws, and notice requirements pertinent to the environmental review process and execution of the proposed contract.
- **Technical Appendices**, contain archival data, modeling results, notices, and other forms of project documentation that are included in separate volumes. Appendices include:
  - Appendix A: Draft EIS/EIR Comment Letters and Responses to Comments.
  - Appendix B: ECORP 2016 CALSIM II Modeling Technical Memorandum
  - Appendix C: 2009 Draft EIS/EIR

2 PURPOSE AND NEED

2.1 INTRODUCTION

P.L. 101-514 was enacted in 1990 to help meet the long-term water needs of El Dorado County. As a recognized initial phase, in a long-term contracting program for El Dorado County Water Agency (EDCWA), the action was appropriate at the time and, with the passage of time, has become increasingly more important to EDCWA. The purpose of the Proposed Action, therefore, is to acquire a new CVP water service contract authorized by P.L.101-514 and fulfill the Congressional mandate stated and confirmed by this law. The need for the Proposed Action is to meet the water demands of planned and approved future growth within El Dorado County.

EDCWA, as illustrated in its 2014 *Water Resources Development and Management Plan 2014 West Slope Update*, identified this current contract as one of many additional water acquisition (or contracting) actions that the agency must pursue to meet the El Dorado County General Plan (El Dorado County Planning Department, 2004) growth projections of the county. Additional water supplies beyond this contract include ditch piping to reduce loss, the partial assignments of existing State filed applications (i.e., El Dorado Water Reliably Project, formally known as the Supplemental Water Rights Project), and a new Alder Reservoir Project. Alder Creek Reservoir would be a new dam and reservoir located on Alder Creek in El Dorado County and has been presented to the California Water Commission as a project potentially requesting Prop 1 funding. Alder Reservoir is also included in Reclamation's Sacramento-San Joaquin River Basin Study as a potential climate change adaptation measure.

At the time that P.L. 101-514 became law, total diversions on the western slopes of El Dorado County were approximately 43,000 acre-feet annually (AFA) with normal-year supplies around 60,000 AFA. Significant growth during the intervening years, however, has increased water demands throughout the western slopes. This demand increase and the narrowing gap between supply and demand are compounded by the ever present urgency for drought contingency planning. During the drought of the late 1980s and early 1990s for example, it became clear that County-wide drought contingency planning in addition to supplemental supplies were needed. While significant drought contingency planning has been undertaken and water conservations efforts continue, supplemental water supplies are still needed to ensure a sufficient water supply to the county in the event of multiple-dry years and over the long-term. The need for supplemental water supplies exists today and, as El Dorado County moves into the future, both an increased demand and the uncertainty of dry-year reliability (especially under multiple dry-year scenarios) will provide a continuing challenge for its water resources management strategies.

Since the mid-1990s, like many other parts of the State, growth has continued within El Dorado County. Numerous indicators confirm this trend. Between 1996 and 2005 for example, the total number of active accounts for El Dorado Irrigation District (EID) increased by almost 35 percent (from 27,254 accounts in 1996 to 36,705 accounts in 2005).[13] Single-family residential water users in the EID service area, making up the largest use category for water consumption, increased their water consumption by approximately 50 percent (10,550 acre-feet [AF] to 15,875 AF) between 1996 and 2005.[14] Multiple-family residential water users also increased consumption over this same period, but not to the same extent and single-family residential users. Commercial/industrial users increased their water consumption by approximately 33 percent (2,099 AF to 2,796 AF).

Growth over the past 20 years in El Dorado County has been episodic. The period from 1996 to 2000, for example, showed an 11.9 percent increase in the total number of EID's active accounts (from 27,254 to 30,512). The ensuing five-year period from 2001 through 2005 showed an increase of 15.3 percent in the total number of EID's active accounts. The period from 2006 through 2010 showed over 20 percent increase in total number of active accounts. The period from 2011 through 2015 showed a much slower increase of about 2 percent due to the general slowdown in land development during this time. The total increase over the period of 1995 through 2015 was about 68 percent in the total number of active accounts. This equates to an average annual increase of about 3.4 percent. Much of the more recent increases can be attributed to the increase in single-family dual potable accounts, where these dwellings receive potable water from EID for indoor use, but recycled water for outside irrigation.

The need for the Proposed Action is supported by the continuing growth requirements within the western slopes of El Dorado County, as facilitated by the water deliveries made by EID and Georgetown Divide Public Utility District (GDPUD), and as supported by the 2004 County General Plan and subsequent amendments including the most recent update on September 25, 2018 (Resolution Nos. 199-2018 & 201-2018) and P.L. 101-514 was passed in 1990 in recognition of El Dorado County's need for supplemental water (EID 2004).

2.2 WATER FOR NEW DEVELOPMENT

The traditional understanding of water suppliers under California law is that there is a "duty to serve" new development. As reflected in case law, this obligation has been understood to require water suppliers to find and develop any new water supplies needed to meet projected growth levels in their service areas. (See *Swanson v. Marin Municipal Water Dist.* (1976) 56 Cal.App.3d 512, 524 (water district has a "continuing obligation to exert every reasonable effort to augment its available water supply in order to meet increasing demand"); *Glenbrook Development Co. v.*

13 El Dorado County Water Agency, Water Resources Development and Management Plan, Chapter 2, Historic Water Use, Table 2-2, April, 2007.

14 El Dorado County Water Agency, Water Resources Development and Management Plan, Chapter 2, Historic Water Use, Table 2-3, April, 2007.

City of Brea (1967) 253 Cal.App.2d 267, 277 ("county water district has a mandatory duty of furnishing water to inhabitants within the district's boundaries"); see also *Lukrawka v. Spring Valley Water Co.* (1915) 169 Cal.318, 322; *Building Industry Assn. of Northern California v. Marin Municipal Water Dist.* (1991) 235 Cal.App.3d 1641, 1648-1649; Slater, California Water Law and Policy (Michie Publications 1996), vol. 2, p. 14-11 (refers to water districts' "duty to serve").)

Consistent with this traditional obligation, a "distributor of a public water supply" can refuse to supply water to new development only if the distributor "finds and determines that the ordinary demands and requirements of water customers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection." (Cal. Water Code, § 350.)

The Urban Water Management Planning Act (Cal. Water Code, § 10610 et seq.), as amended most recently in 2014, was passed in response to the California Legislature's concern that California's water supply agencies might not be engaged in adequate long-term planning. That Act requires "urban water suppliers" to maintain an "urban water management plan" that must identify existing water supply and demand, and must identify any new water sources required to satisfy demand as projected at least 20 years into the future. The projected 20-year supply must account for "average, single-dry, and multiple-dry water years."

In predicting 20-year water demands, urban water agencies must rely on "data from the State, regional, or local service agency population projections[.]" Thus, for example, to the extent that El Dorado County and its incorporated cities (i.e., South Lake Tahoe and Placerville) anticipate large population increases in their adopted general plans, EDCWA is required to identify water sources necessary to serve such planned development, and is not in a position to refuse to comply with that legal obligation as a means of reducing the "growth-inducing" effects of obtaining new water supplies.

Under California Water Code sections 10910 and 10912 an urban water supplier must consult with the county and cities within the supplier's service area when those entities propose development projects of a certain magnitude (e.g., residential projects with more than 500 dwelling units or a retail or business establishment employing more than 1,000 persons or having more than 250,000 square feet). The water supplier must respond to these requests either by identifying the water sources available to serve such development or by identifying the plans it would follow to obtain new water supplies for such developments. In the latter instance, such plans may include information concerning: (1) the estimated total costs, and the proposed method of financing the costs, associated with acquiring additional water supplies; (2) all federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional supplies; and (3) the estimated time frames within which EDCWA expects to be able to acquire additional water supplies. (Cal. Water Code, § 10911, subd. (a)).

Urban water suppliers are also subject to 2001 State legislation commonly known as the "Kuehl Bill" (SB 221), after its author State Senator Sheila Kuehl. (See Cal. Gov. Code, § 66473.7.) That bill requires any city or county considering the approval of a proposed subdivision map for more than 500 units to consult with the relevant water supply agency to determine whether adequate water is available for the proposed subdivision, as well as for "existing and planned future uses" (including agriculture) over the next 20 years, under "normal, single-dry, and multiple-dry year" scenarios. This legal scheme, like the Urban Water Management Planning Act, requires urban water suppliers to constantly take the steps that will be necessary to accommodate the growth planned for the next 20 years by the county and cities within the supplier's service area.

2.3 WATER NEEDS ASSESSMENT METHODOLOGY

EDCWA has identified EID and GDPUD as the recipients of the water that would be made available under the proposed new Central Valley Project (CVP) contract. This section describes the specific water needs of both EID and GDPUD, as determined using Reclamation's methodology for Water Needs Assessments (WNAs) as presented in the 2009 DEIS/EIR.

WNAs were developed for CVP water contractors eligible to participate in the CVP long-term contract renewals process. Not all CVP contractors, however, are subject to WNAs.[15] According to Reclamation, the WNAs are intended to:

1. Confirm past beneficial use of CVP water;
2. Provide water demand and supply information under current and future conditions for the environmental documents; and
3. Provide an estimate of contractor-specific needs for CVP water by the year 2050, to serve as a starting point for discussions regarding contract quantities in the negotiations process.[16]

In order to establish the current demand of purveyors, Reclamation uses recent historical demands, rather than the full contract amount, and requires purveyors' historical water use to demonstrate beneficial use of the CVP supply.

After a baseline demand is established, the WNA projects future demand through 2050. In some cases, 2040 municipal and industrial (M&I) demand has been used for re-contracting entities that have not yet reached buildout. Both agricultural demands and M&I demands are accounted for in the WNA. The M&I methodology estimates residential demand on a standard gallons-per-capita per-day (GPCD) basis, and includes additional calculations of commercial and industrial demands and system losses (such as unaccounted-for water). Agricultural demands are based

15 Small purveyors who provides agriculture water to areas of 2,000 irrigable acres or less, and/or provide urban water now, or in the future in the amount of 2,000 acre-feet annually (AFA) or less are exempt from the Water Needs Assessments.

16 Reclamation Grey literature, Central Valley Project (CVP) Water Needs Assessments Purpose and Methodology.

on standard crop water and evapotranspiration coefficients, irrigation efficiency, and the projected number of acres expected to be cultivated.

Improvements in water use efficiency are built into the federal WNA method in a number of ways. First, purveyors are required by Section 210(b) of the Reclamation Reform Act to have a Reclamation-approved Water Conservation Plan as a prerequisite before being issued a long-term contract for federal water. Reclamation requires an implementation plan for elements of the Utility Operations and Educational Programs specified by the California Urban Water Conservation Council (CUWCC) to be included in the Water Conservation Plans. Third, future agricultural demands are calculated using an irrigation efficiency of 75 percent, which is currently considered to be representative of most areas in California, unless more specific information is available. Fourth, the GPCD used domestically is assumed to decrease from 75 GPCD in the baseline calculation, to 55 GPCD in the future scenario. This approximate 20-gallon reduction in GPCD is assumed to occur through the measures proposed in the Water Conservation Plans, such as water audits, tiered pricing, fixture replacement, and customer education programs.

The WNA also includes documentation of purveyors' existing water supplies, including but not limited to: State Water Project (SWP) contracts, other surface water (such as water acquired through riparian rights), groundwater supplies, water from transfers, and recycled water. Average historical deliveries over the past three years are used to evaluate a purveyor's realistic deliveries and potential supply at the time of the WNA. Reclamation takes into consideration situations where the historical supply may have been reduced due to shortage provisions.

Reclamation then determines the water "need" by subtracting a purveyor's total existing supply from the projected future demand; a purveyor's water need is the difference between the two. If the negative amount is within 10 percent for contracts in excess of 15,000 acre-feet, or within 25 percent for contracts equal to, or less 15,000 acre-feet, then the test of full future needs of CVP supplies under contract is deemed to be met. It should be noted that Reclamation's WNA methodology represents a snapshot in time and but one of several possible water needs evaluations; numerous evaluation techniques, methodologies, and assumptions are available. In fact, EDCWA's 2014 West Slope Update Water Resources Development and Management Plan used a variety of methodologies to determine water demand and needs based on the County General Plan and its own procedures and metrics as well as those of EID and GDPUD.

So, while other evaluations may differ based on varied methodologies and, as a result, show differing numbers over time, based on a different set of assumptions, the WNA determination is the process used by Reclamation to verify federal water contracting allocations. To support the new CVP water service contracting action contemplated here, the water needs methodologies relied upon must conform to Reclamation's contracting process requirements. Accordingly, the WNA represents the process relied upon for this joint environmental document.

This method was used in 2004 to determine EID's water needs during EID's long-term CVP contract renewal process, and in 2006 for GDPUD as a first step in Reclamation's establishment of a Basis of Negotiations for the proposed new CVP M&I water service contract under this action. The water needs analysis for GDPUD was extended to the year 2050 to cover the 40-year term of the proposed contract since its needs for the 7,500 AFA does not occur entirely within the 2025 timeframe. It should be noted that the preliminary assessment performed for GDPUD did not include an independent analysis by Reclamation of the GDPUD's current and future agricultural water use.

For the purposes of the proposed new contract, because the contract water cannot be used for agricultural purposes, the M&I need of each purveyor must be sufficient to support its claim to the P.L.101-514 contract allocation. As detailed below, both EID and GDPUD show sufficient M&I need to, collectively, justify this full contract. Although GDPUD existing and future agricultural acreage assumptions are based on the El Dorado County General Plan, analysis using Reclamation's WNA process must still be performed prior to contract execution. As discussed in the Alternatives Including the Proposed Action and Project Description (Chapter 3.0), the P.L.101-514 contract is tentatively proposed to be equally shared between EID and GDPUD in the amount of 7,500 AFA for each purveyor.

In addition to that used in the 2004 and 2006 WNAs, additional demand is projected as a result of a recent County General Plan Amendment that increases the floor area ratio for commercial/industrial and research and development land use designations. The Final Environmental Impact Report for General Plan Amendment A06-0002 (December 2006) indicates that an additional 13,869 AF of water demand at buildout, occurring primarily within EID's service area, will result from the amendment.

2.4 EL DORADO IRRIGATION DISTRICT WATER NEEDS

Reclamation completed a federal WNA for EID as a part of the CVP long-term contract renewal process in 2004 for EID's existing CVP water contract. The assessment included justification both for the renewal of EID's existing long-term CVP contract, and for the proposed contract amount of 7,500 AFA under P.L. 101-514 Section 206(b)(1)(B), which was anticipated to be a part of EID's available supply in 2025.[17] The following is an excerpt from the letter documenting the final revision of EID's WNA:

> The revised water needs assessment documents that the District has used its CVP water beneficially in the past and confirms the District's future need of its current maximum contractual CVP supply, and 7,500 acre feet of the 15,000 acre feet identified in Section 206(b)(1)(B) of Public Law 101-514.

17 Pers. Comm. From Donna E. Tegelman (Reclamation) to Ane Deister (EID), July 27, 2004.

For the 2004 WNA, Reclamation considered EID's likely future water supply in 2025, which is anticipated to be 75,984 AFA. Table 2.4-1 provides detail of EID's existing and anticipated future water entitlements envisioned in 2004, including their source, total unadjusted quantities, and any potential shortages that may be imposed. EID has in excess of 75,000 AFA of water entitlements with the proposed P.L. 101-514 CVP contract included. With imposed shortages, this total would be reduced to a little over 67,000 AFA. The primary local water entitlements include Sly Park (Jenkinson Lake) (23,000 AFA), the pre-1914 rights of the South Fork American River Project (SFAR) (15,080 AFA), and the recently confirmed Project 184 (17,000 AFA). With the P.L.101-514 contract combined with its existing CVP supply, EID will have a total of 15,050 AFA in federal contract water (subject to dry-year cutbacks leaving a total of 11,288 AF available in those years, were Reclamation to impose the maximum shortage to M&I contractors).

On or about April of each year, EID prepares an annual update to the Water Resources and Service Reliability Report originally published in 1991. Recent available data indicate that the total water diversion was 37,655 AF in 2005, 43,358 AF in 2004, and 37,138 AF in 2003. The total diversion amount includes water used for various beneficial uses and unaccounted-for water. Beneficial uses are defined as water used for operational flushing, sewage lift station and collection system flushing, private fire services, construction meters, and aesthetic maintenance.[18]

Unaccounted-for water is defined as water that is taken into the system from all of EID's main sources, but which is not delivered to the consumers, put to beneficial use, or otherwise accounted for. EID has reduced its unaccounted-for water percentage dramatically over the past ten years, in recent years surpassing the California State goal of 15 percent or less for rural water districts such as EID (see Table 2.4-2).

TABLE 2.4-1. EL DORADO IRRIGATION DISTRICT TOTAL WATER ENTITLEMENTS – SOURCE AND QUANTITIES

Water Source	Future Water Entitlements[1] (AFA)	Notes/Shortage Provisions[2]
Existing CVP water service contract	7,550	Supply after cutbacks under current CVP M&I shortage policy: 5,663 AFA
Proposed P.L. 101-514 CVP water service contract	7,500	Supply after cutbacks under current CVP M&I shortage policy: 5,625 AFA
Sly Park (Jenkinson Lake)	23,000	Facility acquired from Reclamation in 2003. Critical dry year deficiency of 5,000 AF results in 18,000 AFA
Project 184	17,000	Associated with hydropower operation of Project 184, acquired from PG&E in 1999; not

18 Beneficial uses as defined here should not be confused with the "beneficial uses" of water bodies as defined in the Regional Water Quality Control Board Basin Plan.

Water Source	Future Water Entitlements[1] (AFA)	Notes/Shortage Provisions[2]
		subject to Term 91 diversion limitation, based on outcome of recent litigation; a 5-year temporary Warren Act Contract (WAC) for diversion of this water from Folsom Reservoir
Crawford Ditch	700	Contract with Reclamation (temporary or permanent)
Satellites (Strawberry and Outingdale)	154	
Pre-1914 Ditch Rights and Licensed Weber Reservoir rights[3]	3,200[4]	Farmers Free, Gold Hill, and Summerfield Ditches and Weber Reservoir storage rights
SOFAR (Pre-1914 rights)	15,080	EID's pre-1914 ditch water rights
Recycled water	1,800	Usable only for outdoor application in areas plumbed for recycled water (primarily El Dorado Hills)
Total	**75,984**	67,222 (with critical dry-year and likely shortages)

Notes:
1. Reclamation WNA developed for CVP Long-Term contract renewal process (2004). Assuming Normal water year deliveries.
2. El Dorado County Water Agency, Water Resources Development and Management Plan, Chapter 2, Historic Water Use, Table 5-2, April, 2007.
3. Ditch and other rights have subsequently changed to 4,560 AFA as part of the Long-Term Warren Act Contract effective 2/29/2010. (Bureau of Reclamation. 6/18/2010. Long-Term Warren Act Contract for the 40-year Diversion and Rediversion of up to 4,560 AF Water at Folsom Lake.
Source: 2009 P.L. 101-514 Draft EIS/EIR (page: 2-8); Amended as noted herein.

TABLE 2.4-2. EL DORADO IRRIGATION DISTRICT ANNUAL DIVERSION TOTALS AND UNACCOUNTED FOR LOSSES

Calendar Year	Raw Water Diversions[a] (AF)	Real and Apparent Losses[b] (AF)	Losses as a Percentage[c] of Raw Water Diversions (%)
2005	37,656	5,046	13.4
2004	43,358	5,588	12.9
2003	37,138	4,909	13.2
2002	38,885	5,177	13.3
2001	38,847	5,218	13.4
2000	34,882	4,524	13.0
1999	35,496	4,829	13.6
1998	30,027	4,829	16.1
1997	35,748	5,485	15.3
1996	34,199	5,353	15.7

Notes:
a. Includes raw water diversions from Jenkinson Lake, Folsom Reservoir and Project 184 at Forebay Reservoir.
b. Real losses include physical water loss to the ground from pipeline leaks and breaks; while apparent losses are considered paper losses, such as under registration of large meters.
c. The percentage of real and apparent losses can be attributable to 1,245 miles of pipeline, 3 miles of open ditch and over 37,000 service connections.
Source: 2009 P.L. 101-514 Draft EIS/EIR (page: 2-8)

EID has delivered recycled water for industrial use and golf course irrigation for over 30 years. In the past 20 years, the use of recycled water has been expanded to include median and park irrigation, and, more recently, construction water and residential landscaping. Recycled water use for residential landscaping is expected to have a significant beneficial impact on the amount of water available for drinking water supplies and other domestic and commercial potable uses. Since approximately 60 percent of the water demand for single-dwellings is used for outside landscaping, the future prospects of using recycled water as a significant water demand offset is promising. However, a significant increase in recycled water availability will be dependent on the construction of a seasonal storage facility, which has not been authorized at the writing of this document.

2.4.1 Water Conservation

EID has implemented an active water conservation program including public information and educational elements promoting efficient water use to the general public. In addition to its Urban Water Management Plan (UWMP), and Integrated Water Resources Master Plan, EID also has an existing U.S. Bureau of Reclamation Water Management Plan, developed and approved according to Reclamation guidelines[19]. The plan is updated every five years. The district has also focused significant effort on water recycling in the western portions of its service area, and is continuing to increase the recycling facilities' capacity and improve the purple-pipe recycled water distribution network.

Under its UWMP, EID has implemented programs with quantifiable water savings, including residential water audits, water metering, fixture/washing machine rebates, irrigation management services, plumbing retrofits, leak detection and repair, landscape water audits, and commercial/industrial water audits. It also imposes fines and prohibitions on wasteful use of water.[20] The Reclamation Water Management Plan includes outlines of the funding, implementation, and structuring of the water conservation plans implemented by the district, including all elements of the CUWCC Utility Operations and Educational Programs.

EID's active Irrigation Management Services program helps the District's agricultural growers use water more efficiently. The program currently conserves more than 2,000 AF every year, and was recognized in 2006 for its excellence by being chosen as a finalist for an Association of California Water Agencies award. The program was also awarded a Conservation Innovation Grant in 2006 from the USDA Natural Resources Conservation Service (NRCS).[21] The 2000 AFA savings is based on demand data prior to IMS program implementation compared to demand data after implementation.

19 Reclamation (2003), Achieving Efficient Water Management - A Guidebook for Preparing Agricultural Water Management Plans, Second Edition.
20 EID. January 2006. Final Urban Water Management Plan, 2005 Update.
21 EID. Press Release. July 20, 2006.

EID has also undertaken significant water recycling efforts, and began producing recycled water for landscape irrigation purposes in 1999. EID has produced an average of 1,700 AFA of recycled water during the period from 1999 to 2005.[22]

2.4.2 Agricultural Water Use

The County General Plan EIR states that in the year 2000, agricultural land uses within the EID service area included 1,665 acres of vineyard, Christmas trees, olive/citrus orchards, berries and similar crops, and 3,626 acres of pasture, deciduous orchards and other similar uses. Total agricultural water use in the year 2000 for irrigable land was 5,950 AF.[23] As noted previously, but for the limitation on acreage size, CVP M&I water service contracts are not permitted for agricultural use.

2.4.3 Future EID Water Demand

Table 2.4-3 is taken from the Reclamation WNA worksheet and shows the demand calculations used in verifying the water needs of EID to 2025, the time horizon used by Reclamation in its WNAs. Total anticipated M&I needs are 49,257 AF; this includes 7,484 AF of projected distribution system losses. Total residential demand, at 33,805 AFA, make up the majority of EID's anticipated future M&I demands (i.e., almost 70 percent). El Dorado County General Plan data supports the M&I WNA with a projected El Dorado County Western Slope need of approximately 57,000 AFA assuming no effect of climate change and 69,000 AFA considering climate change at buildout (including associated system losses and unaccounted for beneficial uses). [24]

22 EID. Recycled Water Supply Data. Unpublished.

23 Wood Rogers. March 2003. El Dorado County Water Management Plan. Agricultural Water Demand Tables.

24 EDCWA, November 2014. 2014 West Slope Update Water Resources Development and Management Plan, Table 5-7.

TABLE 2.4-3. EL DORADO IRRIGATION DISTRICT 2025 M&I WATER NEEDS ASSESSMENT U.S. BUREAU OF RECLAMATION

Residential Interior Demand # of residents	Residential Interior Demand Per capita factor (gpcd)	Residential Interior Demand Subtotal (AF)	Residential Landscape Demand Irrigated Acreage (ac)	Residential Landscape Demand ETo	Residential Landscape Demand ET Factor	Residential Landscape Demand Subtotal (AF)	Residential Landscape Demand Total (AF)
177,802	55	10,954	7,161	4	0.8	22,851	33,805
Non-Residential Interior Demand Industrial	**Non-Residential Interior Demand Commercial/ Institutional**	**Non-Residential Interior Demand Subtotal (AF)**	**Non-Residential Interior Demand Irrigated Acreage (ac)**	**Non-Residential Landscape Demand ETo**	**Non-Residential Landscape Demand ET Factor**	**Non-Residential Landscape Demand Subtotal (AF)**	**Non-Residential Landscape Demand Total (AF)**
335	1,764	2,099	1,584	4	0.8	5,804	7,903
Distribution System Demand Losses (AF)			**Distribution System Demand Unaccounted Beneficial Use (AF)**				**Distribution System Demand Total (AF)**
6,847			637				7,484
Total M&I demand (AF) = residential + nonresidential + distribution system =							49,257

Note:
1. Data compiled and presented in the WNA for the P.L 101-514 Water Service Contract; included as part of the BON for this contracting action.
Source: 2009 P.L. 101-514 Draft EIS/EIR (page: 2-10)

As shown in Table 2.4-4, agricultural demands are anticipated to be 24,466 AFA, based on General Plan land use and one possible scenario of growth that considers protective General Plan agricultural policies and a growing agro-tourism industry. EID's total water demands (M&I plus Agricultural [AG]) is projected to be 73,723 AFA by the year 2025. With a normal year yield available supply of 68,484 AFA, the projected future water need at 2025 is 5,239 AFA. With a safe yield available supply of 61,597 AFA, the projected future water need of EID at 2025 is 12,126 AFA.

TABLE 2.4-4. EL DORADO IRRIGATION DISTRICT ADDITIONAL AGRICULTURAL DEMANDS AND TOTAL DEMAND TOTAL WATER NEEDS (AFA)

Ag demand	Total demand	Supply Normal[1] Year	Supply Critically Dry[2] Year	Total Water Needs Normal Year	Total Water Needs Critically Dry Year
24,466	**73,723**	68,484	61,597	**5,239**	**12,126**

Notes:
1. Total Normal Year Supply from Table 2.1 less the proposed P.L.101-514 CVP water service contract (i.e., 75,984 – 7,500 = 68,484 AFA).
2. Total Critically Dry Year Supply from Table 2.1 less the proposed P.L.101-514 CVP water service contract (i.e., 67,222 – 5,625 = 61,597 AFA).
Source: 2009 P.L. 101-514 Draft EIS/EIR (page: 2-8)

EID's 2013 Integrate Water Resources Master Plan, limited to just its service area, identifies a long term water need, in Figure 4-2, of up to 22,000 AFA in a single dry year and up to 29,000 AFA in the third year of multiple dry years (Figure 4-2). The most recent EID water needs analyses is described in EDCWA's *Water Resources Development and Management Plan 2014 West Slope Update,* November 2014 (West Slope Update). The analysis includes some allowance for expansion of the EID service area and considers a 2006 General Plan amendment that allows for increased commercial activity on the West Slope. The report indicates that EID needs an additional 38,579 AFA of water supply to meet the General Plan growth projections of the county. The report also describes an analysis of potential water supply needs assuming an effect due to climate change. In this case, the report indicates that EID has a water need of up to 45,262 AFA. These water needs include both M&I and agricultural demands.

In conclusion, EID's long term water supply needs (38,579 to 45,262 AFA) to meet the capacity of the El Dorado County General Plan far exceed the WNA "Total Water Needs" for both normal and critically dry years. The WNA "Total Water Needs" identified in Table 2.4.4 (up to 12,126 AFA) are estimated to occur by 2025. At that time, additional water supply is projected to be needed up to 45,262 AFA, confirming the 2025 estimate of water need will continue through the proposed 40-year contract term.

2.5 GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT WATER NEEDS

The GDPUD was formed in 1946, and began acquiring the properties, facilities and water rights of the Georgetown Water Company. The GDPUD service area encompasses approximately 75,000 acres, or about 6 percent of El Dorado County. GDPUD currently provides surface water to about 30,000 acres within its service area, of which approximately 1,200 acres are currently in irrigated commercial crops. The District provides domestic treated water and untreated agricultural water to the communities of Cool/Pilot Hill, Garden Valley, Greenwood, Georgetown, and Kelsey. GDPUD's sole source of water is the Stumpy Meadows Project. Water is obtained through a total of nine pre-1914 water rights and post-1914 appropriative rights and permits. The firm yield of the project is 12,200 AFA. Allowing for dry year deficiencies of 1,700 AF, the total estimated safe yield supply is 10,500 AFA.

Existing water demand is made up of current water sales plus latent demand. Latent demand is defined as current inactive meters plus non-metered parcels within assessment districts plus preseason (April) agricultural requirements when needed. In 2005, GDPUD reported a total existing demand of 11,162 AF. Of that amount, irrigation water demand was 4,744 AF, treated water demand comprised 1,959 AF of the total, and latent demand was 1,159 AF (including pre-season irrigation requirements). The remaining demand consisted of a five-year average of losses, which includes treatment and conveyance losses, reservoir leakage, evaporation, and other system losses.

2.5.1 Water Conservation

GDPUD has adopted management practices to reduce system losses within the District's conveyance system. Georgetown's historic ditch system is a single, primarily unlined conveyance system. Ongoing management practices aimed at increasing water conservation by reducing storage and conveyance losses include lining of ditches with Gunite, replacement of sections of ditches with pipelines, and improving system operations that affect losses.[25] Current system losses are approximately 30 percent; the goal for losses in GDPUD's system, as a rural water system, is 15 percent. The federal WNA only allows losses of 15 percent to be counted toward the District's water needs.

Beyond decreasing losses, GDPUD has developed an UWMP that outlines measures for demand management and reduction. Nearly all of GDPUD's connections are equipped with water meters, and the District has used tiered pricing since 1982.[22] The District's UWMP includes implementation summaries for past and future efforts toward the CUWCC Utility Operations and Education Programs development laid out by the CUWCC, and provides the District's water shortage contingency plan.

Before receiving any of the P.L.101-514 contract water, GDPUD will be required by Reclamation to develop a Water Management Plan consistent with Reclamation guidelines. This plan must be approved by the Reclamation contracting officer. The plan will be updated every five years. Included in this plan will be GDPUD's policies for addressing water shortages, wasteful use of water, and implementation plans for the elements of the CUWCC Utility Operations and Educational Programs Demand Management Measures.

2.5.2 Agricultural Water Use

The County General Plan EIR states that in the year 2000, irrigated acreage within the GDPUD service area totaled 1,195 acres; 81 acres of vineyard, Christmas trees, orchards, berries and similar crops, and 1,114 acres of pasture and other uses.[26] Total agricultural water use in the year 2000 for irrigable land was 4,349 AF. By the year 2025, it is anticipated that GDPUD will have 3,527 acres under cultivation; by 2050, GDPUD will have 7,385 acres under cultivation.[27]

25 GDPUD. 2011. 2010 Urban Water Management Plan. p. 37.
22 GDPUD. 2011. 2010 Urban Water Management Plan p. 38.
26 El Dorado County Water Agency – Water Resource Development and Management Plan, Agricultural Water Demand, December, 2007.
27 Wood Rogers. March 2003. El Dorado County Water Management Plan. Agricultural Water Demand Tables.

2.5.3 Future GDPUD Water Demand

Based on land use projections presented in the approved El Dorado County General Plan, the future total water demand for the existing GDPUD service area at buildout is anticipated to be approximately 20,687 AFA. [28] This could result in a District-wide shortfall, or "need", of approximately 11,200 AFA without the P.L. 101-514 contract water. Of this anticipated future demand, agricultural demand is estimated to be 10,866 (53 percent) with M&I demand at 9,821 AFA (47 percent). This M&I demand exceeds the proposed contract amount. By 2030, M&I demand is preliminarily estimated to be 4,223 AFA, near the 10 percent margin required by Reclamation to provide the full contract allocation under Reclamation contracting provisions.

The M&I demand assumptions for GDPUD include: a lot size of 0.33 acres, that 60 percent of those parcels are under irrigation, and distribution system losses of 15 percent. As previously noted, losses in the GDPUD system are currently around 30 percent; such losses would need to be significantly reduced in order to meet the target losses provided in the WNA. Agricultural demands are based on the predicted acreages from the County General Plan Update EIR, updated in the El Dorado County Water Agency 2014 West Slope Update Water Resources Development and Management Plan as well as Reclamation's estimates of crop water needs and evapotranspiration; these compare favorably.

The data provided in Table 2.5-5 are taken primarily from the Reclamation preliminary WNA worksheets and shows the demand calculations used in verifying the water needs of GDPUD to 2050. Again, updated information from the El Dorado County Water Agency's 2014 West Slope Update Water Resources Development and Management Plan have been included to more accurately portray GDPUD's current and anticipated water demand conditions to 2050. Total anticipated M&I needs are 8,058 AF; this includes 1,058 AF of projected distribution system losses and 98 AF of unaccounted for beneficial use. Residential demand, relative to non-residential demands (e.g., industrial/commercial) clearly make up the majority of GDPUD's anticipated future M&I demands (i.e., almost 80 percent).

28 El Dorado County Water Agency – Water Resources Development and Management Plan 2014 West Slope Update, November 2014. Table 7-4.

TABLE 2.5-5. GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT[1] WATER NEEDS ASSESSMENT

Residential Interior Demand # of residents	Residential Interior Demand Per Capita Factor (gpcd)	Residential Interior Demand Subtotal (AF)	Residential Landscape Demand Irrigated Acreage (ac)	Residential Landscape Demand ETo = 4.58	Residential Landscape Demand ET Factor	Residential Landscape Demand Subtotal (AF)	Residential Landscape Demand Total (AF)
20,000	55	1,232	1,414	4.58	0.8	5,181	6,413
Non-Residential Interior Demand (AF) Industrial	**Non-Residential Interior Demand (AF) Commercial/ Institutional**	**Non-Residential Interior Demand (AF) Subtotal (AF)**	**Non-Residential Landscape Demand Irrigated acreage (ac)**	**Non-Residential Landscape Demand ETo**	**Non-Residential Landscape Demand ET Factor**	**Non-Residential Landscape Demand Subtotal (AF)**	**Non-Residential Landscape Demand Total (AF)**
95	35	130	98	4.58	0.8	359	**489**
Distribution System Demand (AF) Losses			**Distribution System Demand (AF) Unaccounted Beneficial Use**				**Distribution System Demand (AF) Total (AF)**
1,058			98				1,156
Total M&I demand (AF) = Residential + Nonresidential + Distribution System =							8,058

Note:
1. Data compiled and presented in the WNA for the P.L 101-514 Water Service Contract; included as part of the BON for this contracting action.
Source: 2009 P.L. 101-514 Draft EIS/EIR (page: 2-13)

As shown in Table 2.5-6, GDPUD's agricultural demands are anticipated to be 15,476 AFA by 2050, consistent with County General Plan land use projections. GDPUD's total water demands (M&I plus AG) is projected to be 23,534 AFA by the year 2050. With a firm yield available supply of 12,200 AFA, the projected future water needs at 2050 is 11,334 AFA. With a safe yield of 10,500 AFA, the projected future water needs at 2050 would be 13,034 AFA.

TABLE 2.5-6. GEORGETOWN DIVIDE PUBLIC UTILITY DISTRICT ADDITIONAL AGRICULTURAL DEMANDS AND TOTAL DEMAND TOTAL WATER NEEDS (AF)

Ag demand[1]	Total demand	Supply Firm Year	Supply Critically Dry Year	Total Water Needs Firm Year	Total Water Needs Critically Dry Year
15,476	**23,534**	12,200	10,500	**11,334**	**13,034**

Note:
1. Acreages from El Dorado County Water Agency's 2007 Water Resources Development and Management Plan were used – in the calculation of GDPUD's ag demand using Reclamation's WNA formulas.
Source: Source: 2009 P.L. 101-514 Draft EIS/EIR (page: 2-14)

According to the federal WNA methodology, GDPUD's total water needs within the term of the contract will exceed the proposed contract amount. However, because the proposed contract provides an M&I supply only, the new contract water may only be used to fulfill residential (five-acre limitation on residential parcels), commercial, and industrial demands. As previously indicated, the preliminary assessment performed for GDPUD did not include an independent analysis by Reclamation of the GDPUD's current and future agriculture water use, which may need to be included in the final WNA prior to contract execution.

The most recent GDPUD water needs analyses is described in EDCWA's West Slope Update. The report indicates that GDPUD needs an additional 9,389 AFA of water supply to meet the General Plan growth projections of the county. The report also describes an analysis of potential water supply needs assuming an effect due to climate change. In this case, the report indicates that GDPUD has a water need of 11,200 AFA. These water needs include both M&I and agricultural demands.

3 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

3.1 INTRODUCTION

Chapter 3.0 of the 2009 Draft EIS/EIR presents a detailed description of the Proposed Action and Alternatives to the Proposed Action that were analyzed in that document. Those descriptions, in their entirety, are incorporated by reference in this Final EIS. The following section of this Final EIS summarizes the descriptions of the Proposed Action and alternatives to the proposed action presented in the 2009 Draft EIS/EIR. This section also describes the alternatives "screening" process by which potential project alternatives were developed, considered, and either chosen for further analysis in the Draft EIS/EIR or eliminated from further consideration.

It is important to note, that while the Draft EIS/EIR includes the description and analysis of a No Project Alternative (Alternative 1B) as required by CEQA, this Final EIS does not. As described previously, this Final EIS is a NEPA-only document therefore the selection of alternatives to Proposed Action is subject to NEPA requirements, only. As such, this Final EIS includes the evaluation of the No Action Alternative (Alternative 1A presented in the 2009 Draft EIS/EIR), as required by NEPA, but does not address the CEQA-required No Project Alternative. The evaluation of the No Project Alternative was included in the Final EIR that was certified by EDCWA in January 2011.

Each alternative presented in this Final EIS was addressed in a similar and equal level of detail across all resource categories. In accordance with NEPA, the evaluation of alternatives presents the Proposed Action and all the alternatives in comparative form, to define the issues and provide a clear basis for choice among the options. In its regulations implementing NEPA, the Council on Environmental Quality (CEQ) calls the alternatives analysis section the "heart of the EIS" and requires agencies preparing environmental impact statements to:

a. Rigorously explore and objectively evaluate all reasonable alternatives and for alternatives, which were eliminated from detailed study, and briefly discuss the reasons for them being eliminated.
b. Devote substantial treatment to each alternative considered in detail including the Proposed Action so that reviewers may evaluate their comparative merits.
c. Include reasonable alternatives not within the jurisdiction of the Lead Agency.
d. Include the alternative of No Action.
e. Identify the Lead Agency's preferred alternative or alternatives, if one or more exists, in the draft environmental impact statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

Include appropriate mitigation measures not already included in the Proposed Action or alternatives

3.2 APPROACH TO DEFINING THE “NO ACTION” ALTERNATIVE

Section 1502.14(d) of NEPA requires that an EIS include the No Action Alternative. Under NEPA, the No Action Alternative must contemplate the resulting environmental impacts of not going forward with the proposed federal action. Where the choice of “no action” by a federal Lead Agency, however, would result in predictable actions by others, this consequence of the “no action” alternative should be included in the analysis. NEPA regulations require the federal lead agency to analyze the No Action Alternative even if the agency is under a court order or legislative command to act (e.g., new CVP water service contracts under P.L.101-514). This analysis provides a benchmark, enabling federal decision-makers to compare the magnitude of environmental effects of the action alternatives. It is also an example of a reasonable alternative outside the jurisdiction of the lead agency that should be analyzed.

Depending on the nature of the proposed federal action, two distinct approaches to identifying the "no action" scenario are possible. The first situation would involve a proposed change to an existing plan or policy. In this case for example, a Proposed Action might involve an update to a land management plan. In this situation, the No Action Alternative would be defined as the continuation of ongoing programs initiated under the existing management plan and applicable legislation and regulations. The second approach to identifying the "no action" scenario applies to federal decisions on proposals for projects. The second approach is most appropriate for this Final EIS because the Proposed Action is the execution of a new contract by Reclamation to provide CVP water services to EDCWA and is, therefore, considered a specific project; not the implementation of a proposed plan.

Under the No Action Alternative for this Final EIS, the proposed water services contract mandated by Congress under P.L. 101-514, would not be executed and the source of CVP water for EDCWA under that contract would be unavailable. As noted earlier, however, inaction by the federal lead agency may inspire actions by other parties in furtherance of project objectives, purposes, or needs that might have been pursued through action by the federal lead agency. Due to the demonstrated need for future water supplies to meet future demand for already-approved growth and development within the areas served by EDCWA, the No Action Alternative for purposes of this EIS assumes that alternative water supplies would be acquired by EDCWA to meet future demand within the EID and GDPUD service areas in the absence of the Proposed Action.

3.3 ALTERNATIVES SCREENING PROCESS

During the preparation of the 2009 Draft EIS/EIR, a broad range of potential alternatives to the Proposed Action was considered for inclusion in the EIS/EIR in compliance with the requirements of NEPA. By using an “alternatives screening process,” a reasonable range of project alternatives was selected for further evaluation in the Draft EIS/EIR in compliance with NEPA requirements.

Alternatives that were considered but rejected from further analysis in the EIS/EIR and the alternatives that were ultimately selected for detailed evaluation in the EIR/EIS are described in detail in the Chapter 3 of the Draft EIS/EIR. In addition, Subchapter 3.7 (Alternatives Screening Process) in the Draft EIS/EIR, describes the methodology, considerations, and results of the process used to screen these initial alternatives into those carried forward for detailed analysis in the Draft EIS/EIR. The information contained in the Draft EIS/EIR is summarized below.

The alternatives screening process is important in that it provides a balanced and unbiased means of reducing the initial number of identified alternatives to a *reasonable* range. Ideally, the various screening criteria are developed independent of the alternatives as well as prior to the alternatives identification process, in order to maintain an unbiased evaluation.

3.4 SCREENING CRITERIA

Various screening criteria were identified and developed for the initial listing of potential alternatives during preparation of the 2009 Draft EIS/EIR. These criteria are reprinted in Table 3.4-1, below. These screening criteria are the result of updates to similar criteria used in the EIS/EIR for the new CVP water service contracts under P.L.101-514 prepared by Reclamation and Sacramento County Water Agency (1998), the PCWA/Northridge Groundwater Stabilization Project EIR (1999), and have their original basis from EBMUD's Water Supply Management Program (1989). They were originally developed from professional engineering and environmental expertise.

TABLE 3.4-1. IDENTIFICATION AND DESCRIPTION OF SCREENING CRITERIA

Criterion	Description
A. Technical and Engineering Feasibility	An alternative must be technically and physically feasible. An alternative must be based on existing and accepted state-of-the-art engineering concepts and cannot be based on experimental technologies. Also, an alternative must not be dependent upon either the availability or acquisition of site locations that cannot be reasonably assured.
B. Raw Water Quality	An alternative must provide a water supply or, have the capability of providing a water supply that protects water quality and meets or exceeds State and federal water quality standards or other applicable water quality standards associated with its use.
C. Environmental Fatal Flaw	An alternative cannot have environmental impacts that are so significant as to negate the positive attributes of the alternative or, simply transfer potential environmental impacts from one location to another.
D. Economic – Capital and Operations & Maintenance(O&M)	An alternative cannot be economically impractical or infeasible. An alternative should be economically attractive such that the total direct costs to the customers and purveyors are minimized and do not significantly exceed the costs of alternatives with similar

Criterion	Description
	benefits. Similarly, an alternative cannot result in excessive operation and maintenance costs.
E. Long-term Reliability	An alternative must be capable of supplying raw water reliably year-round and on a long-term basis.
F. Public Health and Safety	An alternative should be able to meet all existing and anticipated future State and federal health and safety requirements.
G. Timing	An alternative must be capable of being implemented within a reasonable timeframe such that the benefits and needs of the proposed project are not unduly delayed.
H. Institutional	An alternative cannot possess significant uncertainty that all permits, licenses, or other logistical requirements can be reasonably obtained.

Source: Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206): Contract Between the U.S. Bureau of Reclamation and the El Dorado County Water Agency, Subcontract Between the El Dorado County Water Agency and the El Dorado Irrigation District, and Subcontract Between the El Dorado County Water Agency and the Georgetown Divide Public Utility District Draft Environmental Impact Statement. June 2009. Page 3-5.

3.5 ALTERNATIVES SELECTED FOR EVALUATION IN THIS EIS

At the conclusion of the project alternatives screening process described above, certain potential alternatives showed promise as reasonable potentially feasible options to the Proposed Action while others, did not. The project objectives played an important factor in determining overall feasibility and realistic applicability. The *Institutional* criterion was important in that it acknowledged the regulatory, administrative, and institutional framework in which these alternatives would have to operate in order to be approved. Fundamental to this acknowledgment was the fact that each of these processes would have to commence from the beginning, gaining internal political and interagency support to move forward. The "Technical and Engineering Feasibility" was easily passed by most alternatives, using a strict application of the criterion that, stated, "…*an alternative must be based on existing and accepted state-of-the-art engineering concepts and cannot be based on experimental technologies*". An aspect of this same criterion that did not allow the New Storage Reservoir alternative from passing was that, "…*an alternative must not be dependent upon either the availability or acquisition of site locations that cannot be reasonably assured*."

Economics played into the screening assessment given that a new water right or new storage reservoir would likely require new facility infrastructure. None of these new facilities (and the lands upon which they would be placed) are presently assured and, as such, was assumed to have to be funded by EDCWA and its member water agencies. The costs for such new infrastructure such as a new storage reservoir would be significant. As noted in the Economic criterion, *"[A]n alternative should be economically attractive such that the total direct costs to the customers and purveyors are minimized and do not significantly exceed the costs of alternatives with similar benefits*…"

Growth Control also failed this criterion since it was assumed that a growth moratorium or even some reduced growth policy would not meet economic and social goals of the County. Such an alternative would be counter to the criterion that states in relevant part, "*An alternative cannot be economically impractical or infeasible*." As noted earlier, EDCWA, EID and GDPUD are legally bound to accept the vision in the County General Plan and to do their best to try to find the water needed to fulfill that vision.

For two of the criteria, *Public Health & Safety* and *Water Quality*; their application was similar across the alternatives. Both groundwater and reclaimed wastewater failed these criteria.

From a potential environmental impact perspective, all alternatives passed the *Environmental Fatal Flaw* criterion. This was largely premised on the fact that none of these alternatives is so objectionable as to be either prohibited by law or impossible to achieve solely due to environmental concerns. The most controversial of the alternatives from an environmental perspective was a New Storage Reservoir. The fatal flaw criterion states, "*An alternative cannot have environmental impacts that are so significant so as to negate the positive attributes of the alternative or, simply transfer potential environmental impacts from one location to another*."

New storage reservoirs, if operated properly, could provide multiple benefits for water supply, increasing water management flexibility, reducing diversions from rivers during critical migration periods, improve flood control, and increase Delta flows during critical times. Ongoing initiatives described in the Draft EIS/EIR and more recent projects such as the Centennial Reservoir Project, indicate a growing perception and commitment by the state that new storage reservoirs are viable alternatives in future water resources management.

Through application of the Screening Criteria presented above and completion of the alternative screening process described in Section 3.5.5 below, the following alternatives were carried forward for detailed analysis in this EIS (their numbering sequences are consistent with those presented in the 2009 Draft EIS/EIR and are retained throughout the remainder of this EIS):

- Alternative 1A – No Action Alternative
- Alternative 2A (Preferred) – Proposed Action Water Diversion (7,500 AF each to EID and GDPUD)
- Alternative 2B – Proposed Action Water Diversion (15,000 AF to EID)
- Alternative 2C – Proposed Action Water Diversion (4,000 AF to EID and 11,000 AF to GDPUD)
- Alternative 3 – Water Transfer Alternative
- Alternative 4A – Reduced Diversion Alternative (12,500 AFA)
- Alternative 4B – Reduced Diversion Alternative (10,000 AFA)
- Alternative 4C – Reduced Diversion Alternative (7,500 AFA)

Each alternative, as noted previously, was addressed in a similar and equal level of detail. The potential impacts associated with each of these alternatives are described individually, by resource, in Chapter 4 (Affected Environment and Environmental Consequences) of this Final EIS.

3.5.1 Alternative 1A – No Action Alternative

The No Action Alternative assumes that the proposed federal action, namely, execution of the P.L.101-514 water contract would not proceed. Without this new water entitlement, El Dorado County, through EDCWA, would be short 15,000 acre-feet per annum (AFA) from its total available water supplies. Both EID and GDPUD would bear the consequences of such a shortfall as it would represent a significant loss to their planned future water supplies. In lieu of this new CVP water contract, it is likely that both EID and GDPUD would be compelled to more aggressively seek to acquire an alternative water supply. To make up the 15,000 AFA shortfall, EID and GDPUD could explore any combination of potential alternative supply strategies. Possible feasible strategies explored in this EIS include new storage, water transfers, water assignments, and groundwater banking (in downstream aquifers). Given the extent to which EID already imposes water conserving practices, it is unlikely that water conservation would stand as an independent alternative to this action. These scenarios are described in detail in 3.6.2 of the Draft EIS/EIR (pg.3-24) and are summarized here in subsections 3.5.3 and 3.5.5, below.

At present, the most likely supplemental water supply achievable under the No Action Alternative would be a new long-term permanent water transfer or new water right from the American River basin obtained through the filing for a partial assignment of a previous State-filed application or an area-of-origin application. The latter option, in fact, represents a pending project of the El Dorado Water & Power Authority. It is considered needed in addition to, not in lieu of, the Proposed Action described in this EIS. P.L.101-514 recognized that the 15,000 AFA of new CVP water was intended only as the first phase of a long-term program by EDCWA to acquire additional water supplies to meet its existing and future General Plan water needs projections. Accordingly, as a current and separate action, the pursuit of the current new water right (i.e., the El Dorado Water & Power Authority, of which both EDCWA and EID are members) does not represent an *alternative* to the P.L. 101-514 contract, but rather, an essential future water supply that is both consistent with P.L. 101-514 and the water needs projections of the El Dorado County General Plan. Without the P.L. 101-514 contract, the El Dorado Water & Power Authority would be compelled to increase its requested water right by 15,000 AFA, equivalent to the shortfall that would be experienced without the P.L. 101-514 contract water in order to fulfill its obligations to meet future County General Plan water supply requirements.

3.5.2 Alternative 2 – Proposed Action (Scenarios A, B, and C)

3.5.2.1 Background

Public Law 101-514 (Section 206), as part of the Water Resources Development Act of 1990, mandated, in total, 50,000 AFA of new CVP M&I contract water for Sacramento and El Dorado counties. As noted previously (see Chapter 2.0, Purpose and Need), the Proposed Action being evaluated in this Final EIS is the execution of the new long-term CVP water service contract between EDCWA and Reclamation. Once executed, the contract will fulfill the mandate of P.L.101-514 and complete this congressionally required new water contracting action. For this

Proposed Action, Reclamation is the federal water contracting entity and, accordingly, the federal Lead Agency under NEPA.

Under this new contract, CVP M&I water, in amounts not to exceed 15,000 AFA, would be made available to EDCWA consistent with federal reclamation law (see below). Consistent with P.L.101-514, new CVP water can be taken directly from Folsom Reservoir, or exchanged for non-CVP water to be diverted from the American River upstream of Folsom Reservoir.

3.5.2.2 Master Contract

Under this Proposed Action, EDCWA would make this new water available to fulfill both current and future in-county water needs. EDCWA is a special district, established under the El Dorado County Water Agency Act that was enacted to address with a range of water issues in El Dorado County. EDCWA has no land use authority, is not a physical supplier of water in the County, and acts as an advisory agency to purveyors in El Dorado County. Furthermore, EDCWA is governed by a Board of Directors separate from the County Board of Supervisors.

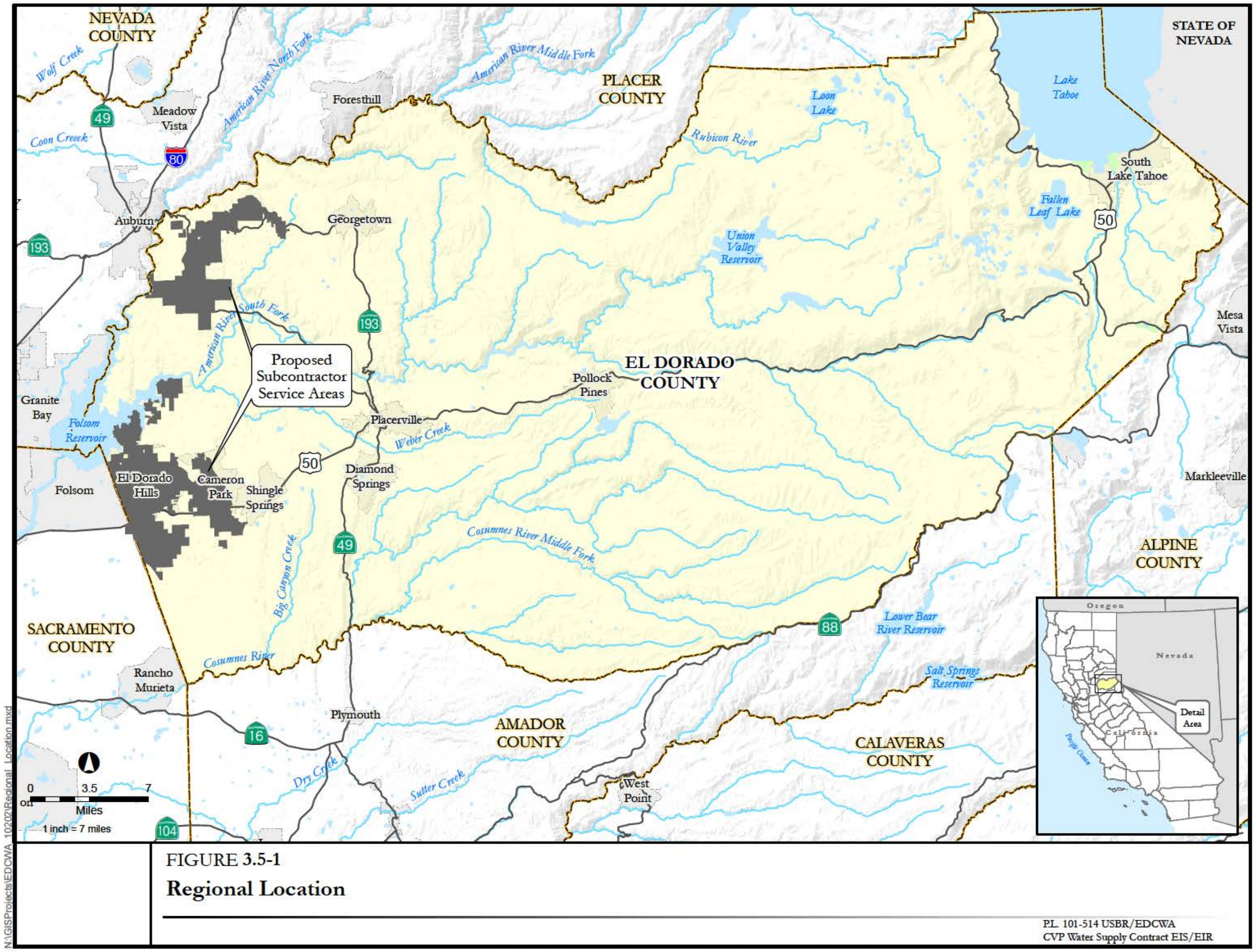
The purveyors within the county with the authority to supply water are referred to as EDCWA's member units, and include irrigation districts, public utility districts, and community service districts. Additionally, several are empowered to provide water service, but currently do not. This new CVP M&I water service contract would represent a *master* contract that, upon execution, would provide EDCWA the necessary flexibility to subsequently execute direct subcontracts with two of its member units, either EID, GDPUD, or both, depending on the timing, needs and desires of those districts. Both of these purveyors would deliver water to portions of their service area along the western slopes of El Dorado County.

The contract is entitled, Contract Between The United States And El Dorado County Water Agency Providing For Project Water Service From The American River Division (Contract No. 07-WC-20-3534). It is authorized under the Act of June 17, 1902 (32 Stat. 388), and acts amendatory or supplementary thereto, including, but not limited to, the Acts of August 26, 1937 (50 Stat. 844), as amended and supplemented, August 4, 1939 (53 Stat. 1187), as amended and supplemented, October 12, 1982 (96 Stat. 1263), Title XXXIV of the Act of October 30, 1992 (106 Stat. 4706), and Section 206(b)(1)(B) of the Act of November 5, 1990 (104 Stat 2074), referred to collectively, as federal reclamation law.

3.5.2.3 Project Location

El Dorado County is located in Northern California, and stretches from the eastern border of Sacramento County to the California/Nevada border south of Lake Tahoe (see Figure 3-5-1). Folsom Reservoir lies at the western end of El Dorado County, and includes portions of Sacramento, Placer, and El Dorado counties. Much of the county is in the American River Watershed. The South Fork American, Middle Fork American, and Rubicon rivers drain much of the central and northern portions of the county into Folsom Reservoir. The southern portion of the county is drained by the North, Middle, and South forks of the Cosumnes River. At its eastern end, the Upper Truckee River drains a small portion of the county within the Lake Tahoe basin.

The county is home to 181,737 people (U.S. Census Bureau, 2013). The primary communities are South Lake Tahoe, El Dorado Hills, Cameron Park, and Placerville which together account for approximately 64 percent of the County population (DOF 2000). Two of the most rapidly growing areas are El Dorado Hills and Cameron Park, along the western slopes of the county. With its proximity to Folsom Reservoir (a CVP facility), EID's intended use of this new water will likely occur in the El Dorado Hills and Bass Lake Tank's service area (in the western portion Cameron Park). Similarly, for GDPUD, its allocation will be used within the western portion of its service area in the vicinity of Cool, Pilot Hill, Auburn Lakes Trail, and Greenwood.



Source: Reclamation 2009. Draft EIS/EIR for a Proposed Water Service Contract pursuant to Public Law 101–514.

Figure 3.5-1 Regional Location

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3.5.2.4 Distribution of P.L. 101-514 Water

P.L.101-514 does not specify how much of the contract amount would be specifically distributed to each individual water district within El Dorado County. The law, in fact, is silent on identifying specific districts by name with whom the EDCWA could subsequently enter into subcontracts. For purposes of this EIS and the analyses contained herein, the Proposed Action includes three scenarios that identify three different potential distributions of P.L. 101-514 water between EID and GDPUD. As noted above, these scenarios are as follows with Alternative 2A selected as the Preferred Alternative:

- Alternative 2A (Preferred) – Proposed Action (EID – 7,500 AFA and GDPUD – 7,500 AFA)
- Alternative 2B – Proposed Action (EID – 15,000 AFA and GDPUD – 0 AFA)
- Alternative 2C – Proposed Action (EID – 4,000 AFA and GDPUD – 11,000 AFA)

It is possible and quite likely that the future demands of EID or GDPUD may increase independently and differentially over time. Such demand increases could prompt a need for water that is greater or lesser than the 7,500 AFA identified as the Proposed Action based on the actual demand at that time EDCWA would facilitate subcontract agreements with both districts as their needs developed. As noted previously, the proposal of a *master* contract maximizes EDCWA's flexibility to distribute new CVP M&I water to those areas in need within the county, as needs dictate, and in a manner consistent with federal contracting provisions. This would ensure optimum beneficial use of the new CVP water supply.

While EID and GDPUD are the intended recipient districts for this new water supply, the specifics of timing, quantity, and the identity of the first recipient of any such water supplies depends on the specific water needs and diversion/delivery capabilities of the districts. EDCWA, as the primary contractor (i.e., holder of the *master* contract) would, therefore, have oversight and control over this ongoing process, and would execute any subcontracts negotiated between the two purveyors in coordination with Reclamation for review and approval. As the prime contractor, EDCWA would be identified by Reclamation as holding primary responsibility for ensuring that the various terms and conditions of the master and subcontract(s) are met. Once executed, the water service master contract authorized by P.L.101514 would allow EDCWA essentially to hold new CVP M&I water *in trust* until such time as the member districts initiate further action. The intent of P.L. 101-514 would be preserved, as this new CVP M&I contract would remain for use in El Dorado County.

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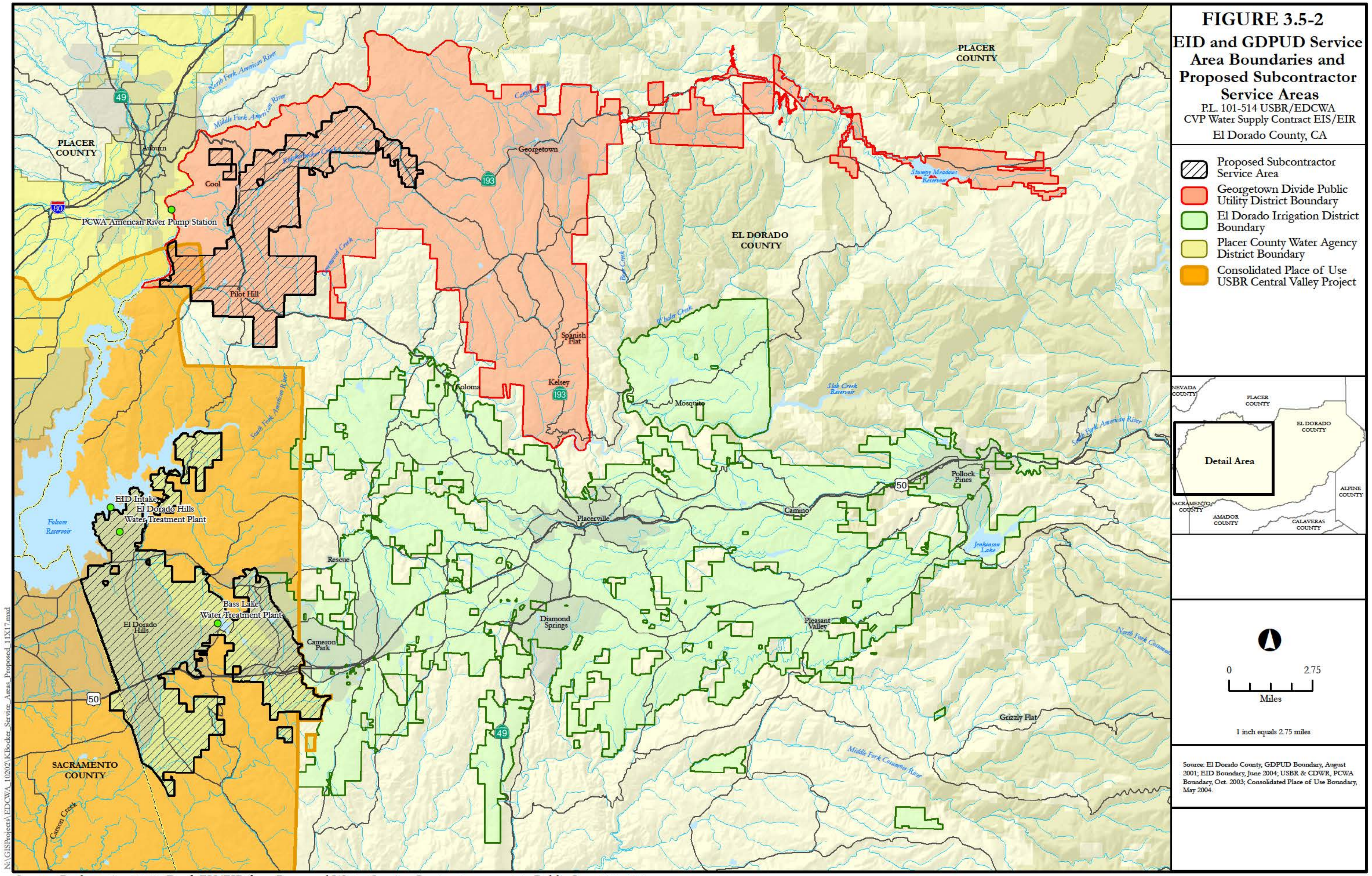

Source: Reclamation 2009. Draft EIS/EIR for a Proposed Water Service Contract pursuant to Public Law 101–514.

Figure 3.5-2 EID and GDPUD Service Area Boundaries

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3.5.2.5 Points of Diversion

Under the Proposed Action, all water diverted by EID would be taken from Folsom Reservoir at EID's existing intake. This water would be conveyed to EID's El Dorado Hills Water Treatment Plant (see Figure 3.5-2). This EIS does not cover EID's potential new water treatment facility at Bass Lake. EID has committed to installing a new temperature control device (TCD) on its current water supply intake at Folsom Reservoir and design in not yet complete. When completed, EID will be able to selectively withdraw water from any one of a range of elevations within the reservoir corresponding to specifically targeted thermal layers. For purposes of analysis in this EIS, the TCD is assumed to be in place and operational for all future-level impact evaluations (see Subchapter 5.1, Introduction to Analysis).

Distinct from EID's direct diversion capabilities at Folsom Reservoir, GDPUD may only obtain water under the Proposed Action through a water exchange with another purveyor, most likely the PCWA, where discussions between the two purveyors were initiated several years ago. This exchange would be necessary because GDPUD does not possess a direct diversion point on Folsom Reservoir (hence, no ability to directly divert CVP water). Water obtained by GDPUD through such an exchange would be from PCWA's Middle Fork Project, and could be diverted from the North Fork American River, near Auburn.

In terms of diversion facilities, PCWA operates a pump station on the American River east of the city of Auburn. PCWA's American River Pump Station includes an empty pump bay at the pumping plant along with an under-river caisson stubbed on the south side of the river. Were an agreement to be reached between GDPUD and PCWA, GDPUD could use the empty pump bay for its own pumps, the under-river caisson and build its own conveyance infrastructure on the southern bank of the North Fork American River to pump water out of the canyon. At this time, a Memorandum of Understanding between PCWA and GDPUD has been drafted and remains under negotiation. Together, these facilities would be capable of diverting water from the river and conveying it up out of the American River canyon to one of GDPUD's existing or future new water treatment facilities on the Georgetown Divide. A more detailed discussion of the GDPUD/PCWA exchange is presented below.

For the purposes of the hydrologic analysis in this Final EIS, the Proposed Action is represented in two ways. First, to account for EID's proposed diversion, a depletion of 7,500 AFA (assumed to occur at the existing EID intake downstream of the South Fork American River inflow) to Folsom Reservoir was modeled. Second, to account for GDPUD's proposed exchange, a depletion of 7,500 AFA from the inflow to Folsom Reservoir from the North Fork American River was also modeled.

The reduction in inflow to Folsom Reservoir represents the diversion of Middle Fork Project water by GDPUD from the exchange with PCWA. Hydrologically, this latter modeling assumption represents the only physical means by which new water, made available through P.L.101-514 can be used by GDPUD within El Dorado County.

3.5.2.6 GDPUD/PCWA Exchange

As noted previously, for GDPUD to receive a new allocation of water under this new contract, an exchange would first have to be negotiated between GDPUD and PCWA. Without a direct diversion at Folsom Reservoir, GDPUD must seek an alternative water source, facilitated through an exchange, since CVP water, based on current CVP water rights permits, may not be diverted from the American River upstream of Folsom Reservoir, the furthest-upstream federal impoundment on the American River. PCWA represents the only water purveyor on the upper American River that could realistically provide GDPUD with an alternative water source that could be exchanged with the new P.L.101-514 contract water. P.L.101-514, in fact, expressly provided for this situation by noting that the, "…CVP water could be diverted directly from Folsom Lake or for exchange upstream on the American River or its tributaries."

Since GDPUD has no direct diversion capability of any kind from the North, South, or Middle forks of the American River, it must either rely on other existing or future facilities or establish its own. As noted previously, the new American River Pump Station would provide the necessary diversion facility for GDPUD. No other current efforts are being developed by GDPUD to establish new separate diversion facilities on these waterbodies (i.e., Folsom Reservoir, North, South or Middle forks of the American River).

Under a potential water exchange, GDPUD could divert a prescribed quantity of PCWA's Middle Fork Project (MFP) water rights water at the American River Pump Station, in exchange for relinquishing a prescribed quantity of its new CVP allotment to PCWA for diversion at Folsom Dam. PCWA is already a CVP contractor, however, as previously noted, must await completion of the Sacramento River Water Reliability Study EIS/EIR and have Reclamation redefine its CVP service area before a diversion of CVP water from Folsom Dam under this exchange could occur.

The exact quantities of the exchange and the conditions of their diversions would be the subject of an agreement between GDPUD, PCWA, and Reclamation. One important consideration in any such exchange would be the differential in shortage provisions between CVP water and non-CVP water rights (see Figure 3.5-3).

For such an exchange to be put to beneficial use by GDPUD, PCWA would ultimately have to petition the SWRCB for a Change in Place of Use (POU) of its MFP water rights. This SWRCB action would be necessary because currently, MFP water rights are not approved for use in El Dorado County. For GDPUD to use MFP water rights water, therefore, its service area would have to be included in an expanded POU for MFP water rights. Execution of the master contract between Reclamation and EDCWA, however, does not, in itself, require any action or approval by either PCWA or the SWRCB. In fact, deliveries of the new contract water could be wholly made, consistent with both P.L.101-514 and the provisions of the master contract, without any involvement by PCWA or the SWRCB, if diversions by GDPUD could be made directly from Folsom Reservoir. PCWA and SWRCB involvement is solely contingent upon GDPUD initiating and proceeding with a request for an exchange at some point in the future, at its sole discretion.

The DEIR/EIS, Final EIR, and this Final EIS provide the project-level hydrologic analysis which not only supports the execution of the new CVP water service contract (i.e., the Proposed Action), but also a possible future exchange between PCWA and GDPUD made at the American River Pump Station on the North Fork American River. The SWRCB, PCWA and GDPUD could, in the future, rely upon the Final EIR as the proper environmental tiering document under CEQA.

If such an exchange were to come to fruition in the future, separate project-level environmental documentation addressing issues other than hydrology, with either PCWA or GDPUD serving as the Lead Agency under CEQA, would need to be prepared. This would include any new pumping facilities, conveyance infrastructure, storage reservoirs, related appurtenances and/or ultimate new treatment facilities.

3.5.2.7 Proposed Subcontractor Service Areas

CVP water is permitted for use only within a specified area as set in Reclamation's permits with the SWB. This area is known as the CVP Consolidated Place of Use (or CVP CPOU) and is illustrated in Figure 3.5-2. The Subcontractor service areas where the proposed P.L.101-514 water will be put to beneficial use is identified by the black-hatched areas on Figure 3.5-2. The Subcontractor service areas where EID intends to deliver water obtained through this contract is consistent with the CVP CPOU. Consistent with Reclamation contracting law, no CVP water can or will be delivered to areas outside of the CVP CPOU.

For GDPUD, since it would be acquiring new water through an exchange of CVP and non-CVP water, the CVP CPOU is not applicable for its use of new water. As long as the exchanged CVP water (to PCWA) is used within the CVP CPOU,[29] which it presumably would be, there would be no violation of federal reclamation law regarding the exchange. The Subcontractor service areas are also known collectively, as the landside, or terrestrial federal *action area* (e.g., this is distinct from the aquatic federal *action area* which covers the CVP/SWP reservoirs and waterways, including the Bay-Delta).

Since the new contract water would be restricted to M&I use, the black-hatched areas shown in Figure 3.5.2 are limited to areas zoned for residential, commercial, public and industrial use according to the 2004 El Dorado County General Plan. All areas in the proposed Subcontractor service areas are wholly within the current service boundaries of either EID or GDPUD. In the future, if either purveyor wishes to expand its Subcontractor service area beyond that currently delineated, two possibilities could arise. If the areas to be added are outside of the current CVP CPOU, Reclamation's inclusion process would have to be requested. Additionally, if the areas to be added are outside of the purveyor's own service area boundaries, an annexation process with the El Dorado Local Agency Formation Commission (LAFCO) would have to be initiated. All

29 As previously stated, PCWA has included a request for a redefined CVP service area within the Sacramento River Water Reliability Study EIS/EIR.

required environmental documentation to support either process would have to be prepared at that time under the direction of Reclamation or El Dorado LAFCO.

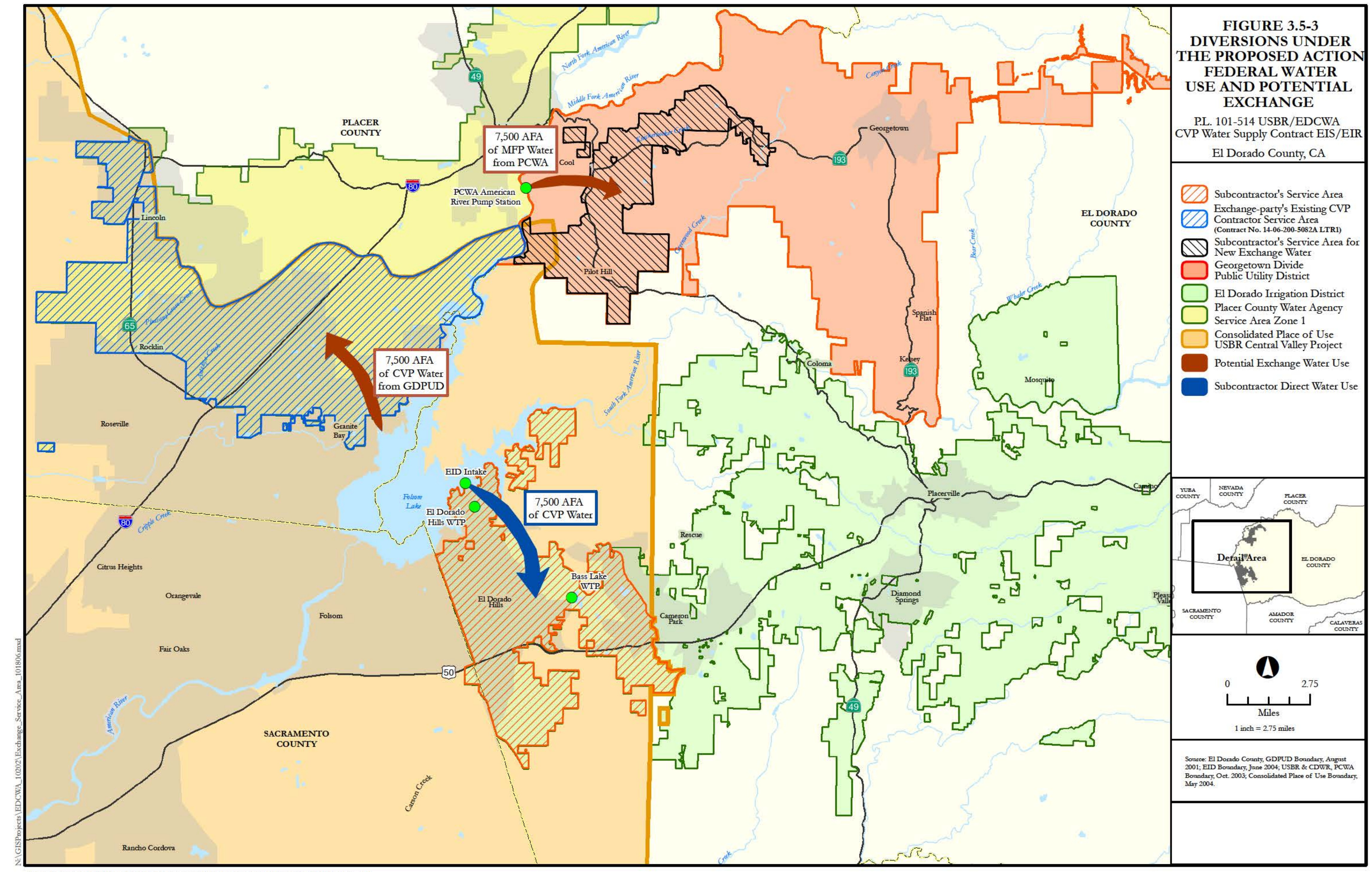

Figure 3.5-3 Diversions Under the Proposed Action Federal Water Use and Potential Exchange

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3.5.2.8 EID Proposed Subcontractor Service Area

The western portion of the EID service area is shown in Figure 3.5-2, where EID provides surface water to approximately 140,000 acres. Its service area covers approximately 30 percent of western El Dorado County. EID's larger sphere of influence, about 347,000 acres, spans from El Dorado Hills in the west to Pollock Pines in the east, and from the Cosumnes River on the south to the South Fork American River on the north. Elevations in the primary EID service area range from 500 feet msl in the west to over 4,000 feet msl in the east. EID provides treated water to the communities of Pollock Pines, Camino, El Dorado, Diamond Springs, Shingle Springs, Cameron Park, El Dorado Hills, Outingdale, and Strawberry. It also provides both wholesale and retail water service within the City of Placerville.

3.5.2.9 GDPUD Proposed Subcontractor Service Area

GDPUD currently provides surface water to about 30,000 acres within its service area, of which 2,500 acres are in irrigated orchard, vineyard and pasture crops. Its service area encompasses approximately 75,000 acres. GDPUD's sphere of influence, about 173,000 acres, extends from the Middle and North Fork American River upstream of Folsom Reservoir and the Rubicon River to the north, to the South Fork American River, to the south. Its service area continues east as far as Stumpy Meadows Reservoir on Pilot Creek. Elevations in the GDPUD service area range from between 800 feet msl in the southwest, to about 3,500 feet msl in the northeast.

GDPUD's proposed Subcontractor service area, like EID's, is also restricted to areas within its current boundaries zoned for residential, commercial, public and industrial use. At this time, GDPUD does not intend to serve water obtained through this Proposed Action east of the Greenwood area, since the elevation differential between the American River Pump Station and the Greenwood area would be at the maximum economically feasible for pumping. The relatively small number of users beyond this area would likely make the cost of pumping water further uphill to Georgetown infeasible.

3.5.2.10 Contract and Diversion Pattern

Regardless of how the total contract amount is split between EID and GDPUD, actual annual allocations would be set based on the yearly determination of water availability made by Reclamation. Early in the water year, CVP contractors request a certain amount of water, up to their full contract amount, based on anticipated needs for that year. Reclamation then allocates water for CVP contractors based on historical uses, available Project storage, and the current year's water conditions. Allocations are expressed as a percentage of historical use during the prior three years of unrestricted allocations. Allocation for the proposed new CVP water service contract could typically range from 75 to 100 percent of historic water use depending on the availability of water and extend as low as 50 percent of historic use under extreme drought conditions under the CVP M&I Shortage Policy, dated November 13, 2015.

Accordingly, the proposed new CVP water service contract would be subject to the same shortage provisions as all other CVP M&I contractors consistent with the Draft M&I CVP Shortage Policy. Adherence to Reclamation shortage provisions is a Term and Condition of the contract. The draft Master Contract (Contract No. 07-WC-20-3534), includes the standard Articles pertaining to CVP water service contracts. These include, but are not necessarily limited to:

- Terms of the Contract
- Point of Diversion
- Point of Delivery/Place of Use and Contractor Service Area
- Timing of Delivery
- Measurement of Water
- Rates and Methods of Payment
- Sales, Transfers or Exchanges
- Temporary Reductions and Shortage Provisions
- Constraints on Availability
- Water Conservation Requirements (including the provision for tiered pricing as specified under P.L. 102-575)

Typically, new water deliveries are expected to occur on a characteristic demand pattern (consistent with either M&I or Ag use) on a monthly use pattern. Table 3.5-2 illustrates a potential monthly demand/diversion pattern for both EID and GDPUD and assumes an equal allocation of 7,500 AFA each to the two districts.

Operational constraints during much of the year, however, preclude EID from diverting CVP water on a typical demand pattern. In any given year, EID takes its various water right entitlements first based on its past practices and economics. Existing system capacity during the early portion of the year is not conducive to taking this new CVP water at these times since much of the available capacity is used for its water right entitlements. Consequently, EID would most likely take the new

TABLE 3.5-2. TYPICAL M&I EXPECTED MONTHLY DIVERSIONS OF THE P.L.101-514 CONTRACT WATER BY EID AND GDPUD (AF PER MONTH)

Diversion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Percent of annual	4	4	4	5	8	12	16	16	13	9	5	4	100
EID	300	300	300	375	600	900	1200	1200	975	675	375	300	7,500
GDPUD	300	300	300	375	600	900	1200	1200	975	675	375	300	7,500
Total	600	600	600	750	1,200	1,800	2,400	2,400	1,950	1,350	750	600	15,000

CVP water allocation during a short period spanning the late summer months, at the end of its peak demand season. One scenario could have EID taking the new P.L.101-514 water - wholly during the months of July, August and September, as individual diversions of 2,500 AF per month.

Conversely, for GDPUD, without the same operational constraints, it would likely divert its allocation on a more typical yearly M&I pattern. Therefore, the Proposed Action diversion schedule assumes an EID diversion from Folsom Reservoir condensed to three late-summer months of 2,500 AF each, while the GDPUD diversion would follow a more typical yearly M&I demand pattern. Table 3.5-3 below, shows how these diversion patterns would differ, with EID's pattern skewed to the three midsummer months. This represents Alternative 2A – Proposed Action – Scenario A or, simply, Proposed Action – Scenario A. As discussed later, adopting this diversion pattern (at least in the case of EID) also provides a *worst-case* scenario for environmental review purposes and presents a positive bias for disclosing potential environmental effects.

TABLE 3.5-3. EXPECTED MONTHLY DIVERSIONS OF THE P.L.101-514 CONTRACT WATER BY EID AND GDPUD (AF PER MONTH) PROPOSED ACTION – SCENARIO A

Diversion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EID	0	0	0	0	0	0	2500	2500	2500	0	0	0	7,500
GDPUD	300	300	300	375	600	900	1200	1200	975	675	375	300	7,500
Total	**300**	**300**	**300**	**375**	**600**	**900**	**3700**	**3700**	**3450**	**675**	**375**	**300**	**15,000**

Variations of this Proposed Action scenario exist. Each variation makes certain assumptions about the ability of either GDPUD or EID to take this water and was developed to maximize the flexibility of the environmental review to support the pending contract. Table 3.5-4, for example, illustrates a potential diversion schedule that assumes a situation where GDPUD cannot physically take any of the new contract water for whatever reason, thereby re-allocating the complete contract amount to EID. This represents the Alternative 2B – Proposed Action – Scenario B or, simply, Proposed Action – Scenario B.

TABLE 3.5-4. EXPECTED MONTHLY DIVERSIONS OF THE P.L.101-514 CONTRACT WATER BY EID AND GDPUD (AF PER MONTH) PROPOSED ACTION – SCENARIO B

Diversion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EID	0	0	0	1000	1000	2500	2500	2500	2500	2000	0	0	15,000
GDPUD	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**0**	**0**	**1000**	**1000**	**2500**	**2500**	**2500**	**2500**	**2000**	**0**	**0**	**15,000**

Conversely, Table 3.5-5 makes the assumption that GDPUD is capable of taking the entire contract amount, that is, up to the limit of the El Dorado County General Plan projections for its service area. At this level of diversion, an analysis of GDPUD's demands indicate that it could take 11,000 AFA of the new contract water, leaving 4,000 AFA for EID (pers. comm. M. Preszler, 2006). This diversion option represents Alternative 2C – Proposed Action – Scenario C or, simply, Proposed Action – Scenario C.

TABLE 3.5-5. EXPECTED MONTHLY DIVERSIONS OF THE P.L.101-514 CONTRACT WATER BY EID AND GDPUD (AF PER MONTH) PROPOSED ACTION – SCENARIO C

Diversion	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
EID	0	0	0	0	0	0	1300	1400	1300	0	0	0	4,000
GDPUD	500	500	500	600	900	1300	1500	1500	1500	1100	600	500	11,000
Total	**500**	**500**	**500**	**600**	**900**	**1300**	**2800**	**2900**	**2800**	**1100**	**600**	**500**	**15,000**

Each of the Proposed Action Scenarios was carried forward for hydrologic modeling as part of the environmental evaluation; as noted, this additional level of analysis provided maximum flexibility to Reclamation, EDCWA, EID, and GDPUD to implement the proposed new contract. See Subchapter 5.2 of the 2009 Draft EIS/EIR (Overview of Impact Analysis) for a complete discussion of the diversion schedules and associated details used in the hydrologic variations in P.L.101-514

3.5.2.11 Contract Implementation impact analysis modeling.

Additional CALSIM II modeling, consistent with and relying on LTO DEIS, was completed to verify the modeling and impact analysis documented in the 2009 DEIR/EIS. Additional modeling comparing the LTO DEIS No Action Alternative with and without the P.L. 101-514 contract was completed. This was used to determine the level of significance attributable to the P.L. 101-514 contract for each of the diversion-related impacts.

Depending on the needs of EID and GDPUD which, to a large extent, would be dictated by the anticipated and actual growth within their service areas, water demands could accrue disproportionately between these water purveyors. EDCWA, as the holder of the master contract, would be responsible for ensuring that the county, within its western slopes, would derive benefit from this new water allocation. Any arrangements for water deliveries stemming from this Proposed Action will be carefully reviewed by EDCWA and Reclamation and be based on genuine water needs.

As previously described, the Proposed Action, therefore, in deference to the fact that EID and GDPUD have differing needs and capabilities in terms of physically taking the new CVP contract water, is made up of various alternative diversion scenarios (Alternative 2 – Proposed Action) including:

- Alternative 2A (Preferred) – Proposed Action (EID – 7,500 AFA and GDPUD – 7,500 AFA)

- Alternative 2B – Proposed Action (EID – 15,000 AFA and GDPUD – 0 AFA)
- Alternative 2C – Proposed Action (EID – 4,000 AFA and GDPUD – 11,000 AFA)

These diversion scenarios and their analysis provide a broader means of assessing the potential environmental effects of the Proposed Action. Accordingly, it covers a wider range of implementation possibilities than the use of just a single diversion scenario.

3.5.3 Alternative 3: Water Transfer Alternative

Alternative 3 (Water Transfer Alternative) would provide an alternative source of non-CVP water supply to serve future projected M&I water demand within the EID and GDPUD the EDCWA service area. Under Alternative 3, EDCWA would acquire up to 15,000 AFA of non-CVP water via a water transfer agreement. For EDCWA to initiate a water transfer, a willing purveyor with a reliable long-term water supply would have to be identified. Moreover, for any such transfer to be economically feasible, proximity to the ultimate use areas within the EID and GDPUD service areas would be important as would the availability of infrastructure. For EID, any purveyor holding a water entitlement in Folsom Reservoir (e.g., City of Folsom, SJWD, and PCWA) could provide a feasible water transfer alternative if available supplies existed and those supplies were long-term.

For GDPUD, because of its location, any water transfer would need to be carried out in a way similar to what is contemplated under the Proposed Action. For this alternative, it is, likely that GDPUD would have to use a point of diversion on the North Fork of the American at the American River Pump Station as well as PCWA's Middle Fork Project (MFP) water rights. More complicated transfers are possible offering a wider range of potential willing water suppliers over a broader geographic range, but such alternatives would involve multiple parties, the likely need for exchange provisions, and increasingly complex facility and pump-back arrangements. For potential transfer partners on the Sacramento River or its tributaries, a complex arrangement would be needed to secure an exchange with a local purveyor having entitlements in Folsom Reservoir so that EID or GDPUD could benefit from any such agreement.

As part of the El Dorado Water & Power Authority's proposed Supplemental Water Rights Project, there is an opportunity for a long-term water transfer with the City of Sacramento. The City of Sacramento, with large unused water entitlements in the upper American River basin, may be willing to transfer a portion of its unused entitlements to EDCWA under an arrangement negotiated between the two parties. Such a transfer, however, would also need Reclamation support since the City's entitlements are tied to Reclamation's permits, as noted previously. Furthermore, as noted earlier, water demands established in the 2004 El Dorado County General Plan verify a need not only for the 15,000 AFA contemplated by the Proposed Action, but also for the Supplemental Water Rights Project as a separate and complimentary project, rather than as an alternative to the Proposed Action.

Water acquisitions under this alternative may, to some degree, also include temporary supplies such as surplus water (e.g., Section 215 water) from Reclamation "spilled" from Folsom Reservoir during the flood season under encroached conditions in the reservoir. Spill water, would not, however, be available outside of these periods and could not be used for drought planning or as a component of any firm yield projection. With the potential for continued and exacerbated water shortage conditions into the future, an increasing number of water purveyors are prudently looking at all options, short-term and long-term, as part of their overall secured water supply portfolios.

3.5.4 Alternative 4: Demand Reduction Alternative (Scenarios A, B, and C)

As presented in the Draft EIS/EIR, Alternative 4 considers means that would reduce future demand within the EID and GDPUD service areas and thus reduce annual diversions made available under P.L. 101-514. As described below, two potential avenues to achieving reduced demand are considered including: increased water conservation and growth control.

3.5.4.1 Increased Water Conservation

Currently, both EID and GDPUD implement a variety of water conservation practices. These practices are consistent with the best management practices (BMPs) identified in the CUWCC *Memorandum of Understanding* and include, but are not limited to tiered pricing, water meters, leak audits, and public education. EID's Water Efficiency Division offers numerous programs directed towards conserving water uses for agricultural, commercial, residential, and landscaping purposes.

Water conservation can also be applied to raw water delivery. Both EID and GDPUD still rely on open ditches/canals as part of their delivery infrastructure to water treatment facilities. Water losses from these conveyances, through seepage, direct evaporation, evapotranspiration, and intended/unintended side and end spills still occur in varying degrees. GDPUD, for example, still experiences canal losses approximating 30 percent annually. EID, however, meets its loss targets of less than 15 percent for a rural water agency. While it is unlikely that EID or GDPUD could implement increased water conservation measures that would generate significant increased savings on the user end, raw water conveyance losses could be notably reduced through full canal/ditch encasement. Such improvements could increase agricultural water delivery efficiencies, especially in the GDPUD service area.

3.5.4.2 Growth Control

Growth control would involve slowing the rate of growth in those parts of the EID and GDPUD service areas where this proposed new water contract would be served. As a future water demand reduction measure, slowed growth or even placing a moratorium on new growth has the potential to conserve existing water supplies. Neither EID nor GDPUD, however, as special district water providers, possess land use authority that would enable them to directly control growth within the County. Growth pressures in El Dorado County are generated irrespective of the water purveyors. In fact, State law gives EID and GDPUD the legal obligation to obtain the supplies necessary to serve planned growth.[30] Institutionally, the entity responsible for planning for growth within unincorporated El Dorado County is the county itself, with its key document being the current County General Plan. That document, as noted earlier, establishes the need not only for the full 15,000 AFA contemplated by P.L.101-514, but also for additional supplies, such as might be obtained through the El Dorado Water & Power Authority's ongoing Supplemental Water Rights Project.

While the lack of new or expanded water supplies can have the practical consequences of slowing the rate of population growth, State law does not permit EDCWA or its member agencies to simply refuse to seek the full supplies necessary to serve growth. Rather, current statutes such as Senate Bill 610 (Wat. Code § 10910 et seq.) and Senate Bill 221 (Gov. Code § 66473.7) relate to the timing and procedures for obtaining water needed for planned growth, and do not permit water suppliers to either simply give up on finding needed water or to refuse to obtain water in order to thwart full implementation of growth decisions made by elected county and/or city officials.

3.5.4.3 Reduced Diversion Scenarios

From an alternatives perspective, reduced diversions warrant careful consideration since they represent options that would impart less impact on the aquatic environment, relative to the full diversion allocations provided for under P.L.101-514. A fundamental tenet of NEPA is that alternatives to the Proposed Action should reduce or minimize environmental effects, relative to the Proposed Action. A reduced diversion alternative would meet those requirements.

Under these alternatives, water allocations would be made to some total lesser amount than that authorized. For the purposes of analysis in the Draft EIS/EIR and this Final EIS, three separate possible reduced diversion alternatives were considered. These included gradations for which decreasing quantities of 2,500 AFA were made from the full 15,000 AFA down to the 50 percent allocation (from full entitlement). The three reduced diversion alternatives evaluated in this EIS are:

- Alternative 4A: 12,500 AFA
- Alternative 4B: 10,000 AFA

30 See Swanson v. Marin Municipal Water District (1976) 56 Cal. App. 3d 512, 524 (water district has a "continuing obligation to exert every reasonable effort to augment its available water supply in order to meet increasing demands"); Glenbrook Development Co. v. City of Brea (1967) 253 Cal. App. 2d 267, 277 ("county water district has a mandatory duty of furnishing water to inhabitants within the district's boundaries"); Lukrawka v. Spring Valley Water Co. (1915) 169 Cal. 318, 332 (water company accepting franchise to furnish water assumes duty to provide service system that keeps pace with municipality's growth); Building Industry Association of Northern California v. Marin Municipal Water Dist. (1991) 235 Cal. App. 3d 1641, 1648-1649 (discussing municipal water district's duty to augment its water supply and discretion in determining how the existing water system can and should be augmented).

- Alternative 4C: 7,500 AFA

It is assumed that the reductions under these scenarios would be shared equally between EID and GDPUD. As noted previously, an alternative that could, potentially, result in fewer or diminished environmental impacts on the CVP/SWP, its waterbodies, and related aquatic resources, relative to the Proposed Action, would be consistent with the requirements of NEPA (40 CFR 1502.14). All of the other components necessary to deliver water as described under the Proposed Action would apply to these scenarios under Alternative 4. Demand Reduction Alternative.

3.5.5 Alternatives Selection and Screening Process

The Proposed Action, as defined, is the execution and ultimate implementation of the new CVP M&I water service contract authorized under P.L.101-514 between Reclamation and EDCWA. This action, in essence, is a new water supply allocation up to 15,000 AFA from the CVP. Potential alternatives to the Proposed Action listed in the Draft EIS/EIR included three categories. The first category includes alternatives that would secure new sources of water supply not provided under P.L. 101-514. The second category of alternatives considers possible reductions in existing and future water demand in lieu of developing new water supplies. The third category of possible alternatives to the Proposed Action considers possible variations in the way the P.L.101-514 contract could be implemented that are not considered part of the Proposed Action

3.5.5.1 Alternative Water Supplies

Potential alternative water supplies to the Proposed Action could include new water rights, new storage, groundwater and groundwater banking, and reclaimed wastewater.

3.5.5.1.1 New Water Rights

A new water right for EDCWA would require a filing with the SWRCB for either a partial assignment of existing State filed applications or a new separate area-of-origin application relying on the protections provided in D-870 and D-893. In March 1957, the SWRCB, in reviewing the applications of the Sacramento Municipal Utility District (SMUD) for its Upper American River Project (UARP) and, specifically, the requests for direct diversion and diversions to storage from the South Fork Rubicon River, Rubicon River, Rock Bound Creek and Gerle Creek found that unappropriated water was available for power purposes. Moreover, the SWRCB found that water may be appropriated in the manner proposed in the applications without injury to any other lawful user. This was codified in Decision 870 (D-870). In March 1958, the SWRCB issued Decision 893 (D-893), granting permits to Reclamation for storage of water at Folsom Reservoir.[31]

31 The Decision also granted permits to the City of Sacramento for the diversion of water from the American River. The City holds water rights on the Sacramento River as well. The Decision also granted to Sacramento, San Joaquin and Placer counties, a 10-year period in which to negotiate with the United States for a contact for American River water before the supply was permanently committed elsewhere.

Reclamation's permits were subject to minimum flows for fisheries resources, as provided for in a memorandum between Reclamation and the Department of Fish & Game (e.g., 250 cfs from January 1 through September 14, and 500 cfs from September 15 through December 31). Reclamation's permits were also subject to reduction as a result of future water appropriations for reasonable beneficial use within the watershed tributary to Folsom Reservoir.

A water source for an appropriation would need to be identified along with any proposed points of diversion, proposed quantities, delivery timing, and beneficial uses. A new water right acquisition for El Dorado County, however, is not a new concept. In 1980, for example, El Dorado filed applications for the proposed South Fork American River (SOFAR) project and petitioned for the assignment of various State-filed applications, including Application No. 5645.[32] Later, in March 1991, El Dorado filed four applications to appropriate water from Silver Lake, Caples Lake, Lake Aloha and the South Fork American River, which it subsequently, the following year, surrendered back to the SWRCB.

Most recently, EDCWA and SMUD have completed negotiation of a Cooperative Agreement that essentially provides EDCWA the use of SMUD's facilities in the UARP as part of the agency's longer term efforts at securing a new supplemental water supply. Currently, the El Dorado Water & Power Authority is pursuing a supplemental water supply through pending water right filings before the SWRCB for a project known as the Supplemental Water Rights Project. This is a separate and distinct project from the P.L. 101-514 contract and supported by its own water needs justification. EDCWA and its member districts, in planning to meet demand established by the 2004 County General Plan, will need the 15,000 AFA contemplated by this Proposed Action, plus additional supplies that might be obtained through a variety of means, including new water rights. Thus, the process of obtaining such rights is not an alternative to a contract between Reclamation and EDCWA, but rather, is a separate project with its own demand increment that is being be pursued separately albeit coincidentally.

3.5.5.1.2 New SWP Contract

A new SWP water contract for EDCWA would likely require a complex multi-party agreement in order to provide EDCWA with a comparable water supply, relative to the Proposed Action. Since SWP supplies originate in the Feather River (at Oroville Reservoir), flow to the Sacramento River and do not include any flows from the American River, a State Water Contract held by EDCWA for such Feather/Sacramento river water would have to be exchanged with an American River purveyor holding entitlements in Folsom Reservoir and/or points upstream, but with access, either directly or through a wheeling arrangement with another party, who can access the Sacramento

32 Application 5645, filed on July 30, 1927, was one of 37 applications filed in 1927 by the [State] Director of Finance under authorization provided by the Feigenbaum Act that sought a permit to appropriate for irrigation and domestic use, various amounts of water from various points in El Dorado County on the tributaries to the American and Cosumnes rivers, including the South Fork American River.

River (through releases from Oroville Reservoir). With the completion of the "RiverArc" Project (i.e., the proposed Sacramento River diversion upstream of the confluence with the American River, this alternative may hold increased feasibility.

It should be noted, however, that the RiverArc Project has not yet been approved and construction would begin no sooner than 2020.[33] It currently does not envision the sort of very complex multi-party water exchange described herein with the El Dorado County interests. Nor is DWR, which manages the SWP, a participant in the SRWRS Project, which currently involves CVP water and water obtained from State water rights, but no SWP contract water.

3.5.5.1.3 New Storage

For EDCWA to develop new storage, a new permanent reservoir site of sufficient capacity and proximity to both EID and GDPUD would be required. Moreover, once the reservoir(s) was approved, designed, and constructed, there would still be the need for EDCWA to perfect a water right to store, divert, and use any captured water within the new facility. The concept of new reservoir storage in the upper American River basin has been considered for many years. Canyon Creek Reservoir, for example, was identified as far back as the 1950's as a potential new storage facility for GDPUD. Recent studies have identified certain potential new on-stream reservoir sites such as Lower Ice House Reservoir[34] on the South Fork Silver Creek as well as a number of smaller reservoirs (e.g. Alder Creek Reservoir).

Within El Dorado County as well, pumped-storage reservoirs are gaining favor. Pumped-storage reservoirs are, however, typically smaller reservoirs and alone, would not meet the broader objectives for supplemental water supply development in the western slopes of the county. Moreover, current pumped-storage reservoirs are designed and operated for power production only and are not used for water supply enhancement.

The available hydrology of the American River basin in which the average annual unimpaired inflow is well over twice the maximum storage of Folsom Reservoir demonstrates that new storage alternatives are, however, feasible in terms of mass balance hydrology.

3.5.5.1.4 Groundwater and Groundwater Banking

Groundwater development within El Dorado County is highly tenuous and site-specific at best. Unlike the lower slopes of the Foothills and the Central Valley where deep alluvial unconsolidated materials provide excellent water bearing formations, the more igneous/metamorphic origin of the

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33 http://riverarcproject.com/project-timeline/ PCWA Project Website. Screenshot dated 5/5/2016.

34 See Joint Benefit Investigation Plan, Technical Analysis of Preliminary Alternatives, Prepared for Joint Benefit Investigation Team, El Dorado County Water Agency, El Dorado Irrigation District, Sacramento Municipal Utility District, and Georgetown Divide Public Utility District, Mead & Hunt, July 2004.

Foothills does not lend itself to high yield aquifers. Groundwater well fields for M&I use are not practical in the Sierra Foothills.

Groundwater banking, however, to an off-site location outside of the Foothills is an option that has generated, and continues to generate interest. In fact, Reclamation is now considering allowing CVP contractors to bank their unused contract water in areas outside of the authorized place of use for CVP water (i.e., outside of the CVP Consolidated Place of Use), and is working on a process to facilitate these actions. Currently, CVP contractors may bank federal water within each of their service areas without Reclamation approval. Were Reclamation to develop this process, it is true that certain contractors would seldom bank outside of the CVP Consolidated Place of Use (e.g., within the Sierra Nevada Foothills), but it is conceivable that other contractors on the fringes of the Sierra Foothills may look to new Central Valley banking opportunities. Public workshops have been held by Reclamation introducing this new concept. While the details of any such federal program still need to be refined (e.g., accounting provisions, M&I versus Ag, financing, environmental compliance, etc.), the prospect of CVP-authorized groundwater banking represents an encouraging development and recognition by Reclamation that wider regional water management efforts need to be considered.

Under a groundwater banking program or project, EID or GDPUD could bank surplus water made available during the spring runoff period in a groundwater aquifer lower in the Sacramento Valley. An agreement with a downstream purveyor overlying a viable aquifer and possessing the appropriate infrastructure (e.g., percolation ponds or direct injection wells) would need to be negotiated and executed between the parties. Details would likely involve infrastructure cost sharing, timing of inputs/withdrawals, financial crediting, and water accounting. In dry years, the bank could be accessed or withdrawn by the downstream purveyor and EID or GDPUD could rely on the offsetting water entitlement held by the groundwater banking entity in Folsom Reservoir. This alternative would be more directed towards providing dry-year protection (drought contingency). Properly designed, it could provide multi-year drought protection.

3.5.5.1.5 Reclaimed Wastewater

EID is currently developing reclaimed wastewater in increasing quantities. Surface storage sites for reclaimed wastewater are currently being planned and reviewed at several locations in western El Dorado County. EID has recognized the benefits of this drought resistant water source and has implemented its recycled water education program to help promote greater community awareness and assistance in implementation. While reclaimed wastewater can provide a genuine water demand offset for non-potable uses, reclaimed sources are not yet approved for potable uses. Accordingly, such use limitations significantly hamper reclaimed wastewater from ever being relied upon as a primary water supply source. To the extent, however, that reclaimed water can provide continually increasing supplies for landscape irrigation which can represent a significant demand on urban/rural outdoor use, reclaimed wastewater will continue to be an important component of long-term water resource management planning.

3.5.6 Alternatives Considered But Eliminated From Further Review

Each of the potential alternatives identified and described above was evaluated against the screening criteria listed in Table 3.4-1, covering a range of standards (e.g., industry norms). Alternatives that met the various screening criteria also had to be able to attain *most* of the Proposed Action's basic objectives and avoid or substantially lessen one or more of the Proposed Action's significant environmental impacts.

As noted in Chapter 2.0 (Purpose and Need), the following primary project objective is:

- Execution of a new CVP M&I water service contract between Reclamation and EDCWA in accordance with the Congressional mandate of P.L.101-514;

Additional project objectives for EDCWA also include:

- Consistent with P.L 101-514, diverting federal water for use in El Dorado County, following completion of the administrative procedures that Reclamation and SWRCB must complete in order to implement that Congressional mandate;
- Consistent with P.L. 101-514, entering into a new CVP M&I water service contract to supply what Congress considers to be the first phase of a long-term effort by El Dorado County to acquire supplemental federal water supplies to meet its future needs;
- Consistent with the enabling legislation and the legal "duty to serve" customers to which EID and GDPUD are subject, obtaining water supplies needed to support planned growth as embodied in the 2004 El Dorado County General Plan;
- Consistent with the existing policies and ongoing efforts of EID, GDPUD, and El Dorado County to conserve water during single- or multiple-dry year scenarios, to provide additional reliable water supplies to reduce the severity of dry-year cutbacks imposed on County residents, businesses, and other customers; and
- Delivering the new CVP M&I water supply through existing, planned, and agreed infrastructure.

By reviewing the project objectives against the alternatives, an initial assessment of the validity and reasonableness of the alternatives can be made. If an alternative does not satisfy the purpose and need for the Proposed Action, as a rule, it should not be included in the analysis as an apparent reasonable alternative. There are times in fact when an alternative that is not reasonable is nevertheless included based on the request of another agency or due to public expectation. As discussed previously, alternatives should offer some offset to the expected environmental impacts associated with the Proposed Action; providing the decision makers with a reasonable range of alternatives with which to compare impacts and associated benefits.

The degree of analysis devoted to each alternative in an EIS is to be substantially similar to that devoted to the Proposed Action. NEPA regulation section 40 CFR 1502.14 is titled "Alternatives including the Proposed Action" to reflect the requirement for comparable treatment. NEPA regulation section 40 CFR 1502.14(b) specifically requires "substantial treatment" in the EIS of each alternative including the Proposed Action. This regulation does not dictate an amount of information to be provided, but rather, prescribes a level of treatment, which may in turn require varying amounts of information, to enable a reviewer to evaluate and compare alternatives.

The project objectives are, for the most part, clearly directed towards the execution, implementation, and long-term reliance on the proposed new CVP M&I water supplies provided under the authority of P.L. 101-514. Assessing the alternatives strictly in light of this objective would be somewhat deceiving, however, since none of the alternatives are specifically called out in P.L. 101-514. More practically, the purpose and need of the Proposed Action, in part, is to secure a new water supply; the Congressional mandate of P.L. 101-514 simply provides EDCWA with the authority to do so in a specific manner, and with a specific means. Accordingly, the range of feasible alternatives should be viewed in this context.

Table 3.7-6 identifies the Alternative Water Supply options and the screening results for those potential alternatives using the criteria identified in Table 3.4-1. Each of the alternatives, in varying degrees, provide for a new water supply or an offset to current demands such that a reduction in overall potable water would be accomplished.

TABLE 3.7-6. ALTERNATIVE WATER SUPPLIES SCREENING

Alternative	T&E Feasibility	WQ	Environ. Fatal Flaw	Economics	Long-Term Reliability	Public H&S	Timing	Institutional
New Water Right	✓	✓	✓		✓	✓		
Transfers	✓	✓	✓	✓		✓	✓	✓
SWP Contract	✓	✓	✓			✓		
Storage		✓	✓		✓	✓		
GW Banking	✓		✓	✓			✓	
Reclaimed	✓		✓	✓			✓	

Note:
✓ Checkmarks denote that the alternative passed the screening for that criterion.

From Table 3.7-6, the alternative that best satisfies the selection criteria appears to be a new water transfer. This alternative passed all of the screening criteria except for Long-Term Reliability. Without knowing the specifics of any such potential transfer, it is not assured that it would possess viability in the long-term, relative to the proposed 40-year CVP M&I contract under P.L. 101-514. Yet, for all intents and purposes, it proved worthy and, hence, reasonable. Moreover, water transfers in an area such as the greater Sacramento area hold increased promise simply due to the number of water purveyors available that may be capable of participating. In fact, when looking at the various purveyor-specific agreements codified in the Water Forum Agreement, the number of inter-agency agreements that rely on some form of transfer is compelling. Transfers and assignments, within the greater Sacramento area are clearly an important component in the make-up of water purveyor portfolios.

A new water right as an alternative is complicated by both its costs and related timing. Given the pending water right filing by the El Dorado Water & Power Authority as part of its Supplemental Water Rights Project, a duplicative filing, as an alternative to the P.L 101-514 contract did not seem realistic. The economics of such an endeavor as well the timing constraints, also present problems. EDCWA would have to initiate a new regulatory process from the outset; thereby, negating any progress and timing advantage afforded by the P.L. 101-514 contract which has the benefit of many years of progress. Institutionally, the SWRCB would be confronted with potentially two water right applications and a compelling case would need to be prepared to justify this duplicative effort.

Acquiring a new SWP M&I contract, for essentially the same reasons as a new water right filing did not pass the Economics, Timing, or Institutional criterion. EDCWA would be engaging the DWR for a new M&I contract and again, would be starting from the beginning of that process. The complexities of any potential multi-party arrangement that would be necessary in order to allow EDCWA to hold rights to Feather/Sacramento river water in exchange for a diversion of American River water are daunting and would require years of negotiation.

While it is acknowledged that several small reservoirs are being considered within the western slopes of El Dorado County and indeed, pumped storage projects are underway, a large on-stream reservoir such as Lower Ice House or Canyon Creek failed several criteria. While these potential new reservoirs, under differing conditions of comparison may prove beneficial and supportable, they did not pass the majority of the screening criteria relative to the Proposed Action. A primary advantage associated with such large new reservoirs would be their long-term reliability, excellent water quality, and retained control by EDCWA or its member agencies.

Significant drawbacks to storage alternatives include the same issues facing all new on-stream reservoirs in California: significant environmental issues; the high cost of approval, design, and construction; the lengthy approval process; and, in the case of these reservoirs, the availability or acquisition of site locations that, at this time, cannot be reasonably assured. Pumped storage projects in El Dorado County are traditionally smaller than most reservoirs; numerous projects would have to be identified, approved, designed, and constructed before an equitable water supply to that provided by the P.L. 101-514 contract. Also, as noted previously, current pumped storage project design and operations would have to be revised to coincidentally include water supply development in addition to hydropower generation.

The screening of groundwater and groundwater banking as potential alternatives revealed completely opposite results from new storage reservoirs. Groundwater within El Dorado County is not a viable option, as no appreciable aquifers or groundwater supplies exist in the county. Groundwater banking regionally (across multiple counties), however, shows promise and is gaining interest. The ability to store water in wet-years or during the annual wet season for long-term drought contingency planning is an increasingly attractive water resource management strategy. In El Dorado County where, as discussed, new surface storage reservoirs are challenging and no subsurface aquifer exists that can serve as an underground storage reservoir, off-site groundwater banking is gaining significant interest.

With groundwater, however, there is the patent uncertainty regarding the hydraulics of the phreatic zone and its potential for contaminant migration. This hydraulic condition can lead to uncertainty, perhaps unacceptable, in terms of guaranteeing adequate water quality. To a certain degree, this water quality uncertainty concern can be attenuated through wellhead treatment. Additionally, with unconfined aquifers and, especially those in unadjudicated basins, water balance calculations are premised on gross assumptions of the continuity equation (i.e., what goes in balances what comes out). A tight accounting system, therefore, would need to be developed and implemented to ensure proper tracking of accretions and depletions in any groundwater bank. While groundwater banking provides an excellent alternative to surface water storage, all of the conditions required of its proper site selection, financial agreement (with a groundwater banking purveyor), accounting system, and *in situ* hydraulics, make this alternative a speculative proposition at this time. Long-term reliability cannot be assured.

The screening of reclaimed wastewater alternatives showed the same results as groundwater and groundwater banking. Its fundamental drawback is in its inability to provide a potable water supply. While increasing reliance on reclaimed wastewater can, under the proper circumstances, offset or reduce on the amount of potable water an agency must provide, there is a maximum cap on the amount of reclaimed water that can serve local needs. This limitation exists because there is only so much landscape irrigation for which reclaimed wastewater could provide a benefit. From an economic perspective, retrofitting existing development infrastructure is very costly. Reclaimed wastewater, therefore, as a means of reducing potable water demands is typically limited to new development areas only. Failure of the Water Quality, Public Health & Safety and Institutional criteria were evident with this alternative.

Table 3.7-7 presents the screening results for the Demand Reduction Alternatives. Two alternatives in this category were evaluated: Increased Water Conservation and Growth Control. While increased water conservation easily passed all of the screening criteria, it could not meet an important check, the ability to meet the primary objective of the Proposed Action to provide a new water supply. Moreover, this alternative could be considered, for the most part, an action that is already being actively implemented. Many of the water conservation measures identified by the CUWCC *Memorandum of Understanding* are already being implemented by EID. In addition, there is general acceptance and acknowledgment that there is a limit to which additional water savings can be achieved at the consumer end, and hence, water conservation alone cannot be relied upon as a firm water supply for anticipated future planned growth. To the extent that open canals and ditches are still being used by both EID and GDPUD, however, increased water conservation could be achieved through various conveyance improvements (e.g., canal lining and pipelines) and this action would help reduce current agricultural deliveries.

TABLE 3.7-7. DEMAND REDUCTION ALTERNATIVES SCREENING

Alternative	T&E Feasibility	WQ	Environ. Fatal Flaw	Economics	Long-Term Reliability	Public H&S	Timing	Institutional
Increased Conservation	✓	✓	✓	✓		✓	✓	✓
Growth Control		✓	✓			✓	✓	

Note:
✓ Checkmarks denote that the alternative passed the screening for that criterion.

Growth Control, as an alternative, similar to the Increased Water Conservation alternative would not provide an additional water supply for EDCWA. It would not even provide an offset or an in lieu supply. Growth Control, by definition, would simply impose restrictions on all future development (residential, commercial, and institutional) for which, an additional water supply would be required. Such an alternative would halt further residential development in growing communities such as El Dorado Hills, Cameron Park, Shingle Springs, and Placerville and would remove any potential future development prospects in Pilot Hill and other areas on the Divide. Not only would the western slopes of the county be affected, but so would areas further uphill, as EID would be faced with water needs for which no additional supplies would be available.

A controlled growth alternative could only be implemented by El Dorado County as neither EDCWA nor any of its member agencies have the authority to impose such restrictions on land-use and population growth, an authority that rests with the County. In the longer term, to the County could amend or update its General Plan to impose growth control measures (consistent with provisions of State law requiring counties to identify lands for their “fair share” of new housing demands), but again, this action would be outside the purview of EDCWA or its member water agencies. The growth control alternative failed the Economic, Long-Term Reliability and Institutional criteria.

Table 3.7-8 identifies the three Reduced Diversion Alternatives under the Variable P.L.101-514 Contract Allocation discussion provided in this chapter. As discussed, these alternatives conceded implementation of the P.L. 101-514 contract, but at reduced diversion quantities. Relative to the Proposed Action, the results of the screening process were identical among the three Reduced Diversion Alternatives.

TABLE 3.7-8. VARIABLE P.L. 101-514 CONTRACT ALLOCATIONS SCREENING

Alternative	T&E Feasibility	WQ	Environ. Fatal Flaw	Economics	Long-Term Reliability	Public H&S	Timing	Institutional
Reduced Diversion – 12,500 AFA	✓	✓	✓	✓		✓	✓	✓
Reduced Diversion – 10,000 AFA	✓	✓	✓	✓		✓	✓	✓
Reduced Diversion – 7,500 AFA	✓	✓	✓	✓		✓	✓	✓

Note:
✓ Checkmarks denote that the alternative passed the screening for that criterion.

The only screening criteria that was not passed was Long-Term Reliability. As the water needs assessment has shown (see Chapter 2.0, Purpose and Need), the full-authorized contract amount of 15,000 AFA is needed between EID and GDPUD. Any reduction from that fully entitled by P.L.101-514 would not meet this established water need.

3.6 SCOPE OF THE ENVIRONMENTAL DOCUMENT

This EIS addresses the potential environmental and socioeconomic impacts of the various alternatives in two ways. First, as a new CVP water contracting action the document addresses the potential impacts of executing this master contract at a project-level. The specific potential effects of this new 15,000 AFA contract (or lesser amounts) diverted from the CVP, including its effects on coordinated CVP/SWP operations, Bay-Delta hydrology, and all other CVP-related water resources is evaluated in detail. This assessment is necessary to support the execution of the new full contract.

Second, to the extent that additional facilities would be required to ultimately implement this action, EID and GDPUD would be responsible for the eventual construction, operation, and maintenance of any such new facilities. The potential environmental impacts of any such facilities would be examined under separate, project-specific environmental documentation in the future, if and when those needs arise. To this end, this EIS provides the project-level hydrological analysis of the new CVP water service contract and includes the necessary hydrologic assessment for the SWRCB to rely upon in a Petition for Change in POU, if and when such a petition is made by PCWA and GDPUD to implement a water exchange, as discussed previously. Additional environmental documentation will be necessary in the future to address any infrastructure associated with a new diversion, conveyance/pumping, and treatment facilities involved in fully implementing a water exchange between PCWA and GDPUD.

Even though a project-specific review of any new potential facilities impacts would be completed in the future, a programmatic review of the facilities needed to ultimately deliver the P.L.101-514 contract water was considered as part of this EIS, only to the extent that such information is currently known. For the most part, little detailed information was available. As explained previously, this EIS primarily focuses on a detailed (or project-specific) review of the potential hydrological impacts associated with executing the master contract, involving a new diversion from the American River basin and a depletion of water supply from the CVP. The evaluation of indirect, or secondary effects of implementing this action, while important, have been exhaustively undertaken by El Dorado County as part of its General Plan Update process and associated EIR (El Dorado County 2004).

3.7 INTENDED USE OF THE EIS

A primary purpose of this EIS is to analyze the potential effects of executing a new water service contract with EDCWA consistent with P.L. 101-514 and reasonable alternatives to that proposed action. Section 206(b)(2) provides in relevant part;

> “Prior to entering into the contracts…the Secretary [of Interior] is directed to comply with the provision of the National Environmental Policy Act by preparing joint Environmental Impact Statements and California Environmental Quality Act Environmental Impact Reports.”

Reclamation is the federal Lead Agency under NEPA and has prepared this Final EIS to support its ultimate determination for the Proposed Action. After completion of the Final EIS, Reclamation will prepare a Record of Decision on the execution of the new water service contract.

3.8 CONSULTATION REQUIREMENTS/REQUIRED PERMITS AND APPROVALS

Consultation requirements for this Proposed Action cover a range of regulatory requirements. These are described and documented in greater detail in Chapter 7 (Consultation/Coordination and Applicable Laws) of this Final EIS. Key consultations have included those associated with the following legislation and identified public trust resource agencies (both federal and State):

- Federal Endangered Species Act (USFWS/NMFS)
- Fish and Wildlife Coordination Act (USFWS)
- National Historic Preservation Act (Reclamation/SHPO)
- Clean Water Act (U.S. EPA Region 9/USACE/Central Valley RWQCB)

A number of regulatory permits and approvals have been identified as potentially being required for the Proposed Action or related projects either currently or at some point in the future. Permits and approvals potentially applicable to the implementation of the Proposed Action may include:

- Petition for Change in POU (SWRCB)
- Clean Water Act Section 401 Water Quality Certification (Central Valley RWQCB)
- Clean Water Act Section 404 Department of the Army Permit (USACE)
- Reclamation Board Encroachment Permit (California State Reclamation Board)
- Section 1602 Streambed Alteration Agreement (CDFW)

As noted previously, with the exception of the Petition for Change in POU, all of the other permits and approvals are tied to future facility projects or new infrastructure and are not necessary to execute this new CVP water service contract.

This EIS provides a project-level evaluation of the hydrological changes and, therefore, potential environmental and socio-economic impacts on water-related resource values associated with the Proposed Action. For any of these permits and/or approvals necessitating or otherwise requiring hydrologic evaluation, this EIS provides that information. The need for several of these permits and/or approvals, however, remains speculative at this time, primarily because no new facilities or infrastructure are being proposed. They will only become applicable if and/or when project-level approvals for specific new projects are proposed in the future.

For this Proposed Action, significant efforts have gone into consultations under section 7(a)(2) of the federal Endangered Species Act with USFWS and NMFS. Aquatic resources, specifically, those related to the potential adverse effects on federally-listed aquatic fish species and their critical habitats, have been addressed in consultations with both USFWS and NMFS. Federally-listed wildlife and plant species were addressed in consultation with USFWS. Detailed discussion of the consultation processes is provided in Chapter 7.0 (Consultation/Coordination and Applicable Laws) of this Final EIS.

This new CVP water service contract will be identified as a new American River Division contract. The lower American River, including Folsom Reservoir, has been the focal point of significant collaborative conservation, restoration, and ecosystem protection work over the past several decades. The landmark Sacramento Water Forum Agreement, together with its Lower American River Habitat Management Plan, associated River Corridor Management Plan and, the most recent Lower American River (LAR) Flow Management Standard make this watercourse one of the most highly studied reaches in the CVP. As a new contracting action, Reclamation, EDCWA, EID, and GDPUD have recognized the importance of stakeholder liaison and coordination with local and regional interests. Reclamation and EDCWA have worked closely with the lower American River groups (e.g., Water Forum Successor Effort) in developing the Draft EIS/EIR, Final EIR, and this Final EIS.

The ongoing Water Forum work associated with the LAR Flow Management Standard and continued activities through the Water Forum Successor Effort have included both Reclamation and EDCWA as active participants. The Water Forum is not a legislated public entity and, as such, does not hold responsible agency status under CEQA or any status under NEPA. While various stakeholder agencies (e.g., CDFW, USFWS, and NMFS) within the Water Forum hold permitting and/or approval authority over certain aspects of the Proposed Action, the Water Forum itself does not. This Proposed Action has been recognized as a part of the future environmental baseline in all recent LAR initiatives and project planning.

4 ENVIRONMENT EFFECTS AND CONSEQUENCES

4.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

This chapter addresses the potential direct and indirect environmental impacts of the Proposed Action and Alternatives described in Chapter 3 of this Final EIS. This chapter summarizes the affected environment and environmental consequences assessments presented in Chapters 4 and 5 of the 2009 P.L. 101-514 Draft EIS/EIR, respectively, and includes text revisions made in response to public comments on the Draft EIS/EIR. This chapter also includes supplemental information and analysis made at the NEPA Lead Agency's discretion. The inclusion of new information and analysis in this Final EIS does not substantially alter any of the impact determinations or mitigation presented in the Draft EIS/EIR.

4.1.1 Basis of the Environmental Analysis

As noted previously, the Draft EIS/EIR, in its entirety, is incorporated by reference in this Final EIS. It is important to reiterate that the 2009 Draft EIS/EIR for P.L. 101-514 was a joint NEPA/CEQA document and, as such, presented information and analysis to fully comply with both NEPA (federal) and CEQA (state) requirements for environmental review. A Final EIR was completed and certified by EDCWA in January of 2011 after the conclusion of the Draft EIS/EIR public review period. With certification of the Final EIR, EDCWA's obligation under CEQA was fully met. This Final EIS, therefore, is intended as a NEPA-only document. The focus and structure of this document, therefore, is different from that of the 2011 Final EIR.

Whereas CEQA requires an EIR to evaluate project impacts relative to the environmental conditions as they exist at the start of the environmental review process, NEPA requires the EIS to evaluate the impact of the project relative to future conditions likely to occur in the absence of the project. These future conditions are typically reflected in the No Action Alternative. For purposes of this Final EIS, the potential direct and indirect impacts of the Proposed Action and alternatives are evaluated relative to the No Action Alternative, exclusively. As defined in the Draft EIS/EIR and reiterated in Chapter 3 of this Final EIS, the No Action Alternative anticipates that an alternative water supply of up to 15,000 AFA would be acquired by EDCWA in the event the Proposed Action is not approved. This water could originate from any one of number of non-CVP sources within the upper American River basin as discussed in Chapter 3.

As noted previously, no new diversion facilities or improvements to existing water infrastructure are proposed as part of the Proposed Action or Alternatives. This EIS recognizes that construction of certain facilities may be needed to make use of water provided to EDCWA's subcontractors under the P.L.101-514 contract and that the appropriate project-level environmental documentation would be prepared by the lead agency responsible for that construction. That documentation would be prepared only after decisions about the location and design of those facilities are made, and environmental evaluation can proceed without undue speculation about potential impacts. Any construction-related impacts and site-specific facility impacts would be the responsibility of those agencies proposing such future projects. Accordingly, in the Draft EIS/EIR and this Final EIS, the impacts of future facilities construction are discussed in limited detail and only where relevant.

Impacts related to future construction and development in areas served by new water supplies are addressed in Section 4.10, Indirect Impacts: Subcontractor Service Areas. The Draft EIS/EIR and this Final EIS do not attempt to re-examine the precise impacts of growth on the environment anticipated to occur as a result of future development because the physical environmental effects of urban development have already been appropriately evaluated in the El Dorado County General Plan and accompanying EIR.

EID and GDPUD, the recipients of water under this action, do not have the power to make land use planning decisions because they are an irrigation district and public utility district, respectively. As such, their powers are limited to doing "any act necessary to furnish sufficient water" (Water Code § 22075; see Public Utilities Code §§ 16407, 16461). California law bars EID and GDPUD from seeking to restrict population growth and development by refusing to augment water supplies. Only a county or city government vested with land use planning power may control growth and development. Inherent in EID's and GDPUD's objectives is the goal of ensuring that sufficient water is available to meet the demand resulting from the land use planning decisions made by El Dorado County. EID and GDPUD's mission statements recognize their responsibility to meet the needs of existing ratepayers and its obligation to accommodate additional customers contemplated under the County General Plan.

4.1.2 Mitigation Measures

Under CEQ's regulations, mitigation can take many forms. 40 C.F.R. 1508.20. NEPA does not require that Reclamation mitigate any potential impact to less than significant or dictate what type of mitigation may be appropriate. In this EIS, Reclamation has identified reasonable mitigation measures where appropriate.

4.1.3 Resources Considered for Environmental Analysis

The potential resources and issues addressed in the Draft EIS/EIR and this Final EIS were identified through a series of public involvement engagements regarding the Proposed Action. A series of informal sessions with various stakeholder groups and agencies was conducted by EDCWA as part of the early project scoping process. The results of this earlier process are reported in the Preliminary Project Scoping Task Report: CVP Water Services Contract. As noted previously, a subsequent NOP/NOI process was initiated in 1998 and, again, most recently in the fall of 2006. All processes generated public comment and helped shape the scope of the Draft EIS/EIR and this Final EIS.

The specific affected environments for each resource area are described in the separate subsections of this chapter pertaining to those individual resources. The Affected Environment discussions describe those natural, social, cultural, and physical features upon which the alternatives for this action were evaluated. Resources that could be directly affected by the proposed water diversions are:

- Water Supply
- Hydropower Generation
- Flood Control
- Water Quality
- Fisheries
- Riparian Biological Resources
- Water-related Recreation
- Water-related Cultural Resources

The affected environment for each of these resources is presented Sections 4.2 through 4.9 below, respectively.

Resources within the subcontractor service areas that could be affected indirectly by future development served by water made available by the Proposed Action or Alternatives include:

- Land Use
- Air Quality
- Noise
- Geology, Soils, Mineral Resources, and Paleontological Resources
- Recreation
- Visual Resources
- Cultural Resources
- Terrestrial and Wildlife Resources

The affected environment for each of these resources is presented in Section 4.10 below.

4.1.4 Approach to Defining the Affected Environment

The Affected Environment discussions presented in this chapter of the Final EIS provide a description of resource features of the regional and local study area that may be affected by implementation of the Proposed Action and Alternatives. The affected environment descriptions for resources evaluated herein are divided into two categories. The first category includes all resources that may be directly affected by future water diversions made under the Proposed Action or Alternatives. This category is referred to as: Direct Impacts – Study Area. The second category includes all resources that could be indirectly affected by future development and construction that could be served by water made available to EDCWA subcontractors (EID and GDPUD) by the Proposed Action or Alternatives. This category is referred to as: Indirect Impacts – Subcontractor Service Areas.

Resources included in the Direct Impact-Study Area evaluation include resources occurring in locations directly affected by potential changes in hydrology (e.g., instream flows, reservoir storage, water surface elevations, etc.) due to future diversions under the Proposed Action. The resources potentially affected directly, therefore, are referred to as diversion-related resources.

Resources included in the Indirect Impact – Subcontractor Service Areas category are resources occurring in locations in the EID and GDPUD service areas where the water made available under the Proposed Action could be used to serve future planned development. These resources are referred to herein as non-diversion related resources. Resource information provided for non-diversion related resources for the Proposed Action and Alternatives is based on the best available information and is intended to describe historical, existing, and where appropriate, anticipated future conditions. This information was obtained through literature review, agency correspondence and consultations.

4.1.5 Approach to the Environmental Impact Analysis

The Proposed Action, which is the execution of the P.L. 101-514 new CVP water service contract, represents a direct action on the part of Reclamation and EDCWA. Accordingly, an evaluation of the potential impacts of this new water contract was performed at the project-level. Project-level detailed analyses focused on the potential impacts of diverting the P.L 101-514 water at two points of diversion: EID's proposed new intake with a Temperature Control Device to their El Dorado Hills Water Treatment Plant and GDPUD's proposed new intake at PCWA's North Fork American River Pump Station. Under the project-level analyses, potential changes in the operation of the coordinated CVP/SWP were evaluated. Any diversion project, given the coordinated nature of the CVP/SWP, has the potential to affect reservoirs, watercourses, and the Delta. Hydrologic modeling was undertaken to quantitatively determine the extent and frequency of any such changes in the hydrologic regime of the CVP/SWP and local area waterways. Section 4.1.6, Hydrologic Impact Framework, describes this process. This modeling output was then used as the basis upon which impact analyses for water-related resources were performed for the Draft EIS/EIR.

The primary analyses, therefore, focused on the hydrological effects of the Proposed Action on potentially affected waterbodies and waterways including those of the local area and broader CVP/SWP, including the Delta.

The CALSIM II mass-balance hydrologic reservoir routing model was used to evaluate the CVP/SWP reservoirs and waterways. Updated CALSIM II modeling based on modeling undertaken for Reclamation's LTO Plan EIS was used in this Final EIS to confirm that modeling performed and presented in the P.L. 101-514 Draft EIS/EIR adequately and appropriately addresses potential flow-related impacts.

Program-level impact analysis is more general. Program-level analyses in this Final EIS were conducted for potential impacts on resources not directly affected by proposed diversions. The potential impact of future development within the Subcontractor Service Areas, for example, are addressed programmatically. This new development includes various facilities, activities, land uses within the Subcontractor Service Areas that could be provided water under P.L. 101-514 that are typically part of development activities within urban and rural areas. The impact of such activities was adequately analyzed in the adopted El Dorado County General Plan Update and EIR, upon which the Draft EIS/EIR and this Final EIS rely. A detailed analysis of those activities, land uses, and resources is not repeated in this Final EIS.

As noted previously in Chapter 1.0, Introduction, CEQA documentation likely will be required and prepared for future projects that would divert, convey, treat and deliver this new CVP water supply. Reclamation involvement in these future projects is unlikely, unless there are issues with facility or infrastructure projects crossing or using Reclamation lands or easements. Reclamation has no land use authority and, therefore, would not be involved in future project actions addressing the potential impacts associated with development of water delivery facilities. So, while a program-level analysis is undertaken for certain non-diversion related resources, activities, and land uses as described for this EIS, this is not a programmatic NEPA document because further action by Reclamation is not anticipated. Where actions by other federal agencies (e.g., permits, funding, or actions on federal land) are necessary for future facilities projects, NEPA compliance would be addressed by the appropriate federal agency.

4.1.6 Hydrologic Impact Framework

As described below under "CALSIM II Operation," the evaluation of diversion-related impacts relied upon a hydrologic impact framework to generate quantitative data with which to evaluate potential impacts on water-related resources. Such potential impacts were evaluated by comparing the existing hydrologic condition (or Base Condition) with that of the simulated system after implementation of the Proposed Action and Alternatives (i.e., diversion of water for the P.L.101-514 contract) using the CALSIM II model.

The period of record used in the hydrologic modeling for the Draft EIS/EIR extended from 1922 through 1993 (72-years) – data is generated to 1994, but 1994 is removed. The more recent hydrologic record now incorporated into CALSIM II operation (to 2005) was unavailable at the time of preparation of the Draft EIS/EIR. The period of record for the water temperature modeling extended from 1923 through 1993 (71 years). Similarly, early life stage salmon mortality modeling also used a 71-year period of record. These periods, based on the historic hydrologic record, are deemed to be representative of the natural variation in hydrology that is characteristic of California in recent times. It includes dry-periods (1928-1934 and 1977), wet-periods (1986), and variations in between. Extended drought, periods of high precipitation and resultant runoff, as well as "normal" water years were included in this record.

4.1.6.1 CALSIM II Model

The CALSIM II model was jointly developed by Reclamation and DWR for planning studies relating to CVP and SWP operations. The primary purpose of CALSIM II is to evaluate the water supply reliability of the CVP and SWP at current or future levels of development. The 2009 Draft EIS/EIR used the year 2001 to reflect the "current" level of development and 2020 to reflect the "future" level of development, with and without various assumed future facilities, and with different modes of facility operations. Providing system-wide coverage, CALSIM II simulates monthly operations of the following water storage and conveyance facilities:

- Trinity, Lewiston, and Whiskeytown reservoirs (CVP);
- Spring Creek and Clear Creek tunnels (CVP);
- Shasta and Keswick reservoirs (CVP);
- Oroville Reservoir and the Thermalito Complex (SWP);
- Folsom Reservoir and Lake Natoma (CVP);
- New Melones Reservoir (CVP);
- Millerton Lake (CVP);
- C.W. Jones (CVP), Contra Costa (CVP) and Harvey O. Banks (SWP) pumping plants; and
- San Luis Reservoir (shared by CVP and SWP).

To varying degrees, CALSIM II nodes also define CVP/SWP conveyance facilities including the Tehama-Colusa, Corning, Folsom-South, and Delta-Mendota canals and the California Aqueduct. Other non-CVP/SWP reservoirs or rivers tributary to the Delta also are modeled in CALSIM II, including:

- New Don Pedro Reservoir;
- Lake McClure; and
- Eastman and Hensley lakes.

CALSIM II uses a mass balance approach to simulate the occurrence, regulation, and movement of water from one river reach (computation point or node) to another. Various physical processes (e.g., surface water inflow or accretion, flow from another node, groundwater accretion or depletion, and diversion) are simulated or assumed at each node as necessary. Operational constraints, such as reservoir size, seasonal storage limits, and minimum flow requirements, also are defined for each node. Accordingly, flows are specified as a mean flow for the month, and reservoir storage volumes are specified as end-of-month values. In addition, modeled X2 locations (the location of the 2 parts per thousand [ppt] salinity near-bottom isohaline; measured as the distance in kilometers from the Golden Gate) are specified as end-of-month locations, Delta outflows are specified as mean outflows for each month, and Delta export-to-inflow (E/I) ratios are specified as mean ratios for each month.

CALSIM II typically simulates system operations for a 72-year period using a monthly time-step. The model assumes that facilities, land use, water supply contracts, and regulatory requirements are constant over this period, representing a fixed level of development. The historical flow record of October 1921 to September 2003, adjusted for the influence of land use change and upstream flow regulation, is used to represent the possible range of water supply conditions. It is assumed in CALSIM II that past hydrologic conditions are a good indicator of future hydrologic conditions. As discussed later, this concept of stationarity in hydrologic conditions has come under significant scrutiny in recent years, both temporally and spatially, with climate change representing a key causal factor in this uncertainty.

The model simulates one month of operation at a time, with the simulation passing sequentially from one month to the next, and from one year to the next. Each estimate that the model makes regarding stream flow is the result of defined operational priorities (e.g., delivery priorities to water right holders, and water contractors), physical constraints (e.g., storage limitations, available pumping, and channel capacities), and regulatory constraints (flood control, minimum instream flow requirements, Delta outflow requirements). Certain decisions, such as the definition of water year type, are triggered once a year, and affect water delivery allocations and specific stream flow requirements. Other decisions, such as specific Delta outflow requirements, vary from month to month. CALSIM II output contains estimated flows and storage conditions at each node for each month of the simulation period. Simulated flows are mean flows for the month, reservoir storage volumes correspond to end-of month storage (HDR/SWRI, 2007).

CALSIM II and associated environmental models (e.g., Reclamation's Trinity, Shasta, Whiskeytown, Oroville, and Folsom Reservoir Water Temperature Models; Reclamation's Trinity, Sacramento, Feather, and American [with Automated Temperature Selection Procedure {ATSP}] River Water Temperature Models; Reclamation's Feather and Sacramento River Early Life Stage Chinook Salmon Mortality Models; Long-Term Gen Model; and General Purpose Output Generation Tool) provided the predictive hydrology and environmental outputs necessary to determine potential water-related resource impacts throughout the CVP/SWP as a result of the Proposed Action and Alternatives.

At the present time, CALSIM II is considered the best available tool for modeling the integrated CVP and SWP and is the only system-wide hydrologic model being used by Reclamation and DWR to conduct planning and impact analyses of potential projects. While these agencies developed the model for project-related purposes, the model also has been employed for various other purposes with varying degrees of success. These limitations are discussed in more detail in the section “CALSIM II Limitations.”

As the official model for California’s two largest inter-regional projects with implications for state-wide and Central Valley water operations and planning, CALSIM II results are often at the center of many technical and policy controversies. As such, CALSIM II, not unlike its predecessors, PROSIM 2000 and PROSIM, warrants and, in fact, has received considerable scrutiny from the water resources and environmental communities. The range of issues raised has been diverse, and includes a variety of issues and perspectives related to water supply reliability, environmental management and performance, water demands, economics, documentation, changing hydrology and climate, software, and regulatory compliance.

A primary intended use of CALSIM II is to estimate the impacts and benefits of large-scale proposed projects and regulatory actions on the state-wide system. Much of the initial focus of system-wide modeling of this nature was intended to help determine export quantities and timing. Most recently, CALSIM II was used in support of the Coordinated Long Term-Operations of the Central Valley Project and State Water Project Final EIS and Record of Decision (Reclamation 2016).

4.1.6.1.1 CALSIM II Operation

As discussed in the Draft EIS/EIR CALSIM II utilizes optimization techniques to route water through a watershed network on a monthly time-step. A linear programming/mixed integer linear programming solver determines an optimal set of decisions for each time period given a set of weights and system constraints. A key component for specification of the physical and operational constraints is the Water Resources Simulation Language (WRESL). The model user describes the physical system (e.g., dams, reservoirs, channels, pumping plants, etc.), operational rules (e.g., flood-control diagrams, minimum flows, delivery requirements, etc.), and priorities for allocating water to different uses in WRESL statements.

CALSIM II includes a hydrology developed jointly by Reclamation and DWR. Water diversion requirements of purveyors (demands), natural stream accretions and depletions, river basin inflows, irrigation efficiencies, return flows, non-recoverable losses, and groundwater operation are components that make up the hydrology used in CALSIM II. Sacramento Valley and tributary basin hydrology is developed using a process designed to adjust the historical sequence of monthly stream flows to represent a sequence of flows at either current or future levels of development. Adjustments to historic water supplies are determined by imposing land use on historical meteorological and hydrologic conditions. San Joaquin River basin hydrology is developed using fixed annual demands and regression analysis to develop accretions and depletions. The resulting hydrology represents the water supply available from Central Valley streams to the CVP and SWP at an established level of development.

CALSIM II uses DWR's Artificial Neural Network (ANN) model to simulate the flow-salinity relationships for the Delta. The ANN model correlates salinity at key locations in the Delta, generated by the Delta Simulation Model 2 (DSM2), with Delta inflows, Delta exports, and Delta Cross Channel operations. The ANN flow-salinity model estimates electrical conductivity (a measure of salinity) at the following four locations for the purpose of modeling Delta water quality standards: Old River at Rock Slough, San Joaquin River at Jersey Point, Sacramento River at Emmaton, and Sacramento River at Collinsville. In its estimates, the ANN model considers antecedent conditions up to 148 days, and considers a "carriage-water" type of effect associated with Delta exports.

The delivery logic CALSIM II utilizes in determining deliveries to North-of-Delta and South-of-Delta CVP and South-of-Delta SWP contractors uses runoff forecast information that incorporates uncertainty and standardized rule curves (i.e., Water Supply Index versus Demand Index Curve) to estimate the water available for delivery and carryover storage. Updates of delivery levels occur monthly from January 1 through May 1 for the SWP and March 1 through May 1 for the CVP as water supply parameters become more certain. The South-of Delta SWP delivery is determined based upon water supply parameters and operational constraints. The CVP system wide delivery and South-of-Delta delivery are determined similarly upon water supply parameters and operational constraints with specific consideration for export constraints.

CALSIM II incorporates procedures for dynamic modeling of Section 3406(b)(2) of the Central Valley Project Improvement Act (CVPIA) and the Environmental Water Account (EWA), under the CALFED Framework and Record of Decision (ROD). Per the October 1999 Decision and the subsequent February 2002 Decision, CVPIA 3406(b)(2) accounting procedures are based on system conditions under operations associated with SWRCB D-1485 and D-1641 regulatory requirements. Similarly, the operating guidelines for selection of actions and allocation of assets under the EWA are based on system conditions under operations associated with SWRCB D-1641 regulatory requirements. This requires sequential layering of multiple system requirements and simulations. CVPIA 3406(b)(2) allocates 800 thousand acre-feet (TAF) (600 TAF in Shasta critical years) of CVP project water to targeted fish actions. The full amount provides support for SWRCB D-1641 implementation. According to monthly accounting, Section 3406(b)(2) actions are dynamically selected according to an action matrix. Several actions in this matrix have defined reserve amounts that limit Section 3406(b)(2) expenditures for lower priority actions early in the year such that the higher priority actions can be met later in the year.

4.1.6.1.2 CALSIM II Simulations

The utility of CALSIM II in environmental analyses is based on its ability to provide comparative data results. This is an important point since CALSIM II, as with most gross-scale, long time-step (monthly) hydrologic simulations, are appropriate for the purposes upon which they were designed but not necessarily for other evolved and evolving applications. While CALSIM II has, and continues to be used for environmental analyses of specific project (or action) increments, its strength does not lie in those types of applications. Nevertheless, with an integrated CVP/SWP and coordinated operations throughout the many interconnecting watersheds, CALSIM II is a useful and accepted tool to gauge system-wide hydrological changes resulting from a particular action. Again, as noted, it does so within a comparative framework where, the results of the with-project condition are compared against the baseline or no-project condition.

Accordingly, the results from a single simulation may not necessarily represent the exact operations for a specific month or year, but should reflect long-term trends. Since CALSIM II is not designed to accurately predict operations and flows, results from individual months should be considered only in the context of overall trends and averages. CALSIM II represents operational or regulatory thresholds through the use of step functions. Due to CALSIM's dynamic responses to system conditions, slight changes in model inputs or operations could trigger responses which may significantly vary on an individual monthly basis between the Base Condition and “Project” simulation. These dynamic responses, however, often average out over longer time periods. It is these longer-term *trends* which are useful in determining potential effects of larger diversion projects on the coordinated CVP/SWP.

Table 4.1-1 identifies the comparisons that were made for the Draft EIS/EIR between simulations to identify the potential effects associated with each of the action alternatives, including the Proposed Action and project. Base Condition denotes existing conditions at the time of modeling under existing hydrology, demands, and operations. As described previously, the nomenclature for the Alternatives uses descriptors identifying the various diversion scenarios included in this environmental analysis. In many of the CALSIM II tables included in the following sections, Proposed Action – Scenario A is identified. This corresponds to the Proposed Action (Alternative 2A), but is shortened for brevity. Similarly, Alternative 2B corresponds to Proposed Action – Scenario B, and so on.

TABLE 4.1-1. CALSIM II MODELING COMPARISONS

Intended Analysis	Base Scenario	Compared Against
No Action	(Base Condition – Current Level)	N/A
Proposed Action or Project (EID/GDPUD Split)	(Base Condition – Current Level)	Alternative 2A (Preferred)– Proposed Action
Proposed Action or Project (Max EID)	(Base Condition – Current Level)	Alternative 2B – Proposed Action
Proposed Action or Project (Max GDPUD)	(Base Condition – Current Level)	Alternative 2C – Proposed Action
Water Transfer Alternative	(Base Condition – Current Level)	Alternative 3 – Water Transfer
Reduced Diversion Alternatives	(Base Condition – Current Level)	Alternative 4C – Reduced Diversion
Future Cumulative	(Base Condition – Current Level)	Future Cumulative Condition
Proposed Action Increment within Future Cumulative1	Future No Action	Future Cumulative Condition
Proposed Action Increment within Future Cumulative1	(Base Condition) Vs Future Cumulative Condition Minus Proposed Action (Base Condition) Vs Future No Action	(Base Condition) Vs Future Cumulative Condition Minus Proposed Action (Base Condition) Vs Future No Action

Notes:
1. For increment of Proposed Action on the Future Cumulative Condition, there are two possible evaluations. Both were evaluated.
2. For the analysis of the Reduced Diversion Alternatives, modeling was performed on Alternative 4C – Reduced Diversion (7,500 AFA total) as this represented the largest reduction, relative to the full contract amount of 15,000 AFA. Separate model runs for Alternative 4A – Reduced Diversion (12,500 AFA) and Alternative 4B – Reduced Diversion (10,000 AFA) were not performed. This was considered appropriate given the accepted acuity of CALSIM II (i.e., inability to accurately depict increments of 2,500 AFA) and the fact that the “bookend” reduction of 7,500 AFA was modeled.

Source: Revised from HDR/SWRI (2007).

CALSIM II modeling undertaken for Reclamation’s Operations Criteria and Plan (OCAP) Biological Assessment (BA) for Delta Smelt was used to provide the foundation for CVP/SWP system-wide baseline conditions simulations used to represent the Base Condition and the Future No Action scenarios.

The modeling output, which total over 2,800 pages, are provided in the Draft EIS/EIR as Appendix I. Due to the physical volume of the printed output, the data are provided on a separate CD within Volume 2 (Technical Appendices) of the Draft EIS/EIR. Alternately, the data CD may be requested from Reclamation or EDCWA during normal business hours.

The specific OCAP simulation relied upon as the initial foundation is identified as: OCAP_2001D10A_TodayEWA_012104, or the OCAP 3 simulation. It is an existing or Current Level simulation with many of the desired baseline assumptions. However, the OCAP 3 simulation did not include the higher Trinity River minimum flow requirements of the ROD for the Trinity River Main Stem Fishery Restoration EIS/EIR. These new requirements were added, and the results reviewed by Reclamation, in a CALSIM II simulation commonly referred to as OCAP 3a. The Base Condition is based on the OCAP 3a simulation. The Future No Action simulation is based on the OCAP_2020D09D_FutureEWA5a simulation.

These two foundation or initial baseline simulations were modified to include updated inputs for lower Yuba River outflow to the Feather River, lower Yuba River diversions at Daguerre Point Dam,

Trinity River instream flow requirements downstream of Lewiston Dam (by use of OCAP 3a), and EID diversion at Folsom Reservoir, as required, and run to produce the existing (Current Level) and Future Level baseline simulations. These initial baseline simulations were then modified as required to implement the specific attributes of the Proposed Action and/or alternatives and, at the time of preparation, represented the most up-to-date renditions of CVP/SWP baseline hydrology.

4.1.6.1.3 CALSIM II Limitations

All models only approximate natural phenomenon. Most models are inherently inexact because the mathematical description is either imperfect and/or our understanding of the inherent processes is incomplete. The mathematical parameters used in models to represent real processes are often uncertain because these parameters are empirically determined or represent multiple processes. Additionally, the initial or starting conditions and/or the boundary conditions in a model may not be well known. CALSIM II, despite its powerful capabilities, remains a model and, as such, is subject to the same issues regarding limitations as any other model.

As noted previously, CALSIM II is able to simulate the integrated CVP/SWP system over the 72-year historical hydrology. In theory, such simulation allows model users to assess the effects that certain actions would have had on the system had they been implemented in any year of the historical record. The ability of the model to represent a predictive indicator of the effect of certain actions into the future, however, largely depends on the representative nature of historical hydrology, relative to likely future hydrology. This is a very important point. There is a growing concern throughout the scientific community that past hydrology may not be a good indicator of expected future hydrological conditions. A major reason for this concern is strong evidence for global and regional climate change. While most water practitioners accept climate change as a reality and agree with its inevitability, the degree to which it will affect specific resources and the temporal pattern of effects are still continuing to be debated. Water managers today consider climate change in earnest when planning for the future. Unfortunately, at the time modeling for this Proposed Action was completed for the Draft EIS/EIR, CALSIM II was not well-suited to model perturbed hydrology or other future scenarios where non-stationarity in hydrologic or meteorological processes are relevant. Current CALSIM II work, however, is moving towards including those types of analyses.

CALSIM II also lacks detailed documentation regarding the known limitations and weakness of the model. Without a clear understanding of the model's formulation, water managers have been wary of applying it in a predictive (absolute) mode. A long-standing issue is that error bars need to be specified for all CALSIM II output; this would be especially applicable where the model was being used in predictive mode (Ferreira et al., 2005).

From a temporal perspective, there is ongoing concern that CALSIM II's monthly time step cannot accurately capture hydrologic variability and, thus, does not compute water exports and export capacity accurately, both of which are significant factors in CVP/SWP operations. CALSIM II's inability to capture within-month variations often results in overestimates of the volume of water the projects can export from the Bay-Delta and makes it seem easier to meet environmental standards than it is in real-time operations. Many of the system's operations function, in fact, on a shorter time scale. CALSIM II cannot represent them well given its current formulation. On the other hand, it is unclear if reducing the time step would result in more accurate or more useful data results given the additional data and assumptions that would be needed to characterize the system at this finer temporal resolution. A daily time step might, in fact, worsen some problems due to questions regarding the precise timing of short events (Ferreira et al., 2005).

CALSIM is also limited by its geographic coverage. For CALSIM II to be a truly State-wide model, it needs to fully cover the Bay Area, Tulare Basin (including the Friant-Kern and Madera canals, eastside San Joaquin reservoirs, and Millerton), Yuba River Basin (for potential water transfer opportunities), Colorado River, Colorado River and Los Angeles aqueducts, and all local Southern California projects. Coupled with a need for greater geographic coverage, CALSIM II should also include management options available in California at both the regional and local levels. Inter– and intra-agency water transfers are now commonplace, as are other management options such as groundwater banking (e.g., aquifer-storage-recovery), conjunctive use, desalination, and water conservation. Accordingly, to effectively simulate the array of potential water operations available within the State, CALSIM II needs to include a wider range of management options, facilities, and regions. It is vital that those involved in the management of California's water be able to analyze how local, regional, and State facilities and options best go together. California does not currently have a model or modeling framework capable of such integrated analysis, to parallel the kinds of integrated management thinking being pursued at local, regional, and state-wide levels (Ferreira et al., 2005).

CALSIM II is also currently lacking in its ability to perform hydropower computations, which is an important component of the federal CVP system. This should ideally include risk-based power capacity evaluation, and possibly incorporate the indexed sequential hydrologic modeling method that Reclamation has used for many years in hydropower capacity analysis. Also, hydropower should not simply be an after-the-fact calculation as it is with the use of the Long-Term Gen Model, but explicitly included in the system objectives and incorporated into CALSIM II.

With respect to groundwater, CALSIM is acknowledged as being significantly limited. Groundwater is modeled as a series of inter-connected lumped-parameter basins. Groundwater pumping, recharge from irrigation, stream-aquifer interaction and inter-basin flow are calculated dynamically by the model. The purpose of the multi-cell groundwater model is to better represent groundwater levels in the vicinity of the streams to better estimate stream gains and losses to aquifers.

In the Sacramento Valley, groundwater is explicitly modeled in CALSIM II using a multiple-cell approach based on Drainage Service Area (DSA) boundaries. For the Sacramento Valley, there are a total of 14 groundwater cells. Currently, no multi-cell model has been developed for the San Joaquin Valley. Instead, stream-aquifer interaction is estimated from historical stream gage data. These flows are fixed and are not dynamically varied according to stream flows or groundwater elevation.

Groundwater availability from aquifers is poorly represented in the model. This results from the fact that aquifers in the northern part of the State (Sacramento Valley) have not been thoroughly investigated regarding their storage and recharge characteristics. Thus, in the model, upper bounds on potential pumping from aquifers remain undefined. Realistic upper bounds to pumping from any of the aquifers represented in the model need to be developed and implemented. In addition, historical groundwater pumping is used to estimate local groundwater sources in the model; however, the information on the historical pumping is very limited, causing these pumping rates to be very uncertain. Improved pumping information is required and an analysis of the effect of this uncertainty on model results needs to be conducted. In general, the level of representation of groundwater in CALSIM II is not optimal.

4.1.6.1.4 2016 CALSIM II Model Verification Process

To support impact determinations presented in this Final EIS and to more fully understand the Proposed Action's effect on diversion-related resources, additional CALSIM II modeling was conducted by ECORP Consulting, Inc. (ECORP 2016). As previously discussed and in keeping with NEPA requirements, this Final EIS addresses the potential impact of the Proposed Action by comparing the effects of that action to the effects of the No Action Alternative. In relation to the evaluation of "diversion-related" direct impacts, however, that comparison is moot in most instances because annual diversion of up to 15,000 acre-feet from the American River and/or Folsom Reservoir would occur under both the No Action Alternative and the Proposed Action. Therefore, no distinction can be made between either alternative relative to potential impacts on various diversion-related resources.

While not required under by NEPA, new CALSIM II modeling runs were conducted for the Proposed Action using an "Alternate Basis of Comparison." This evaluation is provided for informational purposes only and compares the potential direct effects of the Proposed Action (including the No Action Alternative) with conditions likely to occur during the term of the proposed contract without the additional diversion of up to 15,000 AFA that would occur under the Proposed Action and No Action Alternative.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives. The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

There is a significant range of hydrologic variability within the AMF period of record. Although the CalSim II study period does not include the whole period of record, it represents most of the hydrologic variability observed in the period of record. Analysis of the AMF data shows that the 2014-15 hydrology falls within the range of hydrologic variability contained in the CalSim II study period. Water year 1977 is the driest year on record, the 1976-77 and 1987-88 periods are drier than the 2014-15 period, and the three-year 1990-92 period is slightly drier than the 2013-15 period. Based on this analysis, it appears the hydrology used for the CalSim II operations modeling adequately represents the analysis of the potential impacts of the P.L. 101-514 project through the expected range of hydrologic variability in the American River Basin.

4.2 WATER SUPPLY (DIRECT EFFECTS STUDY AREA)

This subsection describes the existing water supply conditions within the regional and local study areas, and provides the basis upon which the evaluation of potential diversion-related impacts on surface hydrology and water supplies were made.

4.2.1 Affected Environment

A description of regional and local hydrology is presented below to provide a basis for assessing the potential impacts on water supplies that the Proposed Action and/or alternatives could have on these environments. The regional setting is the geographic area defined by the operations of the CVP and coordinated operations with the SWP. The local setting includes those specific local area reservoirs and riverine reaches that could also be affected by implementation of the proposed new water service contract.

The regional setting includes:

- Trinity and Shasta Reservoirs;
- the upper Sacramento River and lower Sacramento River (that portion of the Sacramento River below the American River); and
- Sacramento-San Joaquin River Delta (Delta).

The local setting includes:

- Folsom Reservoir;

- Lower American River; and
- North Fork American immediately above Folsom Reservoir.

The Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206) Draft and Final EIS/EIR: U.S. Bureau of Reclamation/Sacramento County Water Agency (SCWA) (November 1998) contains a detailed discussion of the general hydrology of these systems. Comprehensive reviews of the CVP/SWP and its hydrologic infrastructure and operations are also included in the U.S. Bureau of Reclamation, Long-Term Central Valley Project Operations Criteria and Plan (CVP-OCAP) (June 2004), CALFED Bay-Delta Program Programmatic EIR/EIS, (July 2000), and the Sacramento Area Water Forum Draft EIR for the Water Forum Proposal (January 1999). Much of the following hydrologic information describing the affected environment and settings are taken from these documents; they are, hereby, incorporated by reference.

4.2.1.1 Sacramento River Watershed

4.2.1.1.1 Upper Sacramento and Upstream Reservoirs

The Sacramento River is the largest river system in California. It originates near the slopes of Mount Shasta and flows southward to Suisun Bay in the Delta. The river drains 26,146 square miles with an average annual natural runoff of about 18 million acre-feet (MAF). Flows normally peak during the December through February period, corresponding to the annual rainy season and augmented by periodic upper watershed snowmelt events.

Sacramento River flows are largely determined by the operation of upstream or tributary reservoirs (e.g., Shasta, Oroville, and Folsom) as well as the timing and rates of diversions from the Sacramento River and tributary streams. The Trinity River Division of the CVP is a major source of water for the Sacramento River. Lewiston Dam regulates flows in the Trinity River to meet the downstream fishery and temperature requirements of the Trinity River Basin and provides a forebay for the inter-basin diversion of flows through the Clear Creek Tunnel to the Sacramento River. Upstream reservoirs in the Sacramento River basin are operated to fulfill a variety of functions within the coordinated operations of the CVP/SWP, including flood control, water supply, fisheries and wildlife benefits, and power generation, as well as to meet water quality and flow requirements in the Delta. Diversions from the Sacramento River and tributary streams also influence seasonal flow levels by reducing overall flow volumes in the river. Shasta Reservoir is the largest CVP reservoir, capable of storing up to 4.5 MAF.

The natural flow pattern of the Sacramento River has been altered over time due to construction of a variety of river flow control facilities. Flows have been reduced during the wetter months due to upstream storage and diversions, but are maintained during the drier months due to the requirements to sustain flows at levels capable of meeting water quality objectives and water delivery obligations downstream. The flow of the Sacramento River can significantly vary from year-to-year and within a year. Flow in the Sacramento River is generally controlled by operations of the CVP and SWP. At other times, such as during times of significant uncontrolled runoff during storms, flows are not controlled.

4.2.1.1.2 Lower Sacramento River

Sacramento River flows at the City of Sacramento are greatly influenced by the large facilities located in the upper regions of the watershed, particularly Shasta Reservoir; Keswick Reservoir; Whiskeytown Reservoir (which regulates imported water from the Trinity River system); and diversions such as the Corning, Tehama-Colusa, and Glenn-Colusa canals. The historical average annual flow for the Sacramento River at Freeport is approximately 16.7 MAF. The Feather and American rivers are the two largest tributaries of the Sacramento River. Two other inflows that contribute to the Sacramento River are the Cross Canal and the Colusa Basin Drain, which drain the agricultural land in the Glenn-Colusa Irrigation District. The lower Sacramento River begins downstream of its confluence with the lower American River.

During the flood season, Sacramento River overflows spill over the series of weirs upstream of Wilkins Slough and flow into the Butte Sink. These flows are then carried by the Sutter Bypass back into the Sacramento River at Verona. Flood flows may also bypass the Sacramento River at Verona by spilling over the Fremont Weir and into the Yolo Bypass. Overflows occur at this point when the Sacramento River flows exceed 55,000 cfs. Sacramento River overflows may also enter the Yolo Bypass just north of Sacramento by spilling over the Sacramento Weir.

4.2.1.2 Sacramento-San Joaquin Delta

The Sacramento-San Joaquin River Delta (or, Bay-Delta or, simply Delta) lies at the confluence of the Sacramento and San Joaquin Rivers. The Delta boundary extends north along the Sacramento River terminating just south of the American River, south along the San Joaquin River terminating just north of the Stanislaus River, east to the City of Stockton, and west to Suisun Bay. Runoff from Central Valley streams account for approximately 95 percent of the inflows to the Delta.

The Delta receives flows directly from the Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras rivers. These rivers and their tributaries drain more than 40 percent of California. Annual inflows to the Delta averaged approximately 27.8 MAF during the period from 1980 to 1991.

Hydraulic conditions in the Delta are influenced by a number of factors such as inflows (controlled and uncontrolled) from tributary streams, tidal influences from the Pacific Ocean, operation of Delta export facilities, and water diversions within the Delta. The Delta is at mean sea level, and consequently, tides significantly influence both the level and direction of flows through its many channels and sloughs. Tidal water level variations can vary from one foot on the San Joaquin River near Interstate 5 to more than five feet at the outlet of the Delta, near the City of Pittsburg. The direction of flow at these two points also changes dramatically with the tides. On the San

Joaquin River at Venice Island, flows range from 47,000 cfs downstream during low tide to 58,000 cfs upstream during high tide. Near the City of Pittsburg, flows can vary from 340,000 cfs downstream to 330,000 cfs upstream.[35]

The tidal currents carry with them large volumes of seawater back and forth through the Delta with each tide cycle. The mixing zone of saltwater and freshwater can shift two to six miles depending on the tides, and may reach far into the Delta during periods of low inflow. Thus, the inflow of the tributaries into the Delta is essential in maintaining water quality in the Delta.

The average annual Delta outflow to Suisun Bay (for the period 1980-1991) is approximately 21 MAF. Delta inflows rely significantly on runoff from Central Valley streams, and accordingly, also depend on the operations of water facilities on these streams. Releases from Shasta, Folsom, New Melones, and Millerton reservoirs of the CVP and Oroville Reservoir of the SWP control, to a large extent, how much and when freshwater enters the Delta.

4.2.1.3 Central Valley Project

The CVP is operated and maintained by Reclamation and represents the largest surface water storage and delivery system in California, with a geographic scope covering 35 of the State's 58 counties. The CVP is composed of some 20 reservoirs with more than 11 MAF of storage capacity, 11 power plants, and over 500 miles of major canals and aqueducts.

Within the Sacramento Basin, the CVP includes Shasta and Folsom reservoirs, among others. As noted previously, water is also imported from the Trinity River into the Sacramento Basin through Clear Creek Tunnel. The Tracy Pumping Plant exports water from the Delta for storage in San Luis Reservoir and delivery to contractors in the San Joaquin Valley. The CVP also includes New Melones Reservoir on the Stanislaus River and Millerton Reservoir on the San Joaquin River, and it exports water from the San Joaquin Basin to the Tulare Basin through the Friant-Kern Canal. Overall, the project supplies water to 253 water service contractors in the Central Valley, Santa Clara Valley (San Felipe Unit), and the San Francisco Bay Area (including Sacramento River Water Settlement Contractors). Key CVP reservoirs and their storage capacities are listed in Table 4.2-1.

35 California Department of Water Resources, Sacramento-San Joaquin Delta Atlas, 1993. 33 California Department of Water Resources, Sacramento-San Joaquin Delta Atlas, 1993.

TABLE 4.2-1 KEY CVP RESERVOIRS

Reservoir	Reservoir Capacity (TAF)
Trinity	2,447
Shasta	4,552
Folsom	977
San Luis (CVP-share)	966
New Melones	2,420
Millerton	520

Source: U.S. Bureau of Reclamation, CVO Operations, CVP Water Supply Reports, 2007.

The CVP contract amounts total 6,751 TAF and are composed of 3,140 TAF for the Sacramento River, 195 TAF for the American River, and 3,416 TAF for Delta exports.[36] As of 2000, the Sacramento River and Delta export contracts were considered fully subscribed with no new contracts being considered by Reclamation.

4.2.1.4 State Water Project

The SWP is operated by DWR. It consists of 32 storage facilities, 660 miles of aqueducts and pipelines, 17 pumping plants, and eight hydroelectric power plants. Using these facilities, the SWP provides urban and agricultural water supply, flood control, recreation, fish and wildlife enhancement, power generation, and salinity control in the Delta. The project delivers water to over two-thirds of California’s population and approximately 600,000 acres of farmland through 29 urban and agricultural water districts. These agencies have long-term water supply contracts totaling 4.2 MAF per year. However, existing SWP facilities supply less than 2.4 MAF per year during drought conditions. The principal storage facility for the SWP is Oroville Reservoir. Key SWP reservoirs and their capacities are listed in Table 4.2-2.

TABLE 4.2-2. KEY SWP RESERVOIRS

Reservoir	Reservoir Capacity (thousand acre-feet)
Oroville	3,538
San Luis (SWP-share)	1,067

The North Bay Aqueduct, completed in 1988, supplies water to Napa and Solano counties from the northern Delta. Near Byron in the south Delta, the Banks Pumping Plant lifts water into Bethany Reservoir. From this reservoir, a portion of Delta water is lifted by the South Bay Pumping Plant into the South Bay Aqueduct, which serves both Alameda and Santa Clara counties.

36 CVPIA PEIS, 1997.

Most of the water flows from Bethany Reservoir into the Governor Edmund G. Brown California Aqueduct, which winds along the west side of the San Joaquin Valley to the O'Neill Forebay. From there, part of the water is pumped through the William R. Gianelli Pumping-Generating Plant for storage in San Luis Reservoir until it is needed for later use. The B.F. Sisk San Luis Dam, which impounds 2,040,000 AF, is jointly owned; it was built by Reclamation and is operated by DWR. The SWP share of the storage volume of San Luis Reservoir is 1,067 TAF.

Water not retained at San Luis Reservoir continues south in the California Aqueduct, and is raised another 1,069 feet by four more pumping plants (Dos Amigos, Buena Vista, Wheeler Ridge, and Chrisman) before reaching the foot of the Tehachapi Mountains. The water is then raised 1,926 feet by the Edmonston Pumping Plant, over the Tehachapi Mountains, into a tunnel that conveys water to southern California. In the southern San Joaquin Valley, a short Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct along with Santa Barbara and San Luis Obispo counties.

4.2.1.5 Factors Determining CVP/SWP Allocations

Water deliveries to CVP and SWP contractors are made continually throughout the year. The allocation of CVP and SWP water supplies for any given year is based on the following six criteria:

- Forecasted reservoir inflows and Central Valley hydrologic water supply conditions;
- Current amounts of storage in upstream reservoirs and in San Luis Reservoir;
- Projected water demands in the Sacramento Valley;
- Instream and Delta regulatory requirements;
- Demand pattern deliveries south of the Delta;
- Annual management of CVPIA 3406 (b)(2) resources (see Section 3406[b][2] under the CVPIA, below); and
- Efficient use of CVP/SWP export capacity through Joint Point of Diversion flexibility.

Beginning each year (in December for SWP contractors, and in February for CVP contractors), initial allocations of entitlement deliveries are determined based on the above criteria. Generally, allocations are updated monthly until May, although increases may occur later in the year based on changing reservoir storages.

4.2.1.6 CVP Water Allocations

In most years, the combination of carryover storage and current year snowmelt and runoff into CVP reservoirs are sufficient to meet the majority of CVP contractor demands. However, since about 1992 with the passage of the CVPIA, when increasing constraints placed on CVP operations removed some of the inherent flexibility required to deliver water to CVP contractors, this has become more difficult to achieve.

Generally, the water allocation process for the CVP begins in the fall when preliminary assessments are made of the upcoming year's water supply availability. Beginning on February 1, forecasts of water year runoff are prepared using precipitation to date, snow water equivalent content of the accumulated snowpack, and runoff to date. In recent years, February 15 has been the target date upon which the first announcement has been made to all CVP contractors of their forecasted water allocations for the upcoming year. NMFS requires Reclamation to use a conservative estimate (at least 90 percent probability of exceedance) when making such water allocation forecasts. Moreover, NMFS reviews the operations plans prepared by Reclamation to support the initial water allocation (including any subsequent updates) to ensure that they can meet water temperature control criteria on the Sacramento River.

Forecasted runoff is updated monthly between February and May. Water allocations may or may not change as the year unfolds. Since a conservative water runoff forecast is initially prepared, it is often the case that water allocations actually can increase as the year progresses. In most years, therefore, the final water allocations are not known until April, May and even as late as June. This timing can be challenging for some agricultural contractors who, depending on agricultural crop, need to plan as early in the growing as possible.

4.2.1.7 CVP Water Shortage Provisions

Reclamation includes provisions in its CVP contracts specifying that a certain amount of CVP water will be made available to each CVP contractor, only to the extent that such water is available. While Reclamation uses all reasonable means to guard against shortages, delivery reductions can and do occur. Where the overall CVP water supply is not constrained by drought or other unavoidable circumstances, Reclamation is contractually committed to providing each contractor with the CVP water supply specified in the individual contracts.[37] CVP water service contracts have, over the years, had many varying water shortage provisions. In some contracts, M&I and agricultural use have shared shortages equally. In others, such as larger M&I contracts, agricultural water was shorted 25 percent before M&I water was shorted, and then both shared equally. Recognition of the increasing demands on a finite CVP water supply has, however, recently led Reclamation to consider revising its water delivery allocation guidelines. This has been ongoing since 1991, under Reclamation's M&I 2001 Water Shortage Policy.

In general, the policy provides M&I water supplies with a 75 percent water supply reliability based on a contractor's historical use. Historical use, in this context, is defined as the last 3 years of water deliveries unconstrained by the availability of CVP water. Before M&I supplies would be reduced, irrigation water supplies would be reduced below 75 percent of contract entitlement. When the irrigation allocation is reduced below 25 percent, Reclamation will reassess the availability of CVP water supplies and demand. During such water short periods, Reclamation

37 U.S. Bureau of Reclamation, Biological Assessment for U.S. Bureau of Reclamation, Central Valley Operations, 1992.

may also reduce M&I water allocations below 75 percent of adjusted historical use. It should be noted that this policy would apply only to that portion of CVP water identified as of September 30, 1994, as shown in Schedule A-12 of the 1996 Municipal and Industrial Water Rates Book, and for those contract quantities specified in P.L.101-514 (Section 206).

4.2.1.8 Water Allocation Priorities

Reclamation considers various categories of CVP water demands, their contractual amounts, and the deficiency criteria associated with each in their water allocation process. These various demands may be characterized as follows:

- Water Rights Settlement Agreements
- Municipal and Industrial (M&I) Water Service Contracts (e.g., P.L.101-514 contract)
- Legislative Mandates
- Agricultural Water Service Contracts
- Delivery Losses

In general, the allocation of CVP water supplies is accomplished through a two-tier hierarchy. The first tier, or Group I, includes all the categories of water demands with specifically defined minimum supplies. These include: 1) Sacramento River water rights and San Joaquin Exchange contracts, with associated minimum rate of delivery in “Critical” Shasta inflow years, 2) Refuge water supplies which must be provided at a minimum of 75 percent of supplies, 3) M&I water supplies, which are assumed to be maintained at 75 percent of maximum historical use, adjusted for growth (as per Reclamation’s 2001 Draft M&I Water Shortage Policy), and 4) conveyance, evaporation, and other such water delivery losses. Group II includes all other agricultural water service contracts. Under this hierarchy, Group I water demands must be met first. Once met, the supplies available to Group II are then apportioned according to their contract entitlements that contain no delivery provisions. While there are approximately 2.0 MAF of Group II contracts for south of the Delta, due to the ongoing increases in certain Group I requirements over time (e.g., M&I and Refuge water), the potential for deficiencies to Group II users exists every year. With the potential for decreased pumping opportunities, resulting from ongoing and uncertain changes in operational criteria, these deficiencies to Group II could be exacerbated in the future.

4.2.1.9 American River Watershed

Surface water within the local setting originates in three primary watersheds: (1) the North and Middle Fork American River Watershed, which includes Hell Hole and French Meadows reservoirs, the Rubicon River and Stumpy Meadows Reservoir; (2) the South Fork American River Watershed, which includes the South Fork American River and its tributaries, Ice House Reservoir, Union Valley Reservoir, Slab Creek Reservoir, and Chili Bar Reservoir, and (3) the Cosumnes River Watershed, which includes Jenkinson Lake (Sly Park), Bass Lake, and the

Cosumnes River and its tributaries. Each of these three watersheds flows into the Sacramento River, which ultimately flows to the Delta.[38]

The first two watersheds together comprise the upper portion of the American River Watershed and flow into Folsom Reservoir; the source of water for the proposed project diversions would be from within these two watersheds. No diversions will be made from within the Cosumnes River Watershed; thus, any hydrologic impacts on this watershed would be indirect, resulting, if at all, from water use within the Subcontractor service-areas.

The American River basin comprises a 1,875-square-mile drainage area, and is contained within Sacramento, El Dorado, Placer and a portion of Alpine counties. An average of 2.8 MAF of annual runoff drains from this basin.[39] Total reservoir storage of the American River Basin is approximately 75 percent of the mean annual runoff, or about 2.2 MAF.[40] Folsom Reservoir is the largest reservoir on the American River, and the primary flood control and water-storage reservoir, capable of storing maximum of 977 TAF. The other major reservoirs upstream of Folsom Reservoir, and their storage volumes, are: Union Valley, 277 TAF; Ice House, 459 TAF; French Meadows, 133.7 TAF; and Hell Hole, 208.4 TAF. There are also a number of smaller reservoirs in the upper watershed.

4.2.1.9.1 North and Middle Fork American River Upstream of Folsom Reservoir

The proposed GDPUD diversion site under a potential future exchange with PCWA is located near the old Auburn Dam construction site, at the American River Pump Station on the North Fork American River east of the town of Auburn. River flows at this location come from the Middle and North Forks of the American River, including the Rubicon River.

Flows on the Middle Fork are regulated upstream by Hell Hole and French Meadows reservoirs, and are re-regulated by the Ralston Afterbay. The Ralston Afterbay, the most downstream dam in the Middle Fork Project system, releases flows to the Middle Fork American River upstream of its confluence with the North Fork. Downstream of this confluence, Middle Fork flows are a combination of regulated and unregulated flows.[41] Stumpy Meadows Reservoir, operated by

38 El Dorado County Planning Department, El Dorado County General Plan, Volume II, Background Information, January 23, 1996. Section V, Water: Resources, Quality, and Hazards.

39 California Department of Water Resources. May 2006. Bulletin 120. American River below Folsom Lake 50 year average unimpaired runoff.

40 Reclamation, SAFCA. 1994. (from Sac Fazio).

41 Placer County Water Agency and U.S. Bureau of Reclamation, American River Pump Station Project Final EIS/EIR, June 2002, pp.3-35 to 3-40.

GDPUD, also regulates flows on Pilot Creek, a tributary to the Rubicon River, upstream of the confluence of the Middle Fork American and Rubicon rivers.

North Fork American River flows at the American River Pump Station have been estimated based upon upstream gage measurements. Dry-season (summer) flows at this location fluctuate daily; from 100 cfs when power is not being generated at Ralston Afterbay to about 1,100 cfs when power production peaks.[42]

4.2.1.9.2 Folsom Reservoir and Lake Natoma

The authorizing legislation for the construction of Folsom Dam, P.L. 81-356, directed Reclamation to operate the dam to control floods, provide for storage and delivery of water, generate power and provide salinity control in the Delta. The dam was completed in 1955. As a part of the CVP, Folsom Dam and Reservoir are operated not only for flood control and to meet CVP water delivery obligations, but also to satisfy in-stream flow needs in the lower American River and the Delta. Much of its original operational mandate was expanded with the passing of the CVPIA in 1992.

Flood-producing runoff occurs primarily during the October through April period and is usually most extreme during November through March. Snowmelt runoff by itself usually does not result in flood-producing flows, but it is usually adequate to fill the reservoir's empty space. Approximately 40 percent of the American River flow results from snowmelt.[43]

Lake Natoma is situated downstream of Folsom Dam and forms behind Nimbus Dam. This lake is operated as a re-regulating reservoir that accommodates the diurnal flow fluctuations caused by operating the Folsom Power Plant. The capacity of Lake Natoma is approximately 9,000 AF.

The region's municipal, agricultural, and industrial demands are met by several water purveyors in the areas above, around, and below Folsom Reservoir. El Dorado Irrigation District, City of Roseville, SJWD (including its member family: Citrus Heights Water District, Fair Oaks Water District, and Orange Vale Water Company), Sacramento Suburban Water District (formerly, Northridge Water District), Placer County Water Agency, California State Prison and the City of Folsom for example, are the purveyors that divert water from Folsom Reservoir.

Under the Water Forum Agreement (see Sacramento Area – Water Forum Agreement, below), base condition diversions (i.e., unadjusted for water-year type) from the American River

42 Placer County Water Agency and U.S. Bureau of Reclamation, American River Pump Station Project Final EIS/EIR, June 2002, pp.3-35 to 3-40.

43 Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206) Final Environmental Impact Report. U.S. Bureau of Reclamation. November 1998. p. 4-3.

Watershed under normal water years provide the following quantities of water to various water purveyors (see Table 4.2-3).

TABLE 4.2-3. BASE CONDITION DIVERSION UNDER THE WATER FORUM AGREEMENT IN NORMAL (AVERAGE/WET YEARS)

Upstream of Folsom Reservoir	Acre-Feet (AF)
Placer County Water Agency	35,500
GDPUD	19,700
El Dorado Irrigation District	35,430
Folsom Reservoir	
Sacramento Suburban Water District	29,000
City of Folsom	34,000
San Juan Water District	
Placer County	25,000
Sacramento County	57.200
El Dorado Irrigation District	15,050
City of Roseville	54,900
Folsom South Canal	
Southern California Water Company/Arden Cordova Water Company	5,000
California Parks & Recreation	5,000
SMUD	15,000
South Sacramento County Agriculture	35,000
Canal Losses	1,000
Lower American River	
City of Sacramento	96,300
Arcade Water District	11,200
Carmichael Water District	12,000
Sacramento River at SWRTP or SRWRS	
Placer County Water Agency	35,000
City of Sacramento	Up to 80,600
Sacramento County Water Agency	Up to 93,000

Source: Amended from Water Forum Draft EIR, Table 4.1-2., 1999.

There are two pumping plants located at Folsom Reservoir: the Folsom Pumping Plant, located at Folsom Dam, and the EID Pumping Plant. The Folsom Pumping Plant serves the City of Folsom, California State Prison (Folsom Prison), the City of Roseville, Sacramento Suburban Water District, and the SJWD. At times when the reservoir water level is high, gravity flow is possible and pumping is not required. The elevation at which pumping is required depends on the amount of water being pumped. Higher flow rates, typical of summer months, require greater pumping head; therefore, the lower limit of the gravity flow is higher in the summer months.[44] The EID Pumping Plant on the South Fork arm of Folsom Reservoir serves EID exclusively.

4.2.1.10 Lower American River[45]

The lower American River is that portion of the American River below Nimbus Dam. This reach, owing largely to its proximity to the greater Sacramento metropolitan area, has undergone significant channel and embankment alterations since the completion of Folsom and Nimbus dams in the mid1950s. (Reclamation 2015)

4.2.1.10.1 Lower American River Flows

Flow patterns in the lower American River (downstream of Lake Natoma) are influenced by operations of the CVP both within the American River watershed and within the entire Sacramento River watershed. Flows can be affected by local operations such as flood management requirements at Folsom Lake and Lake Natoma, federal and state flow requirements, temperature requirements and water uses in the American River watershed. Flows can also be affected by delta operations including outflow and salinity requirements as well as exports within and south of the delta. Recent mean daily flows in the American River are presented on Figure 5.36 (DWR 2013ak).

4.2.1.10.2 Lower American River Flood Management

Flood management requirements and regulating criteria for October 1 through May 31 each year were specified in 1987 by the USACE to manage flooding in the Sacramento area, as practicable; provide maximum amount of water conservation storage in Folsom without impairing the flood control; and provide maximum amount of power practicable and be consistent with required flood control operations and the conservation functions of the reservoir. Following significant flood events in February 1986 and January 1997, the lower American River flooding issues were analyzed; and revised flood operations criteria were developed by the Sacramento Area Flood Control Agency (SAFCA), as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. The SAFCA release criteria are generally equivalent to the USACE plan, except the SAFCA diagram may prescribe flood releases earlier than the USACE plan. The SAFCA diagram also relies on Folsom Dam outlet capacity to make the earlier flood releases. The outlet capacity at Folsom Dam is currently limited to 32,000 cfs based on lake elevation. Since 1996, Reclamation has operated according to modified flood control criteria, which reserve 400 to 670 TAF of flood control space in Folsom Reservoir in combination with

44 Placer County Water Agency, PCWA American River Pump Station Project Final EIS/EIR, June 2002, pp.3-292

45 Descriptions of the affected environment pertaining to Lower American River hydrologic conditions presented in this Final EIS are taken verbatim or summarized from the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Mid-Pacific Region Bay-Delta Office Final Environmental Impact Statement. November 2015. Pages 5-30 through 5-32.

empty reservoir space in Hell Hole, Union Valley, and French Meadows to be treated as if it were available in Folsom Reservoir.

Reclamation and USACE constructed an auxiliary spillway under the Joint Federal Project, at Folsom Dam to meet their respective objectives of mitigating primary dam safety risks (overtopping) and improving flood damage reduction for the surrounding region and lower American River. In conjunction with the JFP, USACE is developing a revised water control manual for Folsom which incorporates forecast based operations, wetness parameters and other adaptive measures in conjunction with capabilities of the new auxiliary spillway. The USACE is also implementing increased system capabilities provided by the authorized features of the Common Features Project to strengthen the American River levees to convey up to 160,000 cfs and completion of the authorized Folsom Dam Mini-Raise Project.

4.2.1.10.3 Lower American River Minimum Flow and Temperature Requirements

The minimum allowable flows in the lower American River are defined by SWRCB Water Right Decision 893 (D-893), which states that, in the interest of fish conservation, releases should not ordinarily fall below 250 cfs between January 1 and September 15 or below 500 cfs at other times. D-893 minimum flows are rarely the controlling objective of CVP operations at Nimbus Dam. Nimbus Dam releases are nearly always controlled during significant portions of a water year by either flood control requirements or are coordinated with other CVP and SWP releases to meet CVP water supply and Delta operations objectives. Power regulation and management needs occasionally control Nimbus Dam releases. Nimbus Dam releases generally exceed the D-893 minimum flows in all but the driest of conditions.

Dedication of water in accordance with Section 3406(b)(2) of CVPIA on the American River provides instream flows below Nimbus Dam greater than those that would have occurred under pre-CVPIA conditions, as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. Instream flow objectives from October through May generally aim to provide suitable habitat for salmon and steelhead spawning, incubation, and rearing, while considering impacts to other CVP and SWP uses. Instream flow objectives for June to September endeavor to provide suitable flows and water temperatures for juvenile steelhead rearing, while balancing the effects on temperature operations into October and November to help support fall-run Chinook Salmon spawning.

In July 2006, Reclamation, the Sacramento Area Water Forum and other stakeholders agreed to a flow and temperature regime (known as the Lower American River Flow Management Standard [FMS]) to improve conditions for fish in the lower American River, as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. Minimum flow requirements during October, November, and December are primarily intended to address fall-run Chinook Salmon spawning, and flow requirements during January and February address fall-run Chinook Salmon egg incubation and steelhead spawning. From March through May, minimum flow requirements are primarily intended to facilitate steelhead spawning and egg incubation, as well as juvenile rearing and downstream movement of fall-run Chinook Salmon and steelhead. The June through September flows are designed to address over-summer rearing by juvenile steelhead, although this period partially overlaps with adult fall-run Chinook Salmon immigration.

Water temperature control operations in the lower American River are affected by many factors and operational tradeoffs. These include available cold water resources, Nimbus release schedules, annual hydrology, Folsom power penstock shutter management flexibility, Folsom Dam Urban Water Supply TCD management, and Nimbus Hatchery considerations, as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. Meeting both the summer steelhead and fall salmon temperature objectives without negatively impacting other CVP project purposes requires reserving water in Folsom Lake for use in the fall to provide suitable fall-run Chinook Salmon spawning temperatures. In most years, the volume of cold water is not sufficient to support strict compliance with the summer water temperature target of 65˚F at the downstream end of the compliance reach at the Watt Avenue Bridge; while at the same time reserving adequate water for fall releases to protect fall-run Chinook Salmon, or in some cases, continuing to meet steelhead over-summer rearing objectives later in the summer. The Folsom Water Supply Intake TCD has provided additional flexibility to conserve cold water for later use.

4.2.1.10.4 American River Flows to Meet Delta Salinity Requirements

Folsom Reservoir also is operated by Reclamation to release water to meet Delta salinity and flow objectives established to improve fisheries conditions. Weather conditions combined with tidal action and local accretions from runoff and return flows can quickly affect Delta salinity conditions, and require increases in spring Delta inflow to maintain salinity standards, as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations. In accordance with Federal and state regulatory requirements, the CVP and SWP are frequently required to release water from upstream reservoirs to maintain Delta water quality. Folsom Lake is located closer to the Delta than Lake Oroville and Shasta Lake; therefore, the water generally is first released from Folsom Lake. Water released from Lake Oroville and Shasta Lake generally reaches the Delta in approximately three and four days, respectively. As water from the other reservoirs arrives in the Delta, Folsom Reservoir releases can be reduced.

4.2.1.10.5 Implementation of 2009 National Marine Fisheries Service Biological Opinion

The 2009 NMFS BiOp RPA requires Reclamation to implement the FMS; minimize flow fluctuation effects in the lower American River between January and May; and meet specific temperature requirements in the lower American River, as described in Appendix 3A, No Action Alternative: Central Valley Project and State Water Project Operations, through operational modifications of temperature control shutters on Folsom Dam, and installation of structural improvements (TCDs or the functional equivalent) on several intakes in Folsom Lake and Lake Natoma.

4.2.1.11 Groundwater

Locally, there are no designated groundwater basins identified for El Dorado County. Groundwater within the project area is primarily from hard rock aquifers where movement, recharge, and development of the groundwater are highly variable with location due to the area's geologic faults and fractures; volumes of groundwater are not peculiar to a certain geologic formation.[46] The movement of groundwater is limited at depths of 300 feet or more, resulting in greater groundwater yields in shallower wells. The median depth of wells in El Dorado County is 160 feet; the mean depth is 184 feet.[47] Groundwater is used to supply individual properties with water within El Dorado County, but is not considered reliable enough to serve as a supply for water wholesalers or retailers within the county. Within the regional context, the Sacramento Area Water Forum identified three groundwater basins (North, Central, and South) with specific long-term sustainable yield targets as part of the Water Forum Agreement.

4.2.2 Regulatory Framework

Various federal, State, and local regulations, policies, and rules affect available water supply and, related drainage, flooding, and water quality. These are described below. Explanations of other general rules, regulations and executive orders pertinent to this project are presented in Chapter 10.0 (Consultation/Coordination and Applicable Laws).

4.2.2.1 Federal and State

Within the context of hydrologic operations, numerous laws, directives, opinions, and orders affect or otherwise have influence on the management of the CVP. These include, but are not limited to the following:

Reclamation Act (1902)	Formed legal basis for subsequent authorization of the CVP.
Rivers and Harbors Act (1935)(1937)(1940)	First authorization of CVP for construction, and provision that dams and reservoirs be used first for river regulation, improvement of navigation, and flood control. Second authorization for irrigation and domestic uses. Third authorization for power.

46 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, p.4-77, included as Appendix D to PCWA American River Pump Station Project Draft EIS/EIR (SCH #1999062089), August 2001.

47 El Dorado County Planning Department, El Dorado County General Plan, Volume II, Background Information, January 23, 1996. p.V.5-22. Water Forum, (2004) "Draft Policy Document" Lower American River Flow Management Standard, February 2004.

Reclamation Project Act (1939)	Provided for the repayment of the construction charges and authorized the sale of CVP water to municipalities and other public corporations and agencies
Water Service Contracts (1944)	Provided for the delivery of specific quantities of irrigation, municipal, and industrial water to contractors.
Flood Control Act (1944)	Authorized flood control operations for Shasta, Folsom, and New Melones dams.
Water Rights Settlement Contracts (1950)	Provided diverters holding riparian and senior appropriate rights on the Sacramento and American rivers with CVP water to supplement water that historically would have been diverted from natural flows.
Trinity River Act (1955)	Provided that the operation of the Trinity River Division be integrated and coordinated with operation of other CVP features to allow for the preservation and propagation of fish and wildlife.
Fish and Wildlife Coordination Act (1958)	Provided for integration of fish and wildlife conservation programs under federal water resources developments. Authorized the Secretary of the Interior to include facilities to mitigate CVP-induced damages to fish and wildlife resources.
Reclamation Project Act (1963)	Provided a right of renewal of long-term contracts for municipal and industrial contractors.
SWRCB Decision 1379 (1971)	Established Delta water quality standards to be met by both the CVP and SWP.
Endangered Species Act (1973)	Provided protection for animal and plant species that are currently in danger of extinction (endangered) and those that may become so in the foreseeable future (threatened).
SWRCB Decision 1485 (1978)	Ordered CVP and SWP to guarantee certain conditions for water quality protection for agricultural, municipal and industrial, and fish and wildlife use.
Secretarial Decision on Trinity River Release (1981)	Allocated CVP yield so that releases can be maintained at 340,000 AF in normal water years, 220,000 AF in dry years, and 140,000 AF in critically dry years.
Amended (1991)	Released a minimum of 340,000 AF for each dry or wetter water year. During each critically dry water year, 340,000 AF will be released if at all possible.

Corps of Engineers Flood Control	Prescribed regulations for flood control. Manuals for: Shasta (1977), Folsom (1959), New Melones (1982).
Corps of Engineers Flood Control	Outlined descriptions and data on flood potential ratings. Diagrams for: Shasta (1977), Folsom (1986), New Melones (1982)

4.2.2.1.1 Long-Term Central Valley Project Operations and Criteria and Plan (CVP-OCAP)

In 1991, Reclamation requested formal consultation pursuant to Section 7 of the federal Endangered Species Act with both USFWS and NMFS regarding the effects of long-term CVP operations on the bald eagle in Shasta and Trinity reservoirs and on the winter-run Chinook salmon in the Sacramento River, respectively. At the time, the long-term operating criteria and procedures for the Trinity, Shasta, and Delta divisions of the CVP and the Red Bluff Diversion Dam (under the Sacramento River Division) were in question. As a result of this consultation, a development plan was prepared by Reclamation covering the long-term operation of the CVP under a range of potential hydrologic and reservoir storage conditions. Following the issuance by NMFS of a BiOp on the 1992 operations on February 14, 1992, this development plan became known as the Long-Term Central Valley Project Operations and Criteria and Plan; CVP-OCAP (dated October 1992).

Revisions to the CVP-OCAP were subsequently adopted in 2004.[48] The 2004 CVP-OCAP was in place at the time of circulation of the P.L. 101-514 Draft EIS/EIR. As described in the Draft EIS/EIR, the BiOps prepared in support of the 2004 CVP-OCAP document were challenged. Reclamation continued to operate under the provisions of the 2004 CVP-OCAP while preparing a revised Biological Assessment. That BA was completed in October, 2008.[49] In response to the BA, preliminary draft BiOps were completed by the National Marine Fisheries Service December 11, 2008 and the USFWS on December 15, 2008. Reclamation was in the process of reviewing the preliminary draft BiOps at the time of Draft EIS/EIR publication.

4.2.2.1.2 Central Valley Project Improvement Act (CVPIA)

The Central Valley Project Improvement Act (Public Law 102-575, Title XXXIV, 1992) (CVPIA) reauthorized the CVP for a wider range of beneficial uses and interests than originally mandated. In relevant part, the CVPIA established that fish and wildlife are to be recognized as project purposes equal to that of irrigation, power generation, and municipal and industrial use. The CVPIA was intended to authorize water transfers outside of the CVP service area; implement an anadromous fish restoration program (AFRP); create a restoration fund financed by water and

48 INCLUDE 2004 OCAP CITE

49 INCLUDE 2008 BA CITE

power users; provide for a Shasta TCD; implement fish passage measures at the Red Bluff Diversion Dam; plan for increased CVP yield; mandate firm water supplies for Central Valley wildlife refuges; and meet federal trust responsibilities for the protection of fishery resources (Trinity River). A significant measure of the CVPIA was the dedication of 800,000 acre-feet annually for fish, wildlife and habitat restoration (see Section 3406(b)(2) below).

Currently, the CVPIA is being implemented on a broad front. The Final PEIS evaluates projected conditions to the year 2022 (30 years from the CVPIA's adoption in 1992). The Final PEIS was released in October 1999, and the CVPIA ROD was signed on January 9, 2001.

4.2.2.1.3 Section 3406 (b)(2) under the CVPIA

As noted above, under the CVPIA, significant quantities (800,000 acre-feet annually) of CVP yield are reallocated to meet other new beneficial uses. This is the major provision under CVPIA Section 3406[b][2] whose annual allocation has come to be known as "b2" water. The allocation of 800,000 AF per year for this purpose was intended to address the anticipated and recurring impacts of CVP operations on fish and wildlife resources within CVP waterways.

4.2.2.1.4 The CALFED Environmental Water Account (EWA)

The EWA under the CALFED Program is a comprehensive effort to restore the ecological health of the Delta ecosystem consistent with the Ecosystem Restoration Program (ERP). It is intended to provide environmentally beneficial changes in CVP/SWP operations at no uncompensated water cost to the water users. By acquiring alternative sources of CVP/SWP water (or "project" water) supply, called "EWA assets", streamflows and Delta outflows could be augmented, exports modified to meet fishery needs, and regular project water that was interrupted by changes to project operations could be replaced. The EWA was designed so that replacement water would be able to compensate for reductions in deliveries, relative to existing facilities, project operations, and the regulatory baseline.

4.2.2.1.5 Long-Term CVP Contract Renewals

Reclamation has and continues to review and evaluate each CVP water service contract (M&I and Agricultural) as part of the long-term renewal terms of each contract. CVP Agricultural contracts are typically renewed for up to 25 years while M&I contracts are typically renewed for up to 40 years. Contract renewals are negotiated under the provisions of the CVPIA. Many CVP water service contracts are currently up for renewal or will be in the immediate future. These renewals represent a comprehensive effort on the part of Reclamation which is coordinating with USFWS and NMFS through the latter's obligations under Section 7 of the federal Endangered Species Act (ESA). Groupings of contracts and contractors by CVP division are being addressed in the negotiation process for organizational purposes. A total of 109 CVP contracts contained across 12 units of the CVP are being addressed. Currently, completed NEPA and ESA processes exist for the Cross Valley Canal Unit and the Friant Unit (not including the City of Fresno).

4.2.2.1.6 Coordinated Operations Agreement

Both the CVP and SWP rely on the Sacramento River and the Delta as common conveyance facilities. Reservoir releases and Delta exports must be coordinated so that both the CVP and SWP are able to retain their portion of the shared water and also jointly share in the obligations to protect beneficial uses. A COA between the CVP and SWP was developed and became effective in November 1986 as signed by Reclamation and the California DWR.

The COA defines the rights and responsibilities of the CVP and SWP regarding water needs of the Sacramento River system and Delta and includes obligations for in-basin uses, accounting, and real-time coordination of water obligations of the two projects. A CVP/SWP apportionment of 75/25 is implemented to meet in-basin needs under balanced Delta conditions, and the projects are using storage withdrawals to meet the in-basin demands. When unstored flow is available to export under balanced conditions, the apportionment is a 55/45 ratio. There is no apportionment needed when the Delta is under excess flow conditions. The COA contains considerable flexibility in the manner with which Delta conditions in the form of flow standards, water quality standards, and export restrictions are met.

4.2.2.1.7 State Water Resources Control Board

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

4.2.2.1.8 Decision 893 and Decision 1400

Minimum fishery releases to the lower American River from Nimbus Dam are made in accordance with D-893. The SWRCB increased the D-893 minimum release schedule in their Decision 1400 (D-1400). This decision was applied to the water rights permit for Auburn Dam and does not apply to the operation of Folsom and Nimbus dams at this time. However, Reclamation voluntarily operates Folsom and Nimbus dams to meet a “modified D-1400” for minimum fishery flows, and more recently has been striving to meet the recommended AFRP flows for the lower American River.

In 1996, Reclamation established the Lower AROG which includes the following regular participants (Reclamation, USFWS, NMFS, CDFW, Sacramento Area Flood Control Agency, City of Sacramento, County of Sacramento, WAPA, the Water Forum, and Save the American River Association). The AROG generally convenes monthly, or more frequently, with the purpose of providing input to Reclamation regarding the management of Folsom Reservoir for fish resources within the context of water availability and other beneficial uses.

Typically, the AROG plans and develops projected flow release schedules for Folsom Dam based on information received from Reclamation (e.g., flows in the river, reservoir storage, water temperatures, and projected outflows). It provides not only input for reservoir releases but also into the management of the reservoir's coldwater pool. For example, the AROG regularly provides input regarding how best to configure the shutters on the power penstocks at Folsom Dam. It should be noted that although the AROG has been voluntarily implementing these types of adaptive management procedures since 1996, its recommendations are only advisory and the group has no authority to oversee Folsom and Nimbus dam releases. Yet, Reclamation has managed both Folsom and Nimbus dam releases according to AROG recommendations to the fullest extent possible, given its existing other obligations.

4.2.2.2 Sacramento Area - Water Forum Agreement

In early 2000, numerous water interests in the greater Sacramento region ratified a basin-wide agreement, known as the Water Forum Agreement. This long-term agreement was based on two co-equal objectives: providing a reliable and safe water supply for the region's economic health and planned development to the year 2030; and preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River. Ratified through a Memorandum of Understanding, the Water Forum Agreement has the commitment of local water purveyors, business and citizen organizations, environmental groups, and local, State, and federal governments. Of the seven elements that make up the Water Forum Agreement, acknowledged increases in future surface water diversions, commitments to reduce diversion impacts in drier years (dry-year cutbacks), water conservation (demand reduction), and the commitment to implement a new improved flow pattern for the lower American River will all have significant influence on water allocation and management of the lower American River (including Folsom Reservoir) in the future.

The reader is referred to the Sacramento City – County Office of Metropolitan Water Planning's 1995 Water Forum Proposal and its associated environmental documentation (SCH# 95082041) for a full description of the seven major elements including, the specific purveyor-specific agreements (each containing dry-year wedge restrictions on diversions from Folsom Reservoir and the lower American River). While participating in the Water Forum process, neither the El Dorado County Water Agency, nor its members (e.g., EID and GDPUD) hold purveyor-specific agreements under the Water Forum Agreement. Accordingly, they are not bound by the voluntary diversion provisions contained in those agreements that apply to other signatories. Additionally, Reclamation, while participating in the Water Forum Agreement process, is not a signatory to the agreement.

4.2.2.2.1 Lower American River – Flow Management Standard (FMS)

As part of the Water Forum Agreement, a new improved flow pattern for the lower American River was one of the seven key elements. The primary purpose of the proposed FMS is to maximize the annual production and survival of the anadromous fall-run Chinook salmon and steelhead in the lower American River, within water availability constraints and in consideration of Reclamation's obligation to provide for multi-purpose, beneficial uses of the project. With improved habitat conditions for salmonids, the proposed FMS is also expected to benefit other fish species within the river. A more detailed description of the various provisions of the flow standard is provided in Subchapter 4.6.4, Regulatory Framework, for Fisheries and Aquatic Resources.

While EDCWA, EID, and GDPUD support the FMS and, in the case of EDCWA, are active participants in the Water Forum Successor Effort planning process, which includes the FMS development, Reclamation has not supported the specific FMS as currently defined. Reclamation supports the benefits of an improved flow regime for the lower American River but, at this time, owing to the uncertainty associated with the CVP-OCAP, has not committed to the details of the FMS.

4.2.2.2.2 Coordinated Long-Term Operation of the Central Valley Project and State Water Project (January 2016)

As described in Chapter 1 of this Final EIS, Reclamation completed the Record of Decision for adopting the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final EIS (2016 CVP LTO EIS) in January 2016. The EIS evaluated long-term potential direct, indirect, and cumulative impacts on the environment that could result from operation of the CVP and SWP with implementation of the 2008 USFWS BiOp and the 2009 NMFS BiOp. The EIS documents Reclamation’s analysis of the effects of modifications to the coordinated long-term operation of the CVP and SWP that are likely to avoid jeopardy to listed species and destruction or adverse modification of designated critical habitat.

Appendix 5B of the July 2015 Draft EIS describes a sensitivity analysis on EDCWA’s P.L. 101-514 water service contract. The sensitivity analysis includes system operations (CALSIM II) and temperature (HEC-5Q) model runs. The discussion of the sensitivity analysis concludes “addition of these demands did not show sensitivity to the rest of the CVP and SWP system.”[50] The analysis found reservoir storage changes in Shasta, Trinity and Oroville that were “minor and not substantial to the system.”[51] Folsom storage levels showed a 3 percent difference when averaged by water year type and month, with monthly differences as high as 6 percent in August of Critical Dry years. Lower American River water temperatures were found to show improvement overall with the inclusion of these water contracts. Temperature threshold exceedances show 1 percent to 2 percent differences with the inclusion of the contracts.

50 2015 OCAP DEIS, Appendix 5B, page 5B-1.

51 2015 OCAP DEIS, Appendix 5B, page 5B-2.

These updated modeling results support the water temperature conclusions in the P.L. 101-514 Draft EIS/EIR, which states that "Modeling results confirm that the long-term average water temperatures would remain virtually unchanged, relative to the Base Condition during all months of the September through March adult immigration period. Therefore, changes in water temperature would be a less than significant impact…."[52]

4.2.3 Impacts and Mitigation Measures

4.2.3-1 Effects on delivery allocations to CVP customers.

4.2.3.1 Alternative 1A – No Action Alternative

Under the No Action Alternative, the contract between Reclamation and EDCWA for delivery of the 15,000 AF would not be established. However, other water supply projects could and would likely be pursued. These options could cover a range of supplies. For the purposes of this analysis, it was assumed that a non-CVP water supply (e.g., water right) would be acquired by EDCWA and its subcontractors. CALSIM II modeling, therefore, could rely on the results from Alternative 3 – Water Transfer Alternative which showed no significant impacts on CVP customers. Similarly, there would be no significant impacts on CVP customers under the No Action Alternative.

4.2.3.2 Proposed Action – All Scenarios

Tables 5.4-1A through 5.4-1D of the Draft EIS/EIR (see pages 5-14 and 5-15) illustrate the 72-year mean differences in simulated annual deliveries to CVP contractors between the Base Condition and Proposed Action – Scenario A, for CVP M&I (North of Delta), Ag (North of Delta), M&I (South of Delta), and Ag (South of Delta) contractors. For each of the CVP contractor categories, there was virtually no difference in the 72-year mean under the Proposed Action – Scenario A, relative to the Base Condition. As noted in Subsection 4.6.1, above, under CALSIM II Simulations, the Proposed Action – Scenario A, as labeled in these tables and all ensuing tables in Chapters 5 and 6, correspond to Alternative 2A (Preferred) – Proposed Action - Scenario A, consistent with nomenclature used in the Executive Summary and Chapter 3.0: Proposed Action and Project Description.

CALSIM II modeling simulations, when reviewed over the entire 72-year period of record, however, showed maximum changes in modeled M&I deliveries for any one year ranging from a decrease of 9,900 AF to an increase of 7,700 AF and was confined to North of Delta water purveyors (see Proposed Action – Scenario A, Technical Appendix I, this Draft EIS/EIR). In these years, the deliveries generally corresponded to water year type and, equally important, previous year carryover storage. A careful inspection of individual year trends and relationships between

52 P.L. 101-514 DEIR/DEIS, Chapter 5, page 5-75.

years did not reveal distinguishable bias that would suggest the existence of a genuine impact (see Proposed Action – Scenario A, Technical Appendix I, of the Draft EIS/EIR).

For all eleven critically-dry years contained in the 72-year simulation, no significant changes in allocations were observable in the modeled results between the Proposed Action (Scenario A) and the Base Condition.

CVP Ag deliveries showed a much wider range of potential single year increases and decreases (e.g., 70,000 AF and 109,000 AF). This is not surprising given the higher volatility in annual and inter-annual delivery consistency experienced by Ag contractors, relative to M&I contractors and, as previously described, is largely reflected in Reclamation water shortage policy.

CALSIM II modeling results for CVP customer water supply were substantially identical for all scenarios (A, B and C) for the Proposed Action. Given the undetectable changes in simulated deliveries under each Proposed Action scenario relative to the Base Condition, and because the modeling results for Alternative 3 are indistinguishable from that of the No Action Alternative, the impact of Alternative 3 on CVP customers is considered likely to result in minimal effects.

4.2.3.3 Alternative 3 – Water Transfer Alternative

Under Alternative 3 – Water Transfer Alternative, project water needs would be wholly replaced with other water supplies (i.e., assumed water transfer). As noted previously, for EDCWA to affect a water transfer, a willing purveyor with a reliable long-term water supply would have to be identified. While it is possible that a transfer could exist as a CVP water assignment, it is more likely that a water rights transfer would occur. Regardless, as a transfer alternative, no additional CVP diversions would occur under this alternative as previously described (i.e., at most, this would involve a re-allocation or shift in existing entitlements). While it is accepted that diversions of water rights do affect CVP yield, the precise manner with which Reclamation would choose to re-adjust its operations to accommodate a lower yield in any given year is highly variable. Whether system operations would be able to detect a change is questionable. In any case, CALSIM II modeling of this alternative revealed that CVP allocations to all categories and CVP areas would remain virtually unchanged from the Base Condition. For this reason and because the modeling results for Alternative 3 are indistinguishable from that of the No Action Alternative, the impact of Alternative 3 on SWP customers is considered likely to result in minimal effects.

4.2.3.4 Alternative 4 – Reduced Diversion Alternative (All Scenarios)

As demonstrated above, the Proposed Action (all scenarios) would have a negligible impact on CVP contractors (M&I and Ag) both north and south of the Delta. Under Alternative 4 (all scenarios), proposed diversions would be less than those that would occur under the Proposed Action. The effect of Alternative 4 (all scenarios) on CVP customer water supply would be less than the effects identified for the Proposed Action. Because the Proposed Action is likely to result in minimal impact on CVP customer water supply, the same determination can be made for Alternative 4. The impact, therefore, is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.2-2 Effects on delivery allocations to SWP customers.

4.2.3.5 Alternative 1A – No Action Alternative

Under the No Action Alternative, deliveries to SWP customers would mimic those simulated under Alternative 3 – Water Transfer Alternative. Consistent with the description of Alternative 3 – Water Transfer Alternative, this is a reasonable assumption.

4.2.3.6 Alternative 2 - Proposed Action (All Scenarios)

Table 5.4-2A of the Draft EIS/EIR (see page 5-17) shows CALSIM II simulated delivery allocations to SWP contractors under Alternative 2A – Proposed Action – Scenario A, relative to the Base Condition. Over the 72-year period of record, the mean delivery allocations to SWP customers would approximate 2,860,000 AF under the Base Condition.

Simulated delivery allocations under Alternative 2A (Preferred) – Proposed Action – Scenario A would decrease annual allocations, on average by 3,200 AF (or 0.2 percent). Similar to CVP simulated allocations, there would be specific year changes that could either increase or decrease, relative to the Base Condition. Substantial single year decreases occur during dry-year sequences such as the 19311934 period where, annual deliveries would be approximately 50,000 AF (or 3-4 percent) less than the Base Condition. The other hydrologic period of note is the 1960-1961 dry period. Simulated SWP delivery allocations would be 26,000 to 33,000 AF less (or 1-3 percent less) than the Base Condition (see Proposed Action – Scenario A, Technical Appendix I of the Draft EIS/EIR).

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

While the overall 72-year mean change in annual deliveries to SWP customers would not significantly be disrupted by the Proposed Action (all scenarios), as expressed by the 0.2 percent decrease, relative to the Base Condition, specific year decreases of substantial magnitude would occur. The most significant of these, however, are confined to the dry and critically-dry periods, for example 1931-1934 where Base Condition deliveries would already be low; at approximately 50 percent of the 72-year mean. During these times, it is reasonable to expect that SWP contractors would be already aggressively investigating alternative dry-year supplies, with or without the Proposed Action effects. Accordingly, Alternative 2A (Preferred) – Proposed Action would not result in significant impacts on SWP water customer deliveries relative to Base Conditions. Because the effects of the Proposed Action on SWP water customers would be indistinguishable from those of the No Action Alternative, the impact of the Proposed Action on SWP customers is considered likely result in minimal effects.

4.2.3.7 Alternative 3 – Water Transfer Alternative

Under Alternative 3 – Water Transfer Alternative, the simulated long-term 72-year mean SWP delivery allocation would decrease by 8,700 AF (or 0.5 percent) as shown in Table 5.4-2B of the Draft EIS/EIR (see page 5-19). Similar to CVP contractors, notable decreases in SWP customer deliveries under this alternative, relative to the Base Condition were noted during the dry and critically-dry period of 1932-1934. Under this period's hydrology, modeled deliveries were reduced by approximately 113,000 AF (or about 8 percent), relative to the Base Condition (see Water Transfer Alternative, Technical Appendix I of the Draft EIS/EIR). The other hydrologic period of note is during the late 1980's, where CALSIM II model output showed decreases in SWP deliveries of about 16,000 AF and 25,000 AF in 1989 and 1990, respectively, under Alternative 3 – Water Transfer Alternative. Intuitively, decreases (or gains for that matter) of these magnitudes do not seem to comport with the increment of diversion contemplated by the project (i.e., 15,000 AF). This anomaly is explained in the discussion of CALSIM II simulations and its limitations in previous chapters.

Due to CALSIM's dynamic responses to system conditions, slight changes in model inputs or operations could trigger responses which may significantly vary on an individual monthly basis between the Base Condition simulation and "Project" or "Action" simulation. Focusing on the 72-year mean, as an indicator of delivery trend under this alternative, the mean relative change (as a percent) is less than one percent. In most years, no changes were determined through modeling. It is reasonable to conclude that no significant impacts on SWP customers would occur under Alternative 3 relative to the Base Condition when contrasting the actual diversion amount of 15,000 AFA to the simulated CALSIM II output. Because the modeling results for Alternative 3 are indistinguishable from that of the No Action Alternative, the impact of Alternative 3 on SWP customers is considered likely to result in minimal effects.

4.2.3.8 Alternative 4 – Reduced Diversion Alternative (All Scenarios)

As shown above, the potential effects of the Proposed Action on SWP contractors were found to be negligible. Because proposed diversions under Alternative 4 (all scenarios) would be lower than those projected for the Proposed Action, the effect of Alternative 4 on SWP contractors would be reduced relative to the Proposed Action. The impact of Alternative 4, therefore, is likely to result in minimal effects*.*

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.2-3 Effects of delivery allocations to purveyors of the Sacramento Water Forum Agreement as provided under their Purveyor-Specific Agreements (PSAs).

4.2.3.9 Alternative 1A – No Action Alternative

Under the No Action Alternative, anticipated effects on Water Forum Agreement purveyors would be similar to those captured by the modeling simulations under Alternative 3 – Water Transfer Alternative. This is because under the No Action Alternative, it is presumed that EDCWA (along with its member participants) would pursue alternative water supplies, most likely in the form of a long-term transfer or assignment. Moreover, such actions, if made with existing Water Forum Agreement purveyors would be made with the full knowledge by the issuing purveyor of what the implications to their water supply entitlements would be. Under the No Action Alternative, there is no impact on the water delivery allocations of the Water Forum Agreement purveyors relative to the Base Condition examined in the Draft EIS/EIR.

4.2.3.10 Alternative 2 - Proposed Action (All Scenarios)

Table 5.4-3A of the Draft EIS/EIR (see page 5-20) shows the delivery allocations at specific nodes with the CALSIM II model framework. The nodes identified include those for: D300 – North Fork American River at the Auburn/PCWA Pumps; D302 – American River at the City of Sacramento Fairbairn WTP (near Howe Avenue); D8 – Folsom Dam and Reservoir; and D167 – City of Sacramento's SWRTP on the Sacramento River just downstream from its confluence with the lower American River.

Under the Proposed Action (Scenario A), modeled delivery allocations at the American River Pump Station (D300) and Folsom Dam (D8) showed a long-term average annual increase (based on 72-year hydrologic modeling) of 6,000 AF and 6,200 AF, respectively. This is consistent with the Proposed Action, as defined, for the anticipated project diversions at these locations for both EID and GDPUD. These modeling results indicate that, over the long-term (based on 72-year historic hydrology) and, taking into consideration water availability (through Reclamation imposed shortage policy cutbacks), GDPUD could expect to receive 6,000 AF (or 80 percent) on an average annual basis and EID could expect to receive 6,200 AF (or 83 percent) of their allocated quantities under this action. Individual year allocations, however, would vary depending on water availability and Reclamation operational decisions.

The CALSIM II Model Verification Process conducted for this Final EIS concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

From a water supply impact perspective, Table 5.4-3A of the Draft EIS/EIR (see page 5-20) confirms that local water purveyors who divert at other locations would not be affected by the Proposed Action; both the American River and Sacramento River diversions of the City of Sacramento remained unchanged, relative to the Base Condition. The Water Forum Agreement purveyors, who divert from Folsom Reservoir, the lower American River, and the Sacramento River would remain unaffected by the Proposed Action (Alternative 2A). A review of the other allocation scenarios (between EID and GDPUD) under Alternatives 2B and 2C indicate that results similar to those of Alternative 2A would occur based on separate CALSIM II modeling simulations. For this reason and because the modeling results for the Proposed Action are indistinguishable from those of the No Action Alternative, the impact of the Proposed Action on delivery allocations to purveyors of the Sacramento Water Forum Agreement as provided under their PSAs would be likely to result in minimal effects.

4.2.3.11 Alternative 3 – Water Transfer Alternative and Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives

Under Alternative 3 – Water Transfer Alternative, the impacts on the long-term allocations to the same Water Forum Agreement purveyors remain unchanged relative to the Base Condition. However, the actual long-term simulated diversions at both the American River Pump Station and Folsom Reservoir not only increase but, in the case of Folsom Reservoir, significantly so (see Water Transfer Alternative, Technical Appendix I of the Draft EIS/EIR). This is because of the fact that not all purveyors diverting from Folsom Reservoir have Purveyor-Specific Agreements defined under the Water Forum, (i.e., there are diversions occurring outside of those specifically tied to Water Forum PSAs). As far as any potential impacts on the Water Forum Agreement purveyors, however, the anticipated impacts based on modeled simulations would be less than significant relative to the Base Condition under any of these alternatives.

Under the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), no significant impacts on water delivery allocations to any of the Water Forum Agreement purveyors would occur (see Reduced Diversion Alternative, Technical Appendix I of the Draft EIS/EIR, which was modeled for Alternative 4C). For these reasons, and because the impact would be further reduced when compared to No Action Alternative, the potential impact of Alternatives 3 and 4 would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.2-4 Reduction in pumping at the State pumps for annual delivery to South of Delta contractors.

4.2.3.11.1 All Alternatives including the Proposed Action

As illustrated previously in Tables 5.4-1C and 5.4-1D (Allocations to CVP M&I and Ag contractors South of Delta) (see page 5-14 and 5-15 of the Draft EIS/EIR), simulated water deliveries to South of Delta CVP contractors would remain unchanged, relative to the Base Condition under Alternative A – Proposed Action – Scenario A. This condition in annual delivery allocations would be identical under the other scenarios as well as for each of the other alternatives. As noted previously, South-of Delta CVP and SWP delivery within CALSIM II modeling is determined based upon water supply parameters and operational constraints with specific consideration for export constraints; it (CALSIM II modeling output) represents the best indication of how exports have been allocated over the historical period of record. Exports have, are, and will likely continue to be dictated by in-Delta conditions and CALSIM II modeling provides the best available means of detecting long-term trends over an established hydrologic record of how those operational constraints would affect exports. With deliveries to South of Delta contractors unchanged, relative to Base Conditions under all CALSIM II modeling, it is reasonable to conclude that no significant reductions or impairment to pumping levels at the State pumps would occur as a result of the Proposed Action or any alternatives. For this reason, and because the impact would be further reduced when compared to No Action Alternative, the potential impact of the Proposed Action and Alternatives would be likely to result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.2-5 Result in operations that may be inconsistent with the existing or anticipated CVP-OCAP or COA.

4.2.3.11.2 All Alternatives including the Proposed Action

As presented in Section 5.4 of the Draft EIS/EIR (page 5-23), the proposed CVP water service contract would be subject to current and future Reclamation terms and conditions regarding CVP and coordinated CVP/SWP operations, the CVPIA, established (BiOps), federal and State environmental regulations, and Reclamation law. No variances from these conditions, specifically as they relate to the CVP-OCAP and COA, are anticipated.

As discussed in sections 5.3.3 and 5.3.4 of the Draft EIS/EIR, the internal coding for the CALSIM II Model run employed for the Draft incorporates all operational rules consistent with the CVP-

OCAP, COA at the time of the model run, and other regulatory and institutional constraints (e.g., environmental regulations, BiOps, SWRCB Decisions, etc.). CALSIM II modeling that was relied upon in the Draft EIS/EIR, used modeling assumptions and revisions consistent with the 2004 CVP-OCAP. As noted previously, this Draft EIS/EIR modeling also updated the 2004 CVP-OCAP base CALSIM II modeling in various ways (e.g., City of Sacramento demands). The modeling for this EIS/EIR was completed in July 2007, representing the most up-to-date Reclamation version of CALSIM II available at that time. Prior to publication of the Draft EIS/EIR, the CVP-OCAP BiOps[53,54] were completed. Accordingly, all hydrologic impact analyses and associated environmental evaluations incorporated each of the relevant CVPOCAP and COA provisions. For this reason, the potential impact of the Proposed Action and Alternatives was found likely to result in minimal effects*.*

Since publication of the Draft EIS/EIR in 2009, the Record of Decision for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final EIS (January 2016) was filed by Reclamation and legal challenges to the 2008 and 2009 OCAP BiOps were dismissed. These events and their relevance to the Proposed Action and this Final EIS are discussed in detail in Section 1.1.4 (Recent Federal Actions Relevant to P.L. 101-514) of this Final EIS.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

For these reasons, there is no evidence to suggest that project operations carried out under the Proposed Action or Alternatives would be inconsistent with CVP operating criteria and procedures and with the Coordinated Operating Agreement. The impact, therefore, is likely to result in minimal effects*.*

53 NMFS. Draft Biological Opinion on the long-term Central Valley Project and State Water Project Operations Criteria and Plan. National Marine Fisheries Service June 2009.

54 USFWS. Memorandum to Operation Manager, Bureau of Reclamation, Central Valley Operations Office Sacramento, California from: Regional Director, Fish and Wildlife Service, Region 8, Sacramento, California Subject: Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP). December 2008

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.2-6 Result in an inadvertent reduction in groundwater aquifer yields in any of the North, Central or South area aquifers.

4.2.3.12 Proposed Action and Alternatives

Neither the Proposed Action nor any of the Alternatives rely on groundwater supplies, either within El Dorado County or elsewhere. In El Dorado County, as has been discussed previously, no appreciable, commercial groundwater supplies exist that would warrant the municipal and industrial development of such resources by EDCWA or any of its member purveyors. Water transfer alternatives could, however, lead to groundwater pumping from local or adjacent water purveyors who enter into transfer or assignment agreements with EDCWA. For those water purveyors capable of providing a groundwater supply (perhaps as an offset to a direct surface water transfers), they would still be tied to the provisions of the Water Forum Agreement with respect to the basin sustainable yield targets established in the Groundwater Element of the Water Forum Agreement. Accordingly, the Proposed Action and each of the Alternatives evaluated herein would have no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.3 HYDROPOWER (DIRECT EFFECTS STUDY AREA)

This subchapter describes the existing hydropower infrastructure and operations of the CVP and includes discussion of the hydropower operations at Folsom Reservoir which, because of its uniquely based multi-purpose infrastructure, possesses important implications to hydropower generation as well as water supply and environmental considerations, namely, coldwater pool management and downstream thermal benefits. The proposed new CVP water service contract has the potential to affect CVP hydropower generation and capacity as well as pumping power at Folsom Reservoir.

4.3.1 Affected Environment

Hydropower generation in California consists of the coordinated operations of the CVP and its integration with the Northern California Power System and the operations of WAPA.

4.3.1.1 CVP Hydropower System

The CVP hydropower system consists of eleven power plants, 38 generators, two of which are pump-generating plants. A complete list is presented in Table 4.3-1 of the Draft EIS/EIR (page 4-

20). This system is fully integrated into the Northern California Power System and provides a significant portion of the hydropower available for use in northern and central California. The installed power capacity of the system is 2,078,750 kilowatts (kW), or approximately 7,079 megawatts (MW). By comparison, the combined capacity of the 368 operational hydropower plants in California is 12,866 MW; PG&E, the area's major power supplier, has a generating capacity from all sources of over 20,000 MW. The CVP also includes approximately 860 miles of high-voltage transmission lines needed to deliver CVP power.

Once a strong influence on CVP operations, power operations are now secondary to other considerations. In part, this subordination is caused by the elevation of environmental needs to a higher standing, but changes in contractual relationships have also reduced the priority of power generation. Prior to 1977, Reclamation marketed and transmitted power from the CVP; however, under the Department of Energy Organization Act of 1977, WAPA now markets and conveys electrical power throughout the 15 western states.

Power produced by the CVP hydropower system is used first for meeting the authorized needs of the CVP including irrigation and M&I pumping (i.e., project pumping loads), fish and wildlife requirements and station service. Approximately 25 to 30 percent of the CVP total power generation is used to support these “Project Use” needs. CVP pumping facilities are listed in Table 4.3-2 of the Draft EIS/EIR (page 4-20). Power surplus to project use is “commercial power” and is marketed by the WAPA to its “Preference Power Customers” under long-term firm contracts to municipal and government entities (preference customers) at cost-based rates. Preference Power Customers can include federal agencies, military bases, municipalities, public utilities districts, irrigation and water districts, State agencies, rural electric cooperatives, and public transportation districts (Reclamation, 2004).

In addition to providing peaking generation to the central and northern California power system, the CVP supplies many secondary benefits to the power system including VAR (magnetic or inductive power) support, regulation, spinning reserves, and black-start capabilities.

In an average year, 4,600 gigawatt hours (GWh) of energy and 1,700,000 kW of capacity are marketed to preference customers at rates that recover full cost of production and repayment obligations of project investment with interest

4.3.1.2 History of CVP Power Allocations

Power was first generated in the CVP at the Shasta Power Plant in 1944. Formal allocations of 450 MW of CVP power were first made in 1952. In 1964, with the addition of the Trinity River Division facilities, allocations to preference customers were increased to 925 MW. In 1967, under terms of Contract 2948A, power imports over the Pacific Intertie (Northwest imports) were incorporated along with provisions for load level increases up to 985 MW in 1975 and up to 1,050

MW in 1980. Later in 1980, the load level was increased by 102 MW to 1,152 MW (the required PG&E support level for capacity usage by CVP preference customer loads).

This increase in allocations was accomplished under the 1981 Power Marketing Plan (47 FR 4139) dated January 28, 1982. New customers received 26 MW of non-withdrawable power and 42 MW of withdrawable power for a total of 68 MW, with 4 MW of withdrawable power left unallocated. Also, diversity power allocations of 30 MW were made to those customers who could shed load during Sierra Nevada Region's system simultaneous peak. During the same time period, SMUD challenged WAPA's right to meld the costs of Northwest imports into CVP power rates charged to SMUD. In a 1983 settlement, it was agreed that SMUD would pay the melded CVP power rates; SMUD's electric service contract at the time due to expire in 1994, would be extended to 2004; and SMUD would have the right to purchase 100 MW of peaking capacity through 2004. Further, SMUD would have the right to purchase a portion of the power to be marketed from 2005 to 2014.

Under the 1994 Power Marketing Plan (57 FR 45782 and 58 FR 34579) dated October 5, 1992 and June 28, 1993, respectively, existing customers with contracts expiring in 1994 were allocated 501 MW, and approximately 8 MW was allocated to new customers.

In addition to the power marketed in the 1994 Power Marketing Plan, total power under existing contracts includes approximately 910 MW of long-term firm power, 100 MW of peaking capacity, and 60 MW of withdrawable power, for a total of about 1,580 MW. On November 30, 1993, the National Defense Authorization Act (NDA Act) was signed into law. This act provides that, for a 10-year period, the CVP electric power allocations to military installations in the State of California, which have been closed or approved for closure shall be reserved for sale through long-term contracts to preference entities which agree to use such power to promote economic development at the military installations closed or approved for closure. On December 1, 1994, WAPA published the final NDA Act procedures developed to fulfill the requirements of section 2929 of the NDA Act (59 FR 61604). To date, about 42 MW of long-term firm power and about 9 MW of withdrawable power under contract to military installations being closed has been converted to NDA Act power.

4.3.1.3 Folsom Dam and Reservoir

The Folsom Power Plant is located at the foot of Folsom Dam on the right abutment. Three 15-foot diameter steel penstocks are embedded in the concrete section of the dam and deliver water to the turbines. The centerline of each penstock to the turbines is at elevation 307 feet (msl) and the minimum power pool elevation is at 328.5 feet (msl). A reinforced concrete trash rack structure with steel trash racks protects each penstock intake.

The steel trash racks, located in five bays around each intake, extend the full height of the trash rack structure (between 281 and 428 feet). Forty-five 13-foot steel shutter panels (nine per bay) and operated by a gantry crane, were installed in steel guides to select the level of water withdrawal from the reservoir. The shutter panels are attached to one another in a “ganging” configuration starting with the top shutter in groups of 3-2-4.

Reclamation has the ability to preferentially access various levels of the reservoir at these three hydropower penstock intake shutters. These were originally designed in a 1-1-7 configuration; where the top shutter could be opened independent of the others, as could the second shutter, while the remaining 7 shutters could only be opened as one unit. Reconfigured in 1994 under a 3-2-4 ganging configuration, these shutters now provide greater control over the depth of intake, and thus, the temperature of the water being released from the dam. Reclamation also has the ability to “blend” water between the three hydropower penstock intakes, adding yet more operational flexibility towards optimizing coldwater pool management and resultant downstream temperatures.

The three power generating units have a total release capacity of approximately 8,600 cfs. By design, the facility is operated as a peaking facility. Peaking plants schedule the daily water release volume during the peak electrical demand hours to maximize generation at the time of greatest need. At other hours during the day there may be little or no release (and no generation) from the plant.

To avoid fluctuations in flow in the lower American River, Nimbus Dam is operated as a regulating facility. While the water surface elevation in Lake Natoma fluctuates, releases to the lower American River are kept constant. The Nimbus Power Plant consists of two generating units with a release capacity of approximately 5,100 cfs. Electric generation from this facility is continuous throughout the day.

4.3.1.4 Western Area Power Administration (WAPA)

WAPA is the marketing agency for power generated at Reclamation facilities in the American River Basin. As noted previously, WAPA, created in 1977 under the Department of Energy (DOE) Organization Act, markets and transmits electric power throughout 15 western states. WAPA's Sierra Nevada Customer Service Region (Sierra Nevada Region) markets approximately 1,480 MW of power from the CVP and other sources.

WAPA's mission is to sell and deliver electricity that is in excess of Project Use (power required for project operations), which, for the Sierra Nevada Region, includes CVP power plants. WAPA's power marketing responsibility includes managing the federal transmission system and, as a federal agency, ensuring that operations of the hydropower facilities are consistent with its regulatory responsibilities. Specifically, WAPA's capacity and energy sales must be in conformance with the laws that govern its sale of electrical power. As noted previously, the hydroelectric generation facilities of the CVP are operated by Reclamation. Reclamation manages and releases water in accordance with the various acts authorizing specific projects and in accordance with other laws and enabling legislation. Hydropower operations at each facility must comply with minimum and maximum flows and other constraints set by FERC, Reclamation, USFWS, or other regulatory agencies, acting in accordance with law or policy. FERC regulations apply only to non-federal facilities and, as such do not apply to Folsom Dam and Reservoir. However, the case of California v. FERC in 1990 established that requirements of the Federal Energy Regulatory Commission can supersede State regulations relating to minimum stream flows. Most recently, long-term contracts for the sale of Sierra Nevada Region power resources expired December 31, 2004. WAPA developed a marketing plan that defines the products to be offered and the eligibility and allocation criteria for CVP electric power resources beyond the year 2004, and a number of long-term contracts were re-established in 2005.

4.3.2 Regulatory Framework

In 1906, Reclamation Law was amended to include power as a purpose of the projects if power was necessary for operation of the irrigation water supply facilities, or if power could be developed economically in conjunction with the water supply projects. The Act of 1906 allowed for lease of surplus power. Surplus power was described as power that exceeds the capacity and energy required to operation the Reclamation facilities (Project Use load). The Act of 1906 stipulated that surplus power would be leased with preference for municipal purposes.

Power supply was first authorized as a purpose for some CVP facilities in the Rivers and Harbors Act of 1937, which included authorization of initial CVP facilities. The Act of 1937 defined the priorities for the purposes of the CVP as: 1) navigation and flood control, 2) irrigation and M&I water supplies, and 3) power supply.

The Reclamation Act of 1939 modified Reclamation Law for all Reclamation facilities including the CVP. This Act reconfirmed the preference clause, and included the policy that the federal government would market power to serve the public interest rather than to obtain a profit. The Trinity River Act of 1955 authorized construction of the Trinity River Division (TRD) and allocated up to 25 percent of the energy resulting from the TRD to Trinity County. The Rivers and Harbors Act of 1962 authorized the New Melones Project and authorized up to 25 percent of the energy resulting from that project to Calaveras and Tuolumne counties. Customers receiving energy under these authorizations are referred to as “First Preference” customers.

As noted previously, the CVPIA in 1992 modified further the authorizations of the CVP, making fish and wildlife mitigation a higher priority than power, and power and fish and wildlife enhancement, equal priorities.

4.3.3 Impacts and Mitigation Measures

4.3-1 Effects on CVP hydropower generation and capacity.

4.3.3.1 Alternative 1A – No Action Alternative

As shown in the Draft EIS/EIR, changes to CVP hydrology under the No Action Alternative would be small and indistinguishable from that of the Proposed Action. While the environmental effects would be less than significant, there would be a definable economic cost under the No Action Alternative.

4.3.3.2 Alternative 2 - Proposed Action (All Scenarios)

Under Alternative 2A – Proposed Action – Scenario A, CVP system hydropower generation at load center would on average, over the 72-year period of record, be reduced by 3.3 GWH (or 0.1 percent), relative to the Base Condition. Long-Term Gen modeling results showed that in almost all hydrologic years (of the 72-year record), a reduction in CVP hydropower generation would occur, relative to the Base Condition (see Proposed Action – Scenario A, Technical Appendix I of the Draft EIS/EIR). These reductions, however, would be small and, as noted above, averaged about one tenth of one percent of the total CVP system generation at load center.

Results for each of the scenarios under the Proposed Action (Scenarios 2A, 2B and 2C) were not substantially different. With the quantities of diversions contemplated under P.L.101-514, it is not unreasonable or unexpected for modeling results to show this level of change in either CVP hydropower generation or project use. Since the diversions contemplated by all of the Proposed Action scenarios involve varying quantities of allocation between EID and GDPUD, but all occurring from either Folsom Reservoir or a combination of Folsom Reservoir and points upstream, the net impacts on Folsom operations would remain unchanged. A 15,000-acre-foot total diversion from Folsom Reservoir and/or points upstream would also have similar effects on CVP hydropower generation at load center, regardless of how the allocations between EID and GDPUD would be split.

Overall, a net reduction in long-term CVP hydropower production of 3.3 GWH, relative to the annual average CVP energy production of 4,545 GWH is considered to be a less-than-significant impact. Alternatives 2A, 2B and 2c would, therefore, not result in significant impacts on CVP hydropower generation. However, any reduction in energy production, WAPA could be compelled to reduce surplus energy sales or increase purchases to meet its commitments. In either case, such conditions would represent a definable economic cost but an unidentifiable environmental impact. Because of the limited magnitude of potential reductions in projected energy sales and because the level of these reductions under the Proposed Action would be indistinguishable from those expected under the No Action Alternative, the impact is likely to result in minimal effects.

With respect to potential changes in capacity and its effects on preference customers, previous modeling under the Water Forum Agreement analyzed the effects of changing water surface elevations at Folsom Reservoir and the potential implications to increased energy requirements for diverters pumping from the reservoir. The modeling assumed 254,800 AF of additional water diverted from the American River basin alone, relative to the 1995 Base Condition and assumed full diversions by EID and GDPUD for the current P.L.101-514 new CVP water service contracts. This was the premise of the Water Forum EIR. Of that additional 254,800 AF, withdrawals from Folsom Reservoir and upstream assumed that 172,000 AF would occur, again with the inclusion of EID and GDPUD's P.L.101-514 contracts.

Despite the significant additional increment of water withdrawal from the American River Watershed under the entire Water Forum Agreement, modeling results (using the power subroutine of PROSIM at the time) showed that under the Water Forum Agreement, few infringements on the 1,152 MW criteria would occur, relative to the Base Condition. The environmental analysis concluded that no significant impact on net CVP capacity available to CVP preference customers would occur under the Water Forum Agreement, relative to the Base Condition (see Draft Environmental Impact Report for the Water Forum Proposal, January 1999). Since the P.L.101-514 new contracts, under the current Proposed Action, were included in the modeling for the Water Forum Agreement, no substantially impact on net CVP capacity available to CVP preference customers is expected. That potential impact, therefore, is likely to result in minimal effects.

4.3.3.3 Alternative 3 – Water Transfer Alternative and Alternatives 4 (All Scenarios) – Reduced Diversions Alternative

Under these Alternatives, the anticipated effects on CVP capacity available to CVP preference customers would be the same or less than those applicable to the Proposed Action and No Action Alternatives. Diversion quantities considered under these Alternatives were identical to or less than those for each of the Proposed Action scenarios. It is reasonable to assume that under any of the Alternatives 4A, 4B and 4C, modeled changes to CVP hydropower generation or capacity would be less than that simulated for the Proposed Action because of the lesser quantities diverted. Accordingly, similar to the Alternative 2A, the environmental impact on CVP hydropower generation or capacity under these Alternatives would likely result in minimal effects. As noted previously, there would be a definable economic cost relative to existing conditions. This cost, however, would be the same as or less than that of the No Action Alternative. For this reason, the impact is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.3-2 Effects on annual pumping power costs to purveyors relying on the Folsom Reservoir urban water supply intake.

4.3.3.4 Alternative 1A No Action Alternative

Under the No Action Alternative, changes in Folsom Reservoir water surface elevations would be identical to the Proposed Action. Again, while the environmental effects would be less than significant, there would be a definable economic cost under the No Action Alternative since, as defined, it is presumed that a water transfer of some kind would be pursued with similar implications to water surface elevations at Folsom Reservoir.

4.3.3.5 Alternative 2 - Proposed Action (All Scenarios)

Reductions in Folsom Reservoir levels caused by the new water service contract(s) may increase capacity and energy requirements to pump water at the Folsom Pump Plant and the EID pumping plant. Such impacts, like those for hydropower generation, would not be expected to cause direct environmental impacts, but would have economic consequences and increase the demand for other sources of power (depending on the degree of new energy requirements as reflected in reservoir elevation changes).

Under the Water Forum Agreement, analyses of the frequency of Folsom Reservoir water surface elevations during the non-irrigation (November – March) and irrigation (April – October) periods were made. Again, this analysis included the EID and GDPUD new CVP water service contracts under consideration in this action. Using Folsom Reservoir's water surface elevation pumping relationships (i.e., Folsom Reservoir elevations that inhibit gravity flow to the North Fork and Natomas pipelines), it was shown that under the Water Forum Agreement (e.g., where an additional 172,000 AF diversion was imposed, relative to Base Conditions), increased pumping requirements occurred at almost all key reservoir water surface elevations. While the increased frequency of pumping was small (e.g., from pumping requirements 79 percent of the time at water surface elevation below 425 feet msl to 80 percent), these changes would translate into some increased energy usage. Under the Water Forum Agreement, the average annual pumping energy requirements would increase by approximately 5,800 MWh, relative to the Base Condition. EID's increment of increased energy costs would be subsumed in that 5,800 MWh increase, along with all other diverters from Folsom Reservoir.

Consistent with the Water Forum Agreement, this impact is considered to be less than significant from an environmental perspective. While the Proposed Action could result in an increase in annual pumping power costs to purveyors relying on the Folsom Reservoir urban water supply intake, this increase would not be substantially different from that expected under the No Action Alternative. The potential impact relative to cost, therefore, is likely to result in minimal effects*.*

4.3.3.6 Alternative 3 – Water Transfer Alternative and Alternative 4 (All Scenarios) – Reduced Diversions Alternative

Under these Alternatives, the results would be the same or less than those applicable to any of Alternatives 2A, 2B or 2C, all scenarios under the Proposed Action. Diversion quantities considered under these Alternatives were identical or less than those for Alternatives 2A, 2B and 2C. This would apply to Alternative 3 – Water Transfer Alternative. It is reasonable to assume that under any of the Alternatives 4A, 4B or 4C, modeled changes Folsom Reservoir water surface elevations would be less than that simulated under Alternative 2A. Accordingly, similar to Alternative 2A, there would no significant environmental impacts on pumping energy requirements at the Folsom or EID pumping plants. Consistent with the other Alternatives, there would, however, be a definable economic cost with each of these Alternatives. While Alternative 3 could result in an increase in annual pumping power costs to purveyors relying on the Folsom Reservoir urban water supply intake, this increase would not be substantially different from that expected under the No Action Alternative. The potential impact relative to cost, therefore, is likely to result in minimal effects*.*

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.3-3 Change in hydropower generation opportunities in the upper American River basin.

4.3.3.7 Alternative 1A – No Action Alternative

Under both the No Action Alternative, upper American River basin hydrology would remain unaffected in regard to hydropower generation opportunities. Changes in upper basin hydrology would either be identical to Alternative 3 – Water Transfer Alternative. No impacts on hydropower generation opportunities are anticipated under the No Action Alternative.

4.3.3.8 Alternative 2 - Proposed Action (All Scenarios)

Alternatives 2A, 2B and 2C, as defined, would divert water either at Folsom Reservoir or, at a point upstream on the Middle Fork American River at the location of the current American River Pump Station. Upper American River basin hydropower generation, by SMUD (UARP) in El Dorado County or, PG&E and PCWA in Placer County, would remain unaffected by these water service contracts since all contemplated diversions would be well downstream of, or hydrologically disconnected to those hydropower generating projects. Reservoir storage for all hydropower generating facilities in the upper watershed would remain undiminished. Accordingly, all scenarios of the Proposed Action, would have no impact on hydropower generation opportunities in the Upper American River watersheds.

4.3.3.9 Alternative 3 – Water Transfer Alternative and Alternative 4 (All Scenarios) – Reduced Diversions Alternative

Similar to the Proposed Action, Alternatives 3 and 4 would not affect upper watershed hydropower generation by virtue of their ability to divert water from Folsom Reservoir or at points well downstream, as is currently assumed. *No impacts* on upper basin hydropower generation opportunities would occur.

It should be noted, however, that, one possible scenario for the implementation of Alternative 3 could involve the implementation of a new water transfer involving a diversion point on the South Fork Rubicon River if this particular approach is implemented, SMUD's hydropower generation could be affected. If a new diversion were to occur above either the Loon Lake or Robbs Peak powerhouses, SMUD would likely experience lost hydropower generation potential at these facilities. An economic impact on SMUD would occur under such situations. In the event that such an approach was pursued in the future, additional environmental analysis would be required to evaluate the downstream effects of such a diversion.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.4 FLOOD CONTROL (DIRECT EFFECTS STUDY AREA)

This subsection describes the existing flood control facilities and operations within the regional and local study areas, and sets the context for an analysis of the potential diversion-related effects of the new CVP water service contracts on these flood control elements.

4.4.1 Affected Environment

Flood-producing runoff in the American River basin occurs primarily during the October through April period and is usually most extreme between November and March. Snowmelt runoff by itself usually does not result in flood-producing flows, but it is usually adequate to refill the reservoirs in the basin. Approximately 40 percent of the American River flow results from snowmelt.[55] The primary flood-causing events are rain-on-snow events, where warm Pacific storms result in a large amount of precipitation in the form of rain, even in the higher elevations that generally receive snow, prompting rapid melting of the existing snowpack.

Flood control throughout the region is set out by a comprehensive system of dams, levees, overflow weirs, drainage pumping plants, and flood control bypass channels provided by the Sacramento River Flood Control Project (SRFCP) and the American River Flood Control Project

55 Central Valley Project Water Supply Contracts Under Public Law 101-514 (Section 206) Final Environmental Impact Report. U.S. Bureau of Reclamation. November 1998. p. 4-3. . . . .

(ARFCP). Folsom Dam and Reservoir provide additional flood protection for the greater Sacramento metropolitan area. Each of these is discussed in more detail below.

On a regional level, flood control is a major function of the CVP. Along with the other CVP reservoirs providing flood control protection, both Shasta and Folsom reservoirs represent important elements of CVP-coordinated operations with respect to flood control. CVP operational priorities do change between seasons, and flood control is the top priority from November to April. During this period, reservoir releases are controlled by the need to create and maintain reservoir empty space for flood control storage.

4.4.1.1 Folsom Dam and Reservoir

On the local level, flood control is provided by Folsom Dam. Folsom Dam and Reservoir is a unit of the CVP and is the main flood control project in the American River basin. It provides critical flood protection for the approximately 350,000 residents and over $30 billion worth of damageable property currently occupying the floodplain in the Sacramento metropolitan area. Nimbus Dam and Lake Natoma lie immediately downstream of Folsom Dam, but the dam is operated to re-regulate flows released by Folsom Dam rather than for independent flood-control purposes.

Flood control requirements and regulating criteria are specified by the U.S. Army Corps of Engineers (Corps) and described in the Folsom Dam and Lake, American River, California Water Control Manual (Corps, 1987). Flood control objectives for Folsom Reservoir require that the dam and reservoir are operated to:

- Protect the City of Sacramento and other areas within the lower American River floodplain against reasonable probable rain floods;
- Control flows in the American River downstream of Folsom Dam to existing channel capacities, insofar as practicable, and to reduce flooding along the lower Sacramento River and in the Delta in conjunction with other CVP projects;
- Provide the maximum amount of water conservation storage without impairing the flood control functions of the reservoir; and
- Provide the maximum amount of power practicable and be consistent with required flood control operations and the conservation functions of the reservoir.

From June 1 through September 30, no flood control storage restrictions exist for Folsom Reservoir. From October 1 through November 16 and from April 20 through May 31, reserving storage space for flood control is a function of the date only, with full flood reservation space required between November 17 and February 7. Beginning on February 8 and continuing through April 20, flood reservation space is a function of both date and current hydrologic year conditions (e.g., snowpack water equivalent).

If inflow into Folsom Reservoir causes the storage to encroach into the space reserved for flood control, releases from Nimbus Dam are increased. Flood control regulations prescribe the following releases when water is stored within the flood control reservation space:

- Maximum release (after the storage entered into the flood control reservation space) of as much as 115,000 cfs but not less than 20,000 cfs when inflows are increasing;
- Releases will not be increased more than 15,000 cfs or decreased more than 10,000 cfs during a 2-hour period, and
- Flood control requirements override other operational considerations in the fall and winter periods. Consequently, changes in river releases of short duration may occur.

Since 1996, Reclamation has operated according to modified flood control criteria, which reserve 400,000 to 670,000 acre-feet of flood control space in Folsom Reservoir and a combination of upstream reservoirs. The flood control plan, which provides additional protection for the lower American River, is implemented through an agreement between Reclamation and the Sacramento Air Flood Control Agency (SAFCA). The terms of the agreement allow some reservoir empty space in Hell Hole, Union Valley, and French Meadows to be treated as if it were available in Folsom Reservoir. The SAFCA release criteria are generally the same as the Corps plan, except the SAFCA diagram may prescribe flood releases earlier than the Corps plan. The SAFCA plan also relies on Folsom Dam outlet capacity to make the earlier flood releases. The outlet capacity of Folsom Dam is limited up to 32,000 cfs based on water surface elevations.

4.4.1.2 Upper American River Basin

Approximately 820,000 acre-feet of storage capacity exists in American River basin reservoirs upstream from Folsom Reservoir. These facilities have at times proved beneficial in attenuating inflow to Folsom Reservoir, and under current operations, the three largest upstream reservoirs (French Meadows, Hell Hole, and Union Valley) provide as much as 200,000 acre-feet of usable flood storage capacity.

As noted previously, downstream of Nimbus Dam to around River Bend Park, the American River is mostly unrestricted by levees, but is bordered on both the north and south by suburban development. Natural bluffs and terraces in this reach of the river also provide natural morphological controls. From the River Bend Park area to the confluence with the Sacramento River, the lower American River is less constrained by natural features, and has been instead confined by levees, resulting in a slower moving, deeper reach with less meandering (Reclamation and SAFCA. 1994)

This reach of the river is also constrained by the American River Flood Control Project (ARFCP). The project, constructed by the Corps in 1958 and operated/maintained by the State of California, consists of a levee extending along the north side of the American River beginning near Carmichael and extending approximately seven miles downstream to a previously-existing levee near the Interstate Business 80 crossing. Two pumping plants located in low areas landside of the levee discharge storm drainage into the lower American River. The presence of this levee permits Folsom Reservoir to operate to its maximum design release of 115,000 cfs (Corps et al. 1996).

4.4.1.3 Recent Sacramento-Area Floodplain History

After the 1986 flood, the Corps initiated a comprehensive evaluation of the entire Sacramento River and American River flood control systems. Conclusions from the Corps' evaluation downgraded flood protection for the residents and businesses occupying low-lying areas of the Sacramento area to a 63-year level of flood protection, rather than the 120-year level levees were thought to have provided. FEMA reassessed the Sacramento area's 100-year floodplain and issued new Flood Insurance Rate Maps (FIRMs), placing about 110,000 additional acres in the revised 100-year floodplain.[56]

In order to address the deficiencies of the flood control systems, the Corps recommended separation of the Sacramento and American river problems, clearing the way for the Sacramento Urban Levee Reconstruction Project to repair structurally deficient levees along the Sacramento River, and the American River Watershed Investigation to evaluate the alternatives available to increase the capacity of the American River flood control system and the levees around Natomas. The State of California, through DWR and the State Reclamation Board, joined these efforts as the non-federal sponsor.[57]

After the floods of 1997, the Corps once again reevaluated the flood control system on the American and Sacramento Rivers; it determined that the 100-year flood event was much larger than previously predicted. The new evaluation revealed that releases from Folsom Dam would reach 175,000 cfs, which significantly exceeds the design capacity of the American River levee system. FEMA issued revised FIRMs in 1998, which delineate the boundary of the revised 100-year floodplain. The new maps delineate areas classified Zone AR, a designation indicating "an area of special flood hazard that results from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide a 100-year or greater level of flood protection." The AR classification is temporary and will expire 10 years from the date of classification or when certification of the 100-year flood protection is obtained.

56 These revised insurance maps became effective in November 1989. U.S. Bureau of Reclamation and Sacramento Area Flood Control Agency, Interim Reoperation of Folsom Dam and Reservoir: Volume I, Final Environmental Impact Report/Final Environmental Impact Assessment, 1994b.

57 U.S. Bureau of Reclamation and Sacramento Area Flood Control Agency, Interim Reoperation of Folsom Dam and Reservoir: Volume I, Final Environmental Impact Report/Final Environmental Impact Assessment, 1994b.

4.4.1.4 Folsom Dam Safety and Flood Damage Reduction Spillway Addition

Reclamation in cooperation with the U.S. Army Corps of Engineers have recently completed construction of the Joint Federal Project for Folsom Dam (Joint Federal Project or JFP). The project, as authorized, includes two fundamental elements; a Reclamation dam safety element and a Corps of Engineers flood damage reduction element. The new auxiliary spillway provides substantial mitigation of hydrologic risks that have been identified with potential overtopping of the Dam during any extremely rare, infrequently occurring and large magnitude events. Accordingly, a complete re-write and re-design of Folsom Reservoir's water control manual and water control diagram accompany completed construction of Folsom's new spillway. The new operational plans will better manage storage and releases based on high confidence forecast information provided by the National Weather Service's California-Nevada River Forecast Center.

4.4.2 Regulatory Framework

There are numerous agencies that regulate flood control in the greater Sacramento area. At the federal level, the Corps is involved in planning, studying, and constructing regional federally funded flood control projects. FEMA is responsible for administering the National Flood Insurance Program. State agencies responsible for implementing flood control measures include the DWR and the State Reclamation Board. The Corps and the State Reclamation Board are the primary agencies responsible for flood control facilities along the Sacramento River, while flood control along the American River is maintained by the State of California.

The Corps is responsible for providing the flood control regulations (operating criteria/flood control diagrams) and has ultimate authority for approval of flood control operations. Reclamation operates Folsom Dam and Reservoir for flood control within the operational parameters set by the Corps. The flood control operation principles for Folsom Dam and Reservoir, however, are mutually agreed upon by Reclamation and the Corps.

4.4.3 Impacts and Mitigation Measures

This subsection of the Final EIS describes the existing flood control facilities and operations within the regional and local study areas, and presents an analysis of the potential effects of the new CVP water service contracts on these flood control elements. The enumeration of potential impacts addresses environmental conditions that could be directly affected by diversion of project water from the North Fork American River and Folsom Reservoir.

4.4-1 Substantial change in the ability to adhere to the flood control diagrams for Folsom Reservoir under current operation or to its long-term re-operation.

4.4.3.1 No Action Alternative; Alternative 2 – Proposed Action (All Scenarios); Alternative 3 – Water Transfer Alternative; Alternative 4 – Reduced Diversion Alternative (Scenarios A-C)

Folsom Reservoir is operated to provide flood control protection from November through April. Under any of the action alternatives (including the No Action Alternative, as defined), increased diversions from the American River Watershed would occur. On a monthly mean basis during the flood control period, the storage in Folsom Reservoir would generally be slightly lower or unchanged under any of the action alternatives (including all scenarios under the Proposed Action), relative to the existing condition (see Proposed Action – Scenarios A, B and C, Technical Appendix I of the Draft EIS/EIR). This would indirectly provide a flood control benefit to the region by assisting in the ability to provide or, at the very least, maintain existing flood control reservation space. No adverse effect on Folsom Reservoir's ability to meet or adhere to its flood encroachment curve would occur. Moreover, as a diversion project, by definition, these new contracts would, in no way, affect the long-term or permanent re-operation of Folsom Dam and Reservoir for flood control purposes. Therefore, Alternatives 1 through 4 would have no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.4-2 Substantial change in floodplain characteristics that would increase the exposure of persons or property to flood hazards including a substantial change in the hydraulic stress imparted to lower American River levees or lower Sacramento River levees.

4.4.3.2 No Action Alternative; Alternative 2 – Proposed Action (All Scenarios); Alternative 3 – Water Transfer Alternative; Alternative 4 – Reduced Diversion Alternative (Scenarios A-C)

Where any structural change to a natural levee, revetment, dike, or terrace embankment occurs, increased risk to flooding can result. Altered characteristics within a floodplain may, depending on the magnitude of change, impart an increased risk of flooding. Additionally, where water is re-routed and flows increased within confined or defined channels, an increase in hydraulic stress may be imparted. Levee stress, a primary causal factor in failure, is often promoted by high flows over prolonged periods of time. In addition to the kinetic energy imparted by high flows, which can generate substantial erosive potential along the wetted embankment, high flows can also act to saturate confining levees. With this saturation, positive pore water pressures can build within older levees. Such pressures in an elevated structure of unconsolidated material (levees) can promote significant structural risks that can result in failures.

Each of the Alternatives (including the No Action Alternative), however, involve a withdrawal of water, not an addition. Overall, from a reservoir storage and flood reservation perspective, these changes would be small, but the amount of water in storage would be less, not more. Hence, the proposed new contracts, by definition, would provide greater flood control protection, relative to existing or Base Conditions.

The modeling results presented in Section 5.6 of the Draft EIS/EIR confirm the overall long-term reduction in mean monthly flows for most months. Noted increases would be well within the normal operating ranges for lower American River channel flows. Perhaps more importantly, the results confirm the negligible overall change in mean monthly flows, based on CALSIM II hydrologic modeling.

Increased diversions at Folsom Reservoir or points upstream would not result in specific changes to the characteristics of the lower American River floodplain, and there would be no increased risk of flooding. Persons and property within the area protected by these facilities would not experience any significant increase in exposure to flooding hazards, relative to the existing condition. Therefore, there would be no impact.

While future continued development would contribute to losses in surface permeability, it is reasonable to assume that appropriate runoff control practices will be implemented as part of the development process to provide mitigation for such changes in the hydraulic characteristics of the floodplain. Additionally, any indirect impacts on floodplain characteristics and the associated risk of flooding due to future development served by the Proposed Action or Alternatives 3 and 4 would be the same as, or less than that anticipated under the No Action Alternative. This impact, therefore, is considered likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.4-3 Result in operations inconsistent with the Joint Federal Project for Folsom Dam (including the Folsom Dam Safety/Flood Damage Reduction Project).

4.4.3.3 No Action Alternative; Alternative 2 – Proposed Action (All Scenarios); Alternative 3 – Water Transfer Alternative; Alternative 4 – Reduced Diversion Alternative (Scenarios A-C)

As noted previously, the Joint Federal Project for Folsom Dam includes two elements; the dam safety element and the flood damage reduction element. The dam safety element focuses on the construction of a new large spillway near the Mormon Island abutment of the dam (along with other existing spillway modifications) and the flood damage reduction element primarily involves the revision to Folsom Reservoir’s current Water Control Manual; the existing 400-670 flood encroachment curve. As a new diversion project, neither the new spillway nor the pending revision to the Folsom Reservoir empty space flood reservation curve would be affected by this project. Therefore, implementation of the Proposed Action and Alternatives, including the No Action alternative would result in no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.4-4 Result in operations inconsistent with SAFCA and Water Forum levee improvement/stabilization work in the lower American River corridor.

4.4.3.4 No Action Alternative; Alternative 2 – Proposed Action (All Scenarios); Alternative 3 – Water Transfer Alternative; Alternative 4 – Reduced Diversion Alternative (Scenarios A-C)

SAFCA and the Water Forum's levee improvement and stabilization work in the lower American River have included several completed and ongoing initiatives. These include, for the American River Common Features Project:

- American River Common Features - Slurry Wall Construction
- Installation of American River Basin Telemetry Gages
- Bank Protection along the American River Sites 1 through 5
- American River Revegetation Sites
- American River Common Features Jet Grout Contract 1
- American River Erosion Protection RM 1.8
- American River Erosion Sites 7.0R, 10.2L, 6.4L and 6.9
- American River 10.0 Bank Stabilization

For the North Area/Natomas/NLIP:

- North Area Local Project
  - Garden Highway through levee seepage
  - East/West Levee improvements along Steelhead Creek
  - (aka Natomas East Main Drainage Canal [NEMDC])
  - Cross Canal Levee Improvements Phase 1
  - Dry Creek North Levee
  - Robla Creek - Phase 1, 2, 3
  - Arcade Creek Phase 1
  - NEMDC Pump Station
- Natomas Levee Soil Boring Program
- Sand Cove Park Emergency Streambank Protection Project

- Dry Creek Debris Removal Project - Phase 1
- Sacramento River RM 60.0 Jibboom Street Park Levee Widening

Implementation of the Proposed Action and Alternatives, including the No Action Alternative, would have no effect on these completed and/or ongoing efforts. All project diversions contemplated under the new CVP water service contracts would occur upstream, at Folsom Reservoir or, points further upstream. Any changes to downstream hydrology in the lower American River and points further, would be observed as reductions in flow, to the extent that Reclamation operations at Folsom Dam would make these perceptible. Accordingly, none of the Alternatives would impart any adverse effect on levee improvement work being conducted in the lower American River. This impact, therefore, is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.5 WATER QUALITY (DIRECT EFFECTS STUDY AREA)

Section 4.5 of the Final EIS describes the existing water quality conditions within the regional and local study areas and presents the context in which the analysis of potential effects of the Proposed Action and Alternatives was conducted. Water quality impact determinations presented in the Draft EIS/EIR are reiterated here unless otherwise noted.

4.5.1 Affected Environment

The following text provides a description of regional and local water quality setting, to provide a basis for assessing the potential impacts that the Proposed Action and Alternatives could have on the environment. This section presents or summarizes information presented in Section 4.5 of the Draft EIS/EIR. Any revisions to that text or new information is cited as such.

4.5.1.1 Sacramento River

The Sacramento River system drains a 26,146-square-mile basin that extends from the Southern Cascade Range, through the Sierra Nevada to the Coast Ranges. The RWQCB has defined the following existing and potential future beneficial uses for the Sacramento River:

- municipal and domestic water supply;
- industrial service and industrial process supply;
- irrigation and stock watering;
- hydropower generation;
- groundwater recharge;
- contact recreation, non-contact recreation, and canoeing/rafting;
- warm and cold freshwater habitat, warm and cold freshwater migration and spawning habitat,

wildlife habitat; and

- navigation

Several of these beneficial uses (i.e., municipal, industrial and agricultural supply, recreation, groundwater recharge, and fish and wildlife habitat) depend, in part, on maintaining existing water quality. A discussion of each of these beneficial uses is provided below because of their relevance to the discussion of impacts that follow in the subsequent chapters.

4.5.1.1.1 Municipal, Industrial, and Agricultural Uses

Water is diverted from the Sacramento River for use in municipal systems. Industrial uses of water diverted from the river include mining, plant cooling, hydraulic conveyance, gravel washing, fire protection, and oil well re-pressurization. In addition, extensive use is made of Sacramento River waters for agricultural purposes. These uses include irrigation of crops, orchards, and pastures; stock watering; support of vegetation for range grazing; and ranching- and farming-support operations.

4.5.1.1.2 Recreation

Recreational uses of the Sacramento River include swimming, sport fishing, rafting, boating/canoeing and related activities that involve direct water contact and the possibility of limited water ingestion. Non-contact recreational uses include picnicking, hiking, camping, hunting, education, and various other forms of aesthetic enjoyment.

4.5.1.1.3 Groundwater Recharge

Sacramento River flows serve to recharge the groundwater aquifer within the broader project study area. Groundwater recharge helps to maintain soil column salt balance, to prevent salt-water intrusion into freshwater aquifers, and provides a replenishing supply for future groundwater extraction to support municipal, industrial, and agricultural uses.

In addition to natural groundwater recharge, Sacramento River water from downstream of the confluence with the American River may be used in the near future for Aquifer Storage and Recovery (ASR) projects. These artificial recharge projects can use either percolation ponds or injection wells to replenish groundwater by temporarily storing, or banking, water in the aquifer for withdrawal later. ASR projects may be used to store surface water for in-lieu use during dry periods, when using groundwater is preferable to diversion of surface water.

4.5.1.1.4 Maintenance of Fish and Wildlife Habitat

The Sacramento River provides important aquatic habitats that support a wide variety of aquatic and terrestrial wildlife populations. These habitats provide migration, spawning, and rearing areas for anadromous and other migratory fish species, as well as resident fishes. In general, the anadromous salmonid species using the river (i.e., steelhead and Chinook salmon) have the most restrictive water quality requirements. The water quality parameter most likely to adversely affect anadromous salmonids annually is water temperature.

4.5.1.1.5 Existing Water Quality

Sacramento River water quality monitoring studies indicate that the river's water is generally of high quality. Sacramento River water quality is primarily affected by land use practices within the watershed and associated urban runoff, stormwater discharges, agricultural runoff, effluent discharge from wastewater treatment plants, and acid mine drainage. The lower Sacramento River receives urban runoff, either directly or indirectly (through tributary inflow), from the cities of Sacramento, Roseville, Folsom, and their surrounding communities. The Natomas East Main Drainage Canal discharges to the Sacramento River immediately upstream of the confluence with the American River. This canal transfers both agricultural discharges and urban runoff into the Sacramento River.

Past monitoring studies have occasionally shown certain priority pollutants (e.g., trace metals, pesticides) to be at concentrations above State water quality objectives in portions of the Sacramento River.[58] Despite the seasonal variability of many constituents, studies have revealed that monitored water quality parameters in the vicinity of Freeport (immediately upstream of the SRWWTP's point of discharge) typically met water quality objectives specified in the former Inland Surface Waters Plan (described below), except for some metals.[59] The principal source of trace metal loading to the Sacramento River is believed to be the Iron Mountain Mine complex, which discharges to the upper Sacramento River via Spring Creek and Keswick Reservoir. The complex is thought to contribute approximately one-half of the metals loadings attributable to mine drainage.

Ongoing water quality management initiatives (e.g., Sacramento River Coordinated Monitoring Program, Sacramento River Watershed Program, Cal EPA Department of Pesticide Regulation’s Rice Pesticides Program) are helping to reduce the frequency with which water quality objectives are exceeded. In terms of the river’s quality as a raw municipal water source, total dissolved solids (TDS), total organic carbon (TOC), and pathogen levels are of particular concern, but are currently at acceptable regulatory levels. TDS is of concern primarily because of its effects on water treatment costs. TOC is of concern because of its role in the formation of carcinogenic disinfection byproducts (e.g., trihalomethanes) during the chlorination process of treatment. Pathogens (i.e., Cryptosporidium and Giardia) also are of concern with regard to their potential to affect human health. Sacramento River water is diverted for municipal and industrial uses and its flows constitute the bulk of freshwater inflows to the Delta where municipal and industrial diversions

58 City of Sacramento and City of West Sacramento, 1995.

59 State Water Resources Control Board, Draft Environmental Report Appendix to Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, 1994.

also occur. A detailed discussion of these important water quality parameters is provided in the Draft EIS/EIR (refer to Section 4.5.2 beginning on page 4-29). Agricultural drainage constituents of concern include nutrients, pesticides/herbicides, suspended and dissolved solids and organic carbon.[60] In the 1980s, rice pesticides were responsible for fish kills in agricultural drains and also for taste and odor problems in the water treated at the SRWTP. The major fish kills in the Colusa Basin Drain have since been eliminated as a result of the multi-agency rice pesticide control program.[61]

The concern over Giardia and Cryptosporidium concentrations in Sacramento River water, as well as other pathogens, has increased in recent years. Refer to Section 4.5.2 of the Draft EIS/EIR, page 4-30 for a more detailed description of existing conditions relative to Sacramento River pathogens.

4.5.1.2 Sacramento-San Joaquin Delta

Water quality in the Delta is heavily influenced by a combination of environmental and institutional variables, including upstream pollutant loading, water diversions within and upstream of the Delta, and agricultural and other land use activities throughout the watershed. Critical Delta water quality parameters (e.g., salinity and/or TDS, TOC, bromide, pathogens, temperature, nutrients, and priority pollutants) can show considerable geographic and seasonal variation. Salinity, bromide concentrations, and temperature are strongly related to changes in Delta inflows.[62]

Reduced Delta inflows can increase the amount of seawater intrusion and increase the water quality influence of organic-rich agricultural runoff in Delta channels. Delta water quality conditions that are critical for municipal drinking water quality include salinity, chloride, bromide, and TOC concentrations. Delta water quality conditions that are critical to aquatic habitat include salinity, temperature, DO, TSS and turbidity, pH, nutrients, and chlorophyll. The Delta waterways are listed as impaired for two organophosphate pesticides (*chlorpyrifos, diazinon*), Group A organochlorine pesticides, electrical conductivity, mercury, and unknown toxicity (SWRCB 2007).

The extent of saltwater intrusion into the Delta from the Pacific Ocean is largely controlled by freshwater inflow from the Sacramento, San Joaquin, Mokelumne, Calaveras, and Cosumnes rivers. Water diversion facilities upstream and within the Delta can reduce Delta inflows resulting in higher salinity levels at specific locations within the Delta than might otherwise occur. Conversely, water storage facilities can augment Delta inflows in certain months, resulting in

60 City of Sacramento, Relative Risks of the Sacramento and American Rivers as Sources of Water Supply,

61 City of Sacramento and City of West Sacramento, 1995. 63 MWD, 1993.

62 San Francisco Estuary Project, State of the Estuary: A Report on Conditions and Problems in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, 1992.

salinity levels lower than would otherwise occur. By augmenting natural or historic flows via releases from upstream reservoirs, the severe salinity level intrusions that once occurred every summer—which sometimes moved upstream as far as the City of Sacramento on the Sacramento River, and as far as Stockton on the San Joaquin River, have been eliminated.

An additional source of salt or TDS to the Delta is upstream agricultural discharges to the Sacramento and San Joaquin rivers, which can sometimes create elevated salinity levels in portions of the south Delta. Runoff and treated wastewater, to a limited degree, also influence Delta TDS levels.[63] TDS concentrations at the Banks Pumping Plant for the period 1990-1993 ranged from 44 to 417 mg/l, with an annual average of approximately 300 mg/l. Salinity requirements, represented in electrical conductivity (EC) units, for the Delta are defined in Table 4.5-1. These standards are intended to protect various beneficial uses of Delta waters. As noted previously, there are numerous standards for salinity and flow requirements governed by the Bay-Delta Water Quality Control Plan.

Delta waters receive organic carbon materials from a variety of sources, including agricultural drainage, surface runoff, algal productivity, in-channel soils, levee materials, riparian vegetation, and the Banks Pumping Plant during 1990-1993 ranged from 2.6 to 10.5 mg/l, approximately double that at Greene’s Landing. Research has shown an average increase in TOC concentrations of 1.5 mg/l between Greene’s Landing and the Banks Pumping Plant, which may be largely attributed to agricultural drainage.[64]

Nutrients in the Delta (nitrogen, phosphate, and silicate) are derived from several sources including river inflow, ocean water, runoff (urban and agriculture), wetlands, atmospheric deposition (rain and dust), and upstream sewage effluent. Nutrient concentrations vary geographically and seasonally. In the northern reach, where river flow provides most of the nutrient load, nutrient concentrations are highest in winter and lowest in summer.[65] Nutrients at sufficient levels can lead to algal blooms that deplete oxygen in the water during decomposition.

Metals, pesticides and petroleum hydrocarbons enter the Delta from several sources and environmental pathways, including agricultural runoff, municipal and industrial wastewater discharge, urban runoff, recreational uses, river inflow, and atmospheric deposition.[66] The concentrations of these pollutants in the Delta vary both geographically and seasonally.

63 Brown and Caldwell et al., 1995.

64 Brown and Caldwell et al., 1995.

65 San Francisco Estuary Project, State of the Estuary: A Report on Conditions and Problems in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, 1992.

66 San Francisco Estuary Project, State of the Estuary: A Report on Conditions and Problems in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, 1992.

Pesticides from agricultural runoff are of particular concern, as biologically significant concentrations have been recorded in portions of the Delta. Toxic effects of priority pollutants to aquatic life can vary with flow levels, as water flowing into and through the Delta acts to dilute concentrations of priority pollutants.

Finally, levels of Cryptosporidium, Giardia, and other pathogens in Delta waters are becoming of increasing concern to municipal water suppliers. Giardia was not detected at Banks Pumping Plant or Checkpoint 29, but was found in one sample at the DMC at a concentration of 6 cysts per 100 liters. Cryptosporidium was detected at Banks Pumping Plant, the DMC, and Checkpoint 29 at mean concentrations of 54, 40, and 17 oocysts per 100 liter, respectively.[67]

4.5.1.2.1 Delta X2

A major regulatory cornerstone of the 1995 Bay-Delta Water Quality Control Plan is the development of water quality standards based on the geographical position of the 2-ppt isohaline (also known as X2). The geographical position of the 2-ppt isohaline is considered significant to the biologically important entrapment zone of the estuary and the resident fishery. It provides an indicator of habitat protection outflow and salinity starting conditions in the Delta.

As contained in SWRCB Decision-1641 (D-1641), various flow, operational, and water quality standards create a systematic approach to CVP/SWP operations which influence the position of the X2 location. The key to the regulatory system is the concept of an “X2 day”. An X2 day can be operationally accomplished by the CVP/SWP meeting one of three possible equivalents. These include:

- 2.64 mmhos/cm EC at the desired geographic compliance location for the day;
- 14-day average of 2.64 mmhos/cm EC at the desired geographic compliance location; and
- A pre-determined Delta outflow equivalent for the desired X2 compliance location for the day. If any of these conditions are met, the day is included as a potential compliance X2 day.

The determination of the desired geographic compliance location and the required number of X2 days per month in the February through June time period that meet the above noted criteria is defined by regulatory standard tables. The various tables determine the number of required of X2 days based on the previous months inflow, noted as “8RI” since it is estimated on the full natural runoff of the largest eight streams in the Sacramento-San Joaquin River Watershed.

4.5.1.3 Folsom Reservoir

Water quality in Folsom Reservoir is generally acceptable for the beneficial uses currently defined for the facility. However, taste and odor problems have occurred in municipal water supplies

67 MWD, 1993.

diverted from Folsom Reservoir in the past, which were attributed to blue-green algal blooms that occasionally occur in the reservoir as a result of elevated water temperatures.

Folsom Reservoir has numerous beneficial uses as defined in the Central Valley Regional Water Quality Control Board's Basin Plan. The following existing and potential beneficial uses have been defined by the RWQCB:

- municipal, domestic, and industrial water supply;
- irrigation;
- power;
- water contact and non-contact recreation;
- warm and cold freshwater habitat, warm freshwater spawning habitat; and wildlife habitat.

The proposed diversion site for GDPUD is on the North Fork American River, just downstream of the confluence of the North and Middle forks of the American River. Water quality in the American River is considered to be good, although historical water quality data for the North Fork are limited. During early construction activities for the proposed Auburn Dam, Reclamation collected water samples at two locations upstream of the proposed dam site and two locations downstream. These samples were analyzed for pH and turbidity. Monitoring was conducted weekly from 1977 until 1995. The 1991-92 water-year was considered to be representative of the entire period because data for other years showed little variation. Turbidity was low at the nearest downstream and upstream monitoring locations, with annual averages just below or above 1 NTU (nephelometric turbidity unit). The pH ranged from 7.0 to 8.2 at the four monitoring locations. Information on sediment in the river was not readily available; however, the turbidity data indicate the river carries little sediment during low flows.[68]

Sources of historic wastewater flows to the North Fork American River include a sawmill located in Foresthill that discharges to a tributary to Devil's Canyon.[69]

The beneficial uses of the North Fork American River have been established by the RWQCB and are included in the Water Quality Control Plan for the Sacramento San Joaquin River Basins (1998).[70] These uses are:

- municipal and domestic supply;

68 Placer County Water Agency and U.S. Bureau of Reclamation, American River Pump Station Project Final EIS/EIR, June 2002, pp.3-205 to 3-206.

69 Placer County Water Agency and U.S. Bureau of Reclamation, American River Pump Station Project Final EIS/EIR, June 2002, pp.3-205 to 3-206.

70 Placer County Water Agency and U.S. Bureau of Reclamation, American River Pump Station Project Final EIS/EIR, June 2002, pp.3-205 to 3-206.

- agricultural supply;
- water contact and non-contact recreation;
- potential warm freshwater habitat;
- cold freshwater habitat;
- cold freshwater spawning, reproduction, and/or early development of fish; and
- wildlife habitat.

4.5.1.4 Lower American River

Surface water quality in Folsom Reservoir, Lake Natoma, and the lower American River depends primarily on the mass balance of various water quality constituents from groundwater inputs, tributary inflow, permitted discharges from municipal and industrial sources, indirect watershed runoff (unchannelized flow), urban runoff, and stormwater discharges. Water quality varies somewhat among years and seasonally within a year based primarily on these and related factors.

Historically, water quality parameters for the lower American River have typically been well within acceptable limits to achieve water quality objectives and beneficial uses identified for this waterbody,[71] and remain so today. Principal water quality parameters of concern for the river (e.g., pathogens, nutrients, TDS, TOC, priority pollutants, and turbidity) are primarily affected by urban land use practices and associated runoff and stormwater discharges. The stormwater discharges to the river temporarily elevate levels of turbidity and pathogens during and immediately after storm events. TOC and TDS levels in the lower American River are, however, relatively low compared to Sacramento River and Delta waters and thus are generally not of substantial concern.

Although urban land use practices, urban runoff, and stormwater discharges all contribute priority pollutants to the river, recent monitoring has not identified any priority pollutant at concentrations consistently above State water quality objectives.[72,] However, water quality objectives for dissolved oxygen, temperature, and pH are not always met in the lower American River.[73] Finally, taste and odor problems occasionally arise (generally during the late summer months) in the domestic water supplies taken from the lower American River at the Fairbairn WTP.

Water released from Folsom Reservoir, through Lake Natoma, and into the lower American River can affect several water quality parameters in the river. In addition, operation of Folsom Dam and Reservoir directly affects lower American River temperatures throughout much of the year. Water

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71 SWRCB, 1992.

72 City of Sacramento, Relative Risks of the Sacramento and American Rivers as Sources of Water Supply, 1993

73 Sacramento County, Draft Sacramento County General Plan Update Environmental Impact Report, Volume I, Sacramento County, Department of Environmental Review and Assessment,1992.

temperatures in the lower American River are often unfavorably high for salmonids during the summer and fall months of the year. Elevated river temperatures can be particularly problematic to the river's salmonid resources under low-flow conditions, which occur during the drier years.

4.5.2 Regulatory Framework

Section 303 of the federal Clean Water Act (CWA) requires states to adopt water quality standards for all surface water of the United States. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric, although narrative criteria based upon biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards.

The SWRCB and RWQCB are responsible for ensuring implementation and compliance with the provisions of the federal CWA, California's Porter-Cologne Water Quality Control Act, and related programs. Along with the SWRCB and RWQCB, water quality protection is the responsibility of numerous water supply and wastewater management agencies, as well as city and county governments, and requires the coordinated efforts of these various entities.

4.5.2.1 Water Quality Control Plan for the Sacramento San Joaquin River Basins

The Water Quality Control Plan for the Sacramento-San Joaquin River Basins (Basin Plan), adopted by the RWCQB on December 9, 1994 and reprinted (as amended in 1995 and 1996) on September 1, 1998, provides water quality objectives and standards for waters of the Sacramento River and San Joaquin River Basins. The Basin Plan contains specific numeric water quality objectives for bacteria, dissolved oxygen, pH, pesticides, EC, TDS, temperature, turbidity, and trace elements, as well as numerous narrative water quality objectives, that are applicable to certain waterbodies or portions of waterbodies. As discussed above, the Basin Plan contains specific numeric standards for Delta inflow and outflow, chloride, and EC, a measure of water's ability to conduct an electric current, which is based on the relative abundance of free ions in the water, which come from the dissociation of solid materials into the water. Thus, EC is directly related to TDS. EC standards in the Delta exist for both agricultural and fish and wildlife beneficial uses. Since publication of the Draft EIS/EIR in June of 2009, the RWCQB has adopted 15 amendments to the Basin Plan.

4.5.2.2 Bay-Delta Pollutant Policy Document and Accord

The Pollutant Policy Document (PPD) for the San Francisco/Sacramento-San Joaquin Delta Estuary was adopted by the SWRCB on June 21, 1990. The PPD sets forth basic policies for the control of toxic pollutants in the Bay-Delta Estuary. The PPD identifies seven pollutants of concern: arsenic, cadmium, copper, mercury, selenium, silver, and polynuclear aromatic hydrocarbons (PAHs). The PPD also indicates that publicly owned treatment works (POTWs) are a significant source (i.e., greater than 10 percent) of three of the seven pollutants of concern: cadmium, mercury, and silver. The RWQCB has identified the entire Delta as a waterbody of concern and designated the seven pollutants listed by the PPD as pollutants of concern. The most significant provision of the PPD for POTWs is the mass emission strategy (MES), which is designed to control the accumulation of toxic pollutants in sediments and aquatic tissue.

In June 1994, State and federal agency cooperation was formalized with the signing of a Framework Agreement. The Agreement stated that the State and federal agencies would focus on the following three areas of concern: water quality standards formulation; coordination of SWP and CVP operations with regulatory requirements; and long term solutions to problems in the Bay-Delta Estuary.[74] On December 15, 1994, an agreement was reached regarding water quality standards and related provisions that would remain in effect for three years. This agreement included springtime export limits, regulation of the salinity gradient, specified springtime flows on the lower San Joaquin River and intermittent closure of the Delta Cross Channel gates. Many of the standards and provisions in the December 1994 agreement were incorporated into the SWRCB's "Draft Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary" dated December 1994. After revisions were made that addressed comments, the final Delta Water Quality Control Plan was adopted on May 22, 1995[75,] and remains in effect today.

4.5.2.3 Anti-Degradation Policy (State Water Board Resolution 68-16)

In addition to designating beneficial uses and water quality objectives to define water quality standards, federal water quality regulations require each State to adopt an “anti-degradation” policy and to specify the minimum requirements for the policy. The SWRCB has interpreted State Water Board Resolution 68-16 to incorporate the federal anti-degradation policy.

The SWRCB adopted State Water Board Resolution No. 68-16 on October 28, 1968. The goal of this policy is to maintain high quality waters where they exist in the State. Resolution No. 68-16 does not prohibit any reduction to existing water quality. Rather, the RWQCB applies Resolution No. 68-16 when considering whether to allow a certain degree of degradation to occur or remain. As stated in Resolution No. 68-16, whenever the existing quality of water is better than that defined by State water quality objectives and policies, such existing high water quality will be maintained until it has been demonstrated to the State that any change will: 1) be consistent with the maximum benefit to the people of the State; 2) not unreasonably affect present and anticipated beneficial use of such water; and 3) not result in water quality less than that prescribed in water quality control plans or policies.[76] In addition, the discharger must apply best practicable treatment or control measures to assure that: 1) a pollution or nuisance will not occur; and 2) the

74 DWR, 1995.

75 State Water Resources Control Board, Water Quality Control Plan for the San Francisco Bay/Sacramento San Joaquin Delta Estuary, Environmental Report, Appendix I, 1995.

76 RWQCB, 1994.

highest water quality, consistent with the maximum benefit to the people of the State, will be maintained.[77] Hence, for actions that produce significant changes in water quality, the State policy states that a showing must be made that such changes result in the maximum benefit to the people of the State and are necessary to the social and economic welfare of the community in order to be consistent with the anti-degradation policies.

The Porter-Cologne Water Quality Control Act states that water quality objectives are to be established that ". . . will ensure the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." The State Water Code further states that ". . . it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses." This policy statement supports the position that some level of water quality change is allowable under the anti-degradation policies.

4.5.2.4 National Toxics Rule and California Toxics Rule

The U.S. EPA promulgated the National Toxics Rule (NTR) on December 22, 1992, which was amended on May 4, 1995, and November 9, 1999, to establish numeric criteria for priority toxic pollutants for California. The NTR established water quality criteria for 42 pollutants not covered, at that time, under California's state-wide water quality regulations. As a result of a court-ordered revocation of California's state-wide water quality control plan for priority pollutants in September 1994, the EPA initiated efforts to promulgate additional numeric water quality criteria for California. The EPA approved CTR promulgated numeric criteria on May 18, 2000 for priority pollutants not included in the NTR; the CTR was later amended on February 13, 2001. The CTR documentation (Federal Register, Volume 65, 31682) carried forward the previously promulgated criteria of the NTR, thereby providing a single document listing California's fully adopted and applicable water quality criteria for priority pollutants.

4.5.2.5 National Pollutant Discharge Elimination System (NPDES)

Title 40 of the Code of Federal Regulations (40 CFR) includes U.S. EPA regulations to implement the National Pollutant Discharge Elimination System (NPDES) permit system, which was established in the CWA to regulate municipal and industrial discharges to surface waters of the U.S. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that EPA must consider in setting effluent limits for priority pollutants.

77 RWQCB, 1994.

4.5.2.6 National Pollutant Discharge Elimination System (NPDES)

Two types of non-point source discharges[78] are controlled by the NPDES program – non-point source discharges caused by general construction activities and the general quality of stormwater in municipal stormwater systems (either as part of a combined system or as a separate system in which runoff is carried through a developed conveyance system to specific discharge locations). The goal of the NPDES non-point source regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of best management practices (BMPs). BMPs can include the development and implementation of various practices including educational measures (workshops informing public of what impacts result when household chemicals are released into storm drains), regulatory measures (local authority of drainage facility design), public policy measures (label storm drain inlets as to impacts of dumping on receiving waters) and structural measures (filter strips, grass swales and detention ponds).

The 1987 amendments to the CWA directed the federal EPA to implement the stormwater program in two phases. Phase 1 addressed discharges from large (population 250,000 or above) and medium (population 100,000 to 250,000) municipalities and certain industrial activities. Phase 2 addresses all other discharges defined by EPA that are not included in Phase 1, and construction activities that affect one to five acres. The Phase 2 regulations were published in the Federal Register on December 8, 1999.

4.5.3 Impacts and Mitigation Measures

The following describes the potential effects of the Proposed Action and Alternatives on water quality within the Study Area identified for this EIS. The enumeration of potential impacts addresses environmental conditions that could be directly affected by diversion of project water from the North Fork American River and Folsom Reservoir, as defined by the Proposed Action. Results presented in the Draft EIS/EIR are reiterated here. New information and analysis presented below is referenced accordingly. New information and analysis presented herein resulted in no substantive changes to the information, analysis and/or conclusions contained in the Draft EIS/EIR.

4.5-1 Effects of increased diversions and changes in CVP operations on water quality in reservoirs and rivers.

78 Non-point sources diffuse and originate over a wide area rather than from a definable point. Non-point pollution often enters receiving water in the form of surface runoff and is not conveyed by way of pipelines or discrete conveyances.

4.5.3.1 No Action Alternative; Alternative 2 – Proposed Action (All Scenarios); Alternative 3 – Water Transfer Alternative; Alternative 4 – Reduced Diversion Alternative (Scenarios A-C)

As defined, the No Action Alternative would result in increased diversions throughout the CVP and SWP system, relative to the Base Condition. These decreases would result in a decrease in dilution capacity of CVP and SWP rivers and reservoirs. These diversions, however, would not come from direct CVP or SWP allocations, but rather, from other water right holders within the American River Watershed, similar to Alternative 3 – Water Transfer Alternative. Hydrologically, therefore, the effect of the No Action Alternative on system-wide hydrologic variables would be identical to those of the Proposed Action scenarios described below. Accordingly, any impacts on water quality for waterbodies associated with the CVP project area resulting from reductions in Shasta Reservoir storage, Sacramento River flows, Folsom Reservoir storage or lower American River flows would be likely to result in minimal effects.

Increased diversions from Folsom Reservoir or points upstream could be expected to reduce operating storage levels in Folsom Reservoir and thus, also reduce flows in the lower American River. Since CVP reservoirs, in coordination with SWP reservoirs, are operated in an integrated fashion, reduced storage levels in Folsom Reservoir have the potential to also affect storage levels in other reservoirs as well as potentially affect flows in the Sacramento River and into the Delta. Table 5.7-1 of the Draft EIS/EIR (see page 5-37) shows the simulated mean end-of-month storage in Folsom Reservoir under the Proposed Action – Scenario A, over the 72-year hydrologic period of record.

Mean end-of-month storage changes from the Base Condition are small (e.g., the maximum long-term change in mean end-of-month storage was modeled at 1,600 AF representing a 0.3 percent change). Table 5.7-2 of the Draft EIS/EIR (see page 5-37) shows the same data for Shasta Reservoir. For Shasta Reservoir, mean end-of-month storage, over the 72-year period of hydrologic record would remain virtually the same, relative to the Base Condition. While absolute differences shown by CALSIM II modeling showed very slight increases (e.g., 1,100 AF), these are considered negligible when compared to total storage in the reservoir and are reflected in the small percentage increases. The influence of coordinated system operations is reflected in the modeling results for Shasta Reservoir where, slight storage changes (increases) are captured by CALSIM II, despite no direct diversions from the Proposed Action emanating in Shasta Reservoir.

Table 5.7-3 of the Draft EIS/EIR (see page 5-38) shows the mean monthly simulated flows in the lower American River below Nimbus Dam under Alternative 2B – Proposed Action, relative to the Base Condition, over the 72-year period of record. Slight decreases in long-term mean monthly flows were modeled for every month except April.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

These small reductions in flows, acting indirectly as dilution on the concentrations or levels of water quality parameters, would have a small, and immeasurable potential to adversely affect water quality.

Since flows in the Sacramento and American rivers would not be reduced substantially, concentrations of the water quality parameters of interest such as nutrients, pathogens, TDS, TOC, turbidity, and priority pollutants (e.g., metals, organics) would not be expected to be altered substantially, if at all, by the implementation of any of the diversion scenarios under the Proposed Action, or the Water Transfer Alternative, relative to existing conditions. Relative to the No Action Alternative, the reductions in flow for the Proposed Action and Alternatives would indiscernible from or less than those anticipated under the No Action Alternative. Thus, any impacts on water quality for waterbodies associated with the CVP project area resulting from reductions in Shasta Reservoir storage, Sacramento River flows, Folsom Reservoir storage or lower American River flows resulting from the Proposed Action and Alternatives would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.5-2 Effects on Delta water quality or operations contrary to the mandate of the Bay-Delta Water Quality Control Plan, California Inland Surface Waters Plan, Bay-Delta Pollutant Policy Document and Accord, Anti-Degradation Policy, and the pending Bay-Delta Conservation Plan.

4.5.3.2 Alternative 1A – No Action Alternative

Under the No Action Alternative, there would increases in the total amount of water diverted from the CVP/SWP system, similar to those assumed under Alternative 3 – Water Transfer Alternative (see discussion under Alternative 3 – Water Transfer Alternative). Consequently, there would be no measurable changes in the position of X2 or significant reductions in Delta outflow, relative to the Base Condition.

4.5.3.3 Alternative 2 – Proposed Action (All Scenarios); Alternative 3 – Water Transfer Alternative; Alternative 4 – Reduced Diversion Alternative (Scenarios A-C)

Table 5.7-4 of the Draft EIS/EIR (see page 5-39) shows the mean monthly simulated position of X2 (i.e., the position in kilometers eastward from the Golden Gate Bridge of the two parts per thousand [ppt] near-bottom isohaline) over the 72-year period of record under the Proposed

Action (Scenario B), relative to the Base Condition. For each month, while there were individual years (over the 72-year simulation period) that showed slight changes in X2 position, overall, the long-term mean position remained unchanged relative to the Base Condition. As a surrogate, an unchanging X2 position is a positive indicator that proper export/inflow ratios are maintained in the Delta.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

Based on CALSIM II modeling simulations, there would be no shift in the long-term average position of X2 under any of the diversion scenarios of the Proposed Action (see Proposed Action, Scenarios A, B and C, Technical Appendix I of the Draft EIS/EIR). The CALSIM II model simulations conducted included conformance with X2 requirements set forth in the SWRCB Interim Water Quality Control Plan, as well as the Department of the Interior's Final Administrative Proposal for the Management of 3406(b)(2) Water.

Under the Proposed Action and Alternatives, no significant hydrological changes would be expected to reservoir storage in Shasta, Folsom, as well as in lower American River flows. To the extent that any of the Bay-Delta Water Quality Control Plan, California Inland Surface Waters Plan, Bay-Delta Pollutant Policy Document and Accord, Anti-Degradation Policy, and the pending Bay-Delta Conservation Plan are influenced or rely on protective hydrologic regimes and implementable standards, the Proposed Action and all of the alternatives would not be inconsistent with the mandates or operations of those plans.

Relative to the No Action Alternative, the reductions in flow for the Proposed Action and Alternatives would indiscernible from or less than those anticipated under the No Action Alternative. Thus, any impacts on Delta water quality resulting from reductions in Shasta Reservoir storage, Sacramento River flows, Folsom Reservoir storage or lower American River flows resulting from the Proposed Action and Alternatives would be likely to result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6 FISHERIES AND AQUATIC RESOURCES (DIRECT EFFECT STUDY AREA)

This section describes the existing fisheries resources and aquatic habitats occurring within project study areas, including the regional and local areas directly affected by diversions made under the Proposed Action and Alternatives. This section also explains the context in which the analysis of potential effects of the Proposed Action and Alternatives was conducted. Fisheries and Aquatic Resources impact determinations presented in the Draft EIS/EIR are reiterated here unless otherwise noted. New information and analysis presented below is referenced accordingly. New information and analysis presented herein resulted in no substantive changes to the information, analysis and/or conclusions contained in the Draft EIS/EIR.

4.6.1 Affected Environment

This section describes the affected environment related to fisheries and aquatic biological resources in areas potentially affected by the Proposed Action and Alternatives. The discussion addresses environmental conditions that could be affected by increased depletions from the coordinated CVP/SWP system (including upper Sacramento reservoirs, the upper and lower Sacramento River, the Sacramento-San Joaquin River Delta, Folsom Reservoir, and the lower American River), including those potentially resulting from a new water exchange between the North Fork American River and Folsom Reservoir that would be needed for GDPUD to make use water made available to it under P.L. 101-514.

Fish species of primary management concern include recreationally/commercially important species, species listed under the California Endangered Species Act (CESA) and/or federal ESA, and those species being considered for State and/or federal listing or other special status. Special emphasis is placed on these species since they are the focus of State and/or federal initiatives, and are the primary subject of both State and federal fisheries restoration and recovery plans. Improvement of habitat conditions for these species of priority management concern will likely protect or enhance conditions for other fish resources, including native resident species.

Evaluating potential impacts on fishery resources requires an understanding of fish species' life histories and life-stage-specific environmental requirements. Therefore, this information is provided for fish species of primary management concern that occur (or potentially occur) within both the regional (Sacramento River and associated reservoirs and the Delta) and local (American River and associated reservoirs) study areas.

4.6.1.1 Fish Species of Primary Management Concern

The species described in this subchapter are presented in no particular order of importance.

4.6.1.1.1 Chinook Salmon (Oncorhynchus tshawytscha)

Four runs of Chinook salmon (i.e., fall-run, late-fall-run, winter-run, and spring-run) occur in the Sacramento River system, whereas only fall-run occur in the lower American River. Chinook salmon are anadromous, meaning they spend most of their lives in the ocean and return to their natal freshwater stream to spawn. A separate discussion for each of the four runs of Chinook salmon is provided below.

4.6.1.1.1.1 Winter-run Chinook Salmon

Winter-run Chinook salmon was listed as endangered under the federal ESA on January 4, 1994 and this status was reaffirmed on June 28, 2005. The Evolutionary Significant Unit (ESU) includes all naturally spawned populations of winter-run Chinook salmon in the Sacramento River and its tributaries in California, as well as two artificial propagation programs: winter-run Chinook from the Livingston Stone National Fish Hatchery (NFH), and winter run Chinook in a captive broodstock program maintained at Livingston Stone NFH and the University of California Bodega Marine Laboratory. A final designation of its critical habitat was made on June 16, 1993. This species was also listed as endangered under CESA in 1989.

Under Section 7 of the ESA, federal agencies are required to ensure that their actions are not likely to result in the destruction or adverse modification of a listed species' critical habitat. Critical habitat for the winter-run Chinook salmon is defined to occur in the Sacramento River from Keswick Dam (river mile [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.[79]

Adult winter-run Chinook salmon immigration (upstream spawning migration) through the Delta and into the lower Sacramento River occurs from December through July, with peak immigration during the period January through April.[80] Winter-run Chinook salmon primarily spawn in the main-stem 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.[81] Emigration (downstream migration) of winter-run Chinook salmon

79 National Marine Fisheries Service, Biological Opinion on the Winter-run Chinook Salmon, 1993.

80 U.S. Fish and Wildlife Service, Draft Anadromous Fish Restoration Plan, 1995.

81 U.S. Bureau of Reclamation, Biological Assessment for U.S. Bureau of Reclamation, Central Valley Operations, 1992.

juveniles past Red Bluff Diversion Dam is believed to peak during September and October,[82] with abundance of juveniles in the Delta generally peaking during February, March, or April.[83] Additional information on the life history and habitat requirements of winter-run Chinook salmon is contained in the NMFS Biological Opinion for this species, which was developed to specifically evaluate impacts on winter-run associated with CVP and SWP operations.[84]

4.6.1.1.1.2 Spring-run Chinook Salmon

Spring-run Chinook salmon was listed as threatened under the federal ESA on September 16, 1999 and reaffirmed as threatened on June 28, 2005. Its critical habitat was designated on September 5, 2005 with an effective date of January 2, 2006. This species in the Sacramento River drainage was also listed as threatened under CESA in 1999.

Spring-run Chinook salmon enter the Sacramento River during the period late March through September,[85] but peak abundance of immigrating adults in the Delta and lower Sacramento River occurs from April through June.[86] 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.[87] 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.

4.6.1.1.1.3 Late Fall-run Chinook Salmon

Listing of Late fall-run Chinook salmon was determined not to be warranted under the federal ESA on September 16, 1999, but the species was classified as a Species of Concern on April 15, 2005. The ESU includes all naturally spawned populations of fall-run Chinook salmon in the

82 R.J. Hallock and F.W. Fisher, Status of the Winter-run Chinook Salmon (Oncorhynchus tshawytscha) in the Sacramento River, 1985.

83 D. Stevens, “When do winter-run Chinook salmon smolts migrate through the Sacramento-San Joaquin Delta?”, unpublished memorandum, 1989.

84 National Marine Fisheries Service, Biological Opinion on the Winter-run Chinook Salmon, 1993.

85 F.L. Reynolds, R.L. Roberts and J. Shuler, Central Valley Salmon and Steelhead Restoration and Enhancement Plan, 1990.

86 U.S. Fish and Wildlife Service, Technical/Agency Draft Sacramento-San Joaquin Delta Native Fishes Recovery Plan, 1994a.

87 F.L. Reynolds, R.L. Roberts and J. Shuler, Central Valley Salmon and Steelhead Restoration and Enhancement Plan, 1990.

Sacramento and San Joaquin River Basins and their tributaries, east of Carquinez Strait, California.

Adult immigration of late fall-run Chinook salmon in the Sacramento River generally begins in October, peaks in December, and ends in April.[88] 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.[89] Spawning in the main-stem Sacramento River occurs primarily from Keswick Dam (RM 302) to Red Bluff Diversion Dam (RM 258), and generally occurs from December through April.[90] Post-emergent 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.[91]

4.6.1.1.1.4 Fall-run Chinook Salmon

Similar to late fall-run Chinook salmon, the listing of the fall-run also was determined not to be warranted under the federal ESA on September 16, 1999, but the species was also classified as a Species of Concern late on April 15, 2005. The ESU includes all naturally spawned populations of fall-run Chinook salmon in the Sacramento and San Joaquin River Basins and their tributaries, east of Carquinez Strait, California.

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. Fall-run Chinook salmon represent the greatest percentage of all four runs, and consequently, they continue to support commercial and recreational fisheries of significant economic importance.

In general, 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.[92] Fall-run Chinook salmon spawn in numerous tributaries of the Sacramento River, including the

88 U.S. Bureau of Reclamation, Appendices to Shasta Outflow Temperature Control Planning Report/Environmental Statement, Part I – Fisheries, 1991b.

89 U.S. Fish and Wildlife Service, Technical/Agency Draft Sacramento-San Joaquin Delta Native Fishes Recovery Plan, 1994a.

90 U.S. Bureau of Reclamation, Appendices to Shasta Outflow Temperature Control Planning Report/Environmental Statement, Part I – Fisheries, 1991b.

91 U.S. Fish and Wildlife Service, Technical/Agency Draft Sacramento-San Joaquin Delta Native Fishes Recovery Plan, 1994a.

92 F.L. Reynolds, R.L. Roberts and J. Shuler, Central Valley Salmon and Steelhead Restoration and Enhancement Plan,1990.

lower American River, lower Yuba River, Feather River, as well as tributaries to the upper Sacramento River. The majority of main-stem Sacramento River spawning occurs between Keswick and Red Bluff Diversion dams. A greater extent of fall-run 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).[93] 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 emigrants may be present in the lower American and Sacramento rivers from January through June,[94] and remain in the Delta for variable lengths of time prior to ocean entry.

As fall-run Chinook salmon occur within the local study area and are a species of primary management concern in the lower American River, additional life history and environmental requirement information pertaining more specifically to the lower American River fall-run population is provided below.

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. Both historic (fish passage at Old Folsom Dam, 1944-46) and more contemporary (creel survey, 1991-94) data indicate that adult Chinook salmon arrivals in the lower American River peak in November, and that typically greater than 90 percent of the run has entered the river by the end of November.[95]

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. Due to the timing of adult arrivals and occurrence of appropriate spawning temperatures, spawning activity in recent years (i.e., 1991-1993) has peaked during mid- to late-November. These same studies indicated that approximately 98 percent of all redds observed during these years were located between Watt Avenue (RM 9.5) and Nimbus Dam (RM 23).

Egg incubation survival rates are dependent on water temperature and intra-gravel water movement. CDFG reported egg mortalities of 80 percent and 100 percent for Chinook salmon at

93 Burmester, personal communication, 1996.

94 F.L. Reynolds, R.L. Roberts and J. Shuler, Central Valley Salmon and Steelhead Restoration and Enhancement Plan, 1990

95 CDFG 1992, 1993, 1994, 1995. 102 CDFG 1992, 1993a, 1995.

water temperatures of 61°F and 63°F, respectively.[96] Egg incubation survival is highest at water temperatures at or below 56°F.

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. The remaining fry rear in the lower American River where they feed and grow for up to 6 months, prior to emigrating as juveniles or smolts through June. Emigration surveys conducted by CDFG have shown no evidence that peak emigration of Chinook salmon is related to the onset of peak spring flows.[97] Temperatures required during emigration are believed to be about the same as those required for successful rearing.

Water temperatures between 45°F and 58°F have been reported to be optimal for rearing of Chinook salmon fry and juveniles.[98], Raleigh et al. reviewed the available literature on Chinook salmon thermal requirements and suggested a range of approximately 53.6°F to 64.4°F as suitable rearing temperatures, and 75°F as an upper limit.[99] 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. The 69-year average (1922-1990) water temperatures at Watt Avenue, as indicated by the Reclamation's Lower American River Temperature Model under existing hydrology, are 61.7°F in May and 65.9°F in June. Hence, average May and June river temperatures at Watt Avenue are currently at the upper end of the suitable range of Chinook salmon rearing temperatures, as defined above.

4.6.1.1.1.5 Central Valley Steelhead (*Oncorhynchus mykiss*)

Central Valley steelhead (hereinafter, simply referred to as steelhead) was listed as threatened under the federal ESA on March 19, 1998. Its threatened status was reaffirmed on January 5, 2005. The final designation of its critical habitat status was made on September 2, 2005 with an effective date of January 2. 2006. The Distinct Population Segment (DPS) includes all naturally spawned anadromous O. mykiss (steelhead) populations below natural and manmade impassable barriers in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries, as well as two artificial propagation programs: the Coleman NFH, and Feather River Hatchery steelhead hatchery programs.

96 California Department of Fish and Game, Anadromous Fish Conservation Act Project AFS-17, Management Plan for American Shad in Central California, Final Report, 1980.

97 Snider et al. 1997.

98 Reiser and Bjornn 1979.

99 Raleigh et al. 1986.

Steelhead are the anadromous form of rainbow trout. Adult steelhead migrate through the Sacramento River system beginning in August and continue through March. Adult steelhead return to their 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.[100] Spawning generally occurs from January through April.[101] 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.[102,]

The lower American River steelhead population is believed to be supported primarily by fish produced at the 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.[103,] Optimal immigration temperatures have been reported to range from 46°F to 52°F.[104]

Spawning usually begins during late-December and may extend through March, but can range from November through April.[105] Optimal spawning temperatures have been reported to range from 39°F to 52°F.[106] Unlike Chinook salmon, not all steelhead die after spawning. Those that do not die return to the ocean after spawning, and may return to spawn again in future years. The egg and fry incubation life stage 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.[107,] Optimal egg and fry incubation temperatures have been reported to range from 48°F to 52°F.[108] Optimal temperatures for fry and juvenile rearing is

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[100] F.L. Reynolds, R.L. Roberts and J. Shuler, Central Valley Salmon and Steelhead Restoration and Enhancement Plan, 1990.

[101] McEwan, personal communication, 1997.

[102] F.L. Reynolds, R.L. Roberts and J. Shuler, Central Valley Salmon and Steelhead Restoration and Enhancement Plan, 1990.

[103] California Department of Fish and Game, Endangered and Threatened Animals of California, 1986.

[104] California Department of Fish and Game 1991. . . . .

[105] 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.

[106] California Department of Fish and Game 1991.

[107] 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.

[108] CDFG 1991.

reported to range from 45°F to 60°F.[109] 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°F122 being increasingly less suitable and thermally more stressful.

4.6.1.1.1.6 American Shad (*Alosa sapidissima*)

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.[110]

Adult American shad typically enter the lower American River from April through early July,[111] with the spawning migration peaking from mid-May through June.[112] Water temperature is an important factor influencing the timing of spawning. American shad are reported to spawn at water temperatures ranging from approximately 46°F to 79°F,126 although optimal spawning temperatures are reported to range from about 60ºF to 70°F.[113,]

A 1990 field investigation 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 (Jones and Stokes Associates 1990). In contrast to salmonids, distributions of spawning virgin shad are determined by river flow rather than homing behavior. Substrate and cover played no apparent role in habitat selection. Snider and Gerstung 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.[114] When suitable spawning conditions are found, American shad school and broadcast their eggs throughout the water column.

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109 CDFG 1991. 122 Bovee 1978.

110 California Department of Fish and Game, Anadromous Fish Conservation Act Project AFS-17, Management Plan for American Shad in Central California, Final Report, 1980.

111 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.

112 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 Delta, 1987. 126 U.S. Fish and Wildlife Service, Special Scientific Report Fisheries No. 550, Biology and Management of the American Shad and Status of the Fisheries, Atlantic Coast of the U.S., 1967.

113 Leggett and Whitney 1972. . . . .

114 W.M. Snider and E. Gerstung, Instream Flow Requirement of the Fish and Wildlife Resources of the Lower American River, Sacramento County, California, California Department of Fish and Game Stream Evaluation Report, 1986.

Based on laboratory experiments conducted on American shad incubation, Walburg and Nichols concluded that temperatures suitable for normal egg development ranged from about 54°F to 70°F.[115] These investigators further reported that eggs hatched in 3 to 5 days at 68°F to 74°F and in 4 to 6 days at temperatures of 59°F 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.[116] Few juvenile American shad have been collected in the lower American River.[117] Therefore, the presence of American shad in the lower American River is primarily restricted to adult immigration, spawning, and fry life stages.

4.6.1.1.1.7 Striped Bass (*Morone saxatilis*)

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 CVP and SWP.[118]

Adult striped bass are present in the lower American River throughout the year,[119] with peak abundance occurring during the summer months.[120,] No studies have definitively determined whether striped bass spawn in the lower American River.[121,] However, the scarcity of sexually ripe adults among sport-caught fish indicates that minimal, if any, spawning occurs in the lower American River, and that adult fish which entered the river probably spawned elsewhere or not at

115 Walburg and Nichols 1967.

116 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.

117 California Department of Fish and Game, Anadromous Fish Conservation Act Project AFS-17, Management Plan for American Shad in Central California, Final Report, 1980.

118 USFWS 1988.

119 R. W. DeHaven, An Angling Study of Striped Bass Ecology in the American and Feather Rivers, California, Unpublished Progress Report No. 2, 1977.

120 R. W. DeHaven, An Angling Study of Striped Bass Ecology in the American and Feather Rivers, California, 1977, and An Angling Study of Striped Bass Ecology in the American and Feather Rivers, California, Unpublished Progress Report No. 4, 1979.

121 California Department of Fish and Game, A Report to the 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, 1971.

all.[122] The number of striped bass entering the lower American River during the summer is believed to vary with flow levels and food production.[123] 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.[124] 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. 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 lower American River apparently is a nursery area for young striped bass (CDFG 1971; 1986). Numerous schools of 5- to 8-inch-long fish have been reported in the river during the summer months (CDFG 1971). In addition, juvenile and sub-adult fish 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°F to 71°F (USFWS 1988).

4.6.1.1.2 Sacramento Splittail (Pogonichthys macrolepidotus)

Sacramento splittail were listed as threatened under the federal ESA on February 8, 1999, however, the species was delisted on September 22, 2003. Splittail are currently classified as a State species of special concern. Splittail are members of the minnow family (Cyprinidae), achieving lengths of up to about 16 inches.

Adult splittail usually reach sexual maturity in their second year, and migrate upstream in the late fall to early winter prior to spawning activities. Spawning occurs from mid-winter through July in water temperatures between 9-20°C (48-68°F) (Wang 1986) at times of high winter or spring runoff (DWR 1994a). 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. Water temperature and photoperiod also influence the timing of spawning.

122 R. W. DeHaven, An Angling Study of Striped Bass Ecology in the American and Feather Rivers, California, 1977, and An Angling Study of Striped Bass Ecology in the American and Feather Rivers, California, Unpublished Progress Report No. 3, 1978.

123 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.

124 W. M. Snider and E. Gerstung, Instream Flow Requirement of the Fish and Wildlife Resources of the Lower American River, Sacramento County, California, California Department of Fish and Game Stream Evaluation Report, 1986.

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 (CDFG 1989). 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 1994a). Downstream emigration into the Delta is believed to peak during the period April through August (Meng and Moyle 1995).

Low numbers of splittail have been collected in the lower American River. CDFW 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 Keenan 1994; Snider and Titus 1994; Snider and Titus 1996). The fish sampling surveys were conducted from approximately January through June, when adult and larval splittail would likely be in the river. Splittail were collected in very low numbers, primarily at the lowest sampling station located downstream of 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.

4.6.1.1.3 Hardhead (Mylopharodon conocephalus)

Hardhead is a large (occasionally exceeding 600 mm standard length), native cyprinid species that generally occurs in large, undisturbed low- to mid-elevation rivers and streams of the region (Moyle 1976). They are widely distributed throughout the Sacramento-San Joaquin River system. Spawning migrations, which occur in the spring, into smaller tributary streams are common. The spawning season may extend into August in the foothill streams of the Sacramento and San Joaquin river basins. Little is known about life stage-specific temperature requirements of hardhead; however, temperatures ranging from approximately 65°F to 75°F are believed to be suitable (Cech et al. 1990). Hence, this species has greater thermal tolerance compared to that of the anadromous salmonids discussed above.

4.6.1.1.4 Delta Smelt (Hypomesus transpacificus)

Delta smelt was listed as a threatened species under the ESA in March 1993, and critical habitat for delta smelt was designated on December 19, 1994. Critical habitat was designated for delta smelt in 1994 (FR 59:65256, December 19, 1994). The reclassification from threatened to endangered was determined to be warranted but precluded by other higher priority listing actions (FR 75:17667, April 7, 2010). Delta smelt was listed as threatened under CESA in 1993 and as endangered under CESA in 2010.

Delta smelt is a short-lived, slender-bodied, translucent fish endemic to the Delta. Adult size is typically 60-70 mm, although some individuals as large as 120 mm standard length have been recorded (USFWS 1994a). As a euryhaline species, delta smelt can tolerate wide-ranging salinities, but rarely occur in waters with salinities greater than 10-14 ppt. Historically, they have been abundant in low (around 2 ppt) salinity habitats. Delta smelt typically live for only one year but some can live for two years. At all life stages they are found in greatest abundance in the top two meters of the water column and usually not in close association with the shoreline, inhabiting open surface water of the Delta and Suisun Bay. Critical thermal maximum for delta smelt, the temperature at which smelt can no longer survive as determined by laboratory studies, is 25.4°C (plus or minus 1.7°C).

Critical habitat for delta smelt is defined (USFWS 1994c) 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 1994a), 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. The adult migration may begin in October and continue through April, but movement peaks during the period December through April (USFWS 1994a). 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 1994a). Delta smelt lay adhesive eggs that are believed to attach to tree limbs or small rocks. Eggs hatch after approximately 11-13 days and smelt become free-floating larvae. The larvae are difficult to detect with fish sampling gear and are not detectable in the standard fish salvage sampling at the CVP and SWP fish facilities.

In drier years, spawning is often concentrated on the Sacramento River side of the Delta, especially near the Cache Slough area. In wetter years, spawning is widespread and can occur as far west as the Napa River, as it did during 1997. A large young-of-the-year delta smelt population often results in higher "take" at the CVP and SWP pumping facilities.

Stressors for delta smelt and longfin smelt include several factors related to entrainment, species production, habitat quality/availability, as well as other factors. Entrainment concerns include those for CVP/SWP facilities, DWR-owned diversions, Reclamation owned diversions, private diversions (e.g., Contra Costa Water District), Mirant Pittsburg and Contra Costa power plants, and North Bay Aqueduct. Factors concerning species production include: insufficient food supplies/location, reduced suitable spawning habitat, reduced suitable rearing habitat, reduced seasonal availability of adult habitat, competition, water quality problems (e.g., reduced DO, seasonal salinity gradients, and TSS), and levee construction/island reclamation. Habitat quality and availability issues involve; sediment input, reclamation/land conversions, agricultural/urban development, reduced seasonal transport flows, reduced upstream attraction flows, reduced riparian vegetation, channelized riprap levees, expansion of non-native species (e.g., Egeria), upstream impoundment storage, flood control operations, and island subsidence. Other sources of mortality that have been noted include; CVP/SWP salvage, Clifton Court predation, exposure to toxics, predation, propeller entrainment, harvest, illegal harvest, and disease.

Continued challenges will be faced by fisheries managers as they strive to understand and better manage to increase the resilience of this species. Facing them will be several factors including; reduced genetic integrity and diversity, reduced population abundance, reduced population geographic distribution, reduction in independent populations, adaption to variability, reductions in habitat diversity, frequency of chaotic events, changes in long-term seasonal hydrology (i.e., from climate-induced changes – diminishing snowpack and shifts in precipitation events), and potential future sea level rise.

CDFW conducts four types of monitoring surveys through the year to determine distribution of juvenile, sub-adult and adult delta smelt. In two cases, abundance indices have been calculated historically. These indices provide an indication of general trends in smelt abundance over the years. The abundance indices also provide an indication of the year to year trends in smelt abundance based on the number of fish caught in each survey.

Two of these monitoring surveys, the Fall Mid-Water Trawl and the Summer Tow Net Survey, have been conducted since the 1960s. These surveys are undertaken in a consistent manner each year allowing for effective trend analysis over time. Such data, however, are not indicative of actual population estimates, which would have to make assumptions about the effectiveness of the sampling equipment, distribution of smelt, volume of water sampled by the equipment, and other factors. To date, it has been difficult to garner scientific consensus regarding these assumptions.

In addition to the surveys, the number of fish salvaged at the CVP and SWP facilities may provide an indication of the presence of delta smelt in the south Delta channels. However, the SWP has the 31,000 AF maximum capacity Clifton Court Forebay in front of its Harvey O. Banks (Banks) Pumping Plant, while the CVP William Jones (Jones) Pumping Plant and salvage facilities divert directly from the south Delta channels. Accordingly, the CVP facility is, in many ways, more reliable as a sampling “instrument” of the south Delta channels than the SWP facility, especially in June and July. Delta smelt may spawn in the Clifton Court Forebay or, juveniles may move into the Forebay earlier in the year and, therefore, the juveniles salvaged at the SWP facility in June and July may reflect those fish already in the Clifton Court Forebay and not those from the south Delta channels.

The CDFW sample adult delta smelt from mid-January into April or May as part of their Spring Kodiak Trawl survey. Sampling is conducted every other week, taking four to five days and sampling some 39 stations (from the Napa River to Stockton on the San Joaquin River, and to Walnut Grove on the Sacramento River).

The CDFW's 20 mm survey provides information of the distribution and relative abundance of post-larval and juvenile delta smelt at up to 41 locations throughout their historical range from March through June, or July. The surveys take eight to ten days and are conducted bi-weekly. The sampling equipment is designed to detect juveniles between 20 mm and 50 mm in length.

4.6.1.1.5 Green Sturgeon (Acipenser medirostris)

NMFS received a petition in June 2001 from several environmental organizations requesting that the agency list the north American green sturgeon (*Acipenser medirostris*) under the federal ESA. On January 29, 2003, NMFS announced its determination that listing green sturgeon was not warranted at that time. However, due to the remaining uncertainties that existed at the time about the population structure and overall status of the species, NMFS added two distinct population segments of green sturgeon to its list of candidate species. On April 6, 2005, the species was proposed for listing by NMFS as threatened under the federal ESA. This included only those fish south of the Eel River, California (the southern DPS). This species was listed a year later on April 7, 2006, when the southern DPS was listed as threatened under the federal ESA. On September 8, 2008, NMFS proposed to designate critical habitat for the southern DPS; the comment period on this proposal closed on December 22, 2008.

Green sturgeon is an anadromous species, migrating from the ocean to freshwater to spawn. They exist in the Sacramento River system, as well as in the Eel, Mad, Klamath, and Smith rivers in the northwest portion of California. Adults of this species tend to be more marine than the more common white sturgeon. Nevertheless, spawning populations have been identified in the Sacramento River (Beak Consultants 1993), and most spawning is believed to occur in the upper Sacramento River. Fertilization of eggs 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 spawn at temperatures ranging from 46°F 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) (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).

4.6.1.1.5.1 Longfin Smelt (*Spirinchus thaleichthys*)

On April 8, 2009, the USFWS announced that the Bay-Delta population of longfin smelt does not meet the legal criteria for protection as a species subpopulation under the federal ESA. The 2007 petition specifically asked to list as a DPS only the population that lives in Bay-Delta. The petition asserted that the Bay-Delta longfin smelt are physically isolated, genetically different, and live in a unique setting. Longfin smelt (San Francisco Bay–Delta DPS) is included on USFWS list of Candidate species for listing under ESA (FR 80, 80584, December 24, 2015)

Longfin smelt is also a euryhaline species. This is particularly evident in the Delta where they are found in areas ranging from almost pure seawater upstream to areas of pure freshwater. In this system, they are most abundant in San Pablo and Suisun bays (Moyle 1976). The longfin smelt spends the early summer in San Pablo and San Francisco bays, generally moving into Suisun Bay in August. Spawning occurs in the winter months when this species congregates in upper Suisun Bay and the upper reaches of the Delta (Moyle 1976). Young longfin smelt move downstream and back into the bays in April and May (Ganssle 1966).

4.6.1.2 Potentially Affected Waterbodies

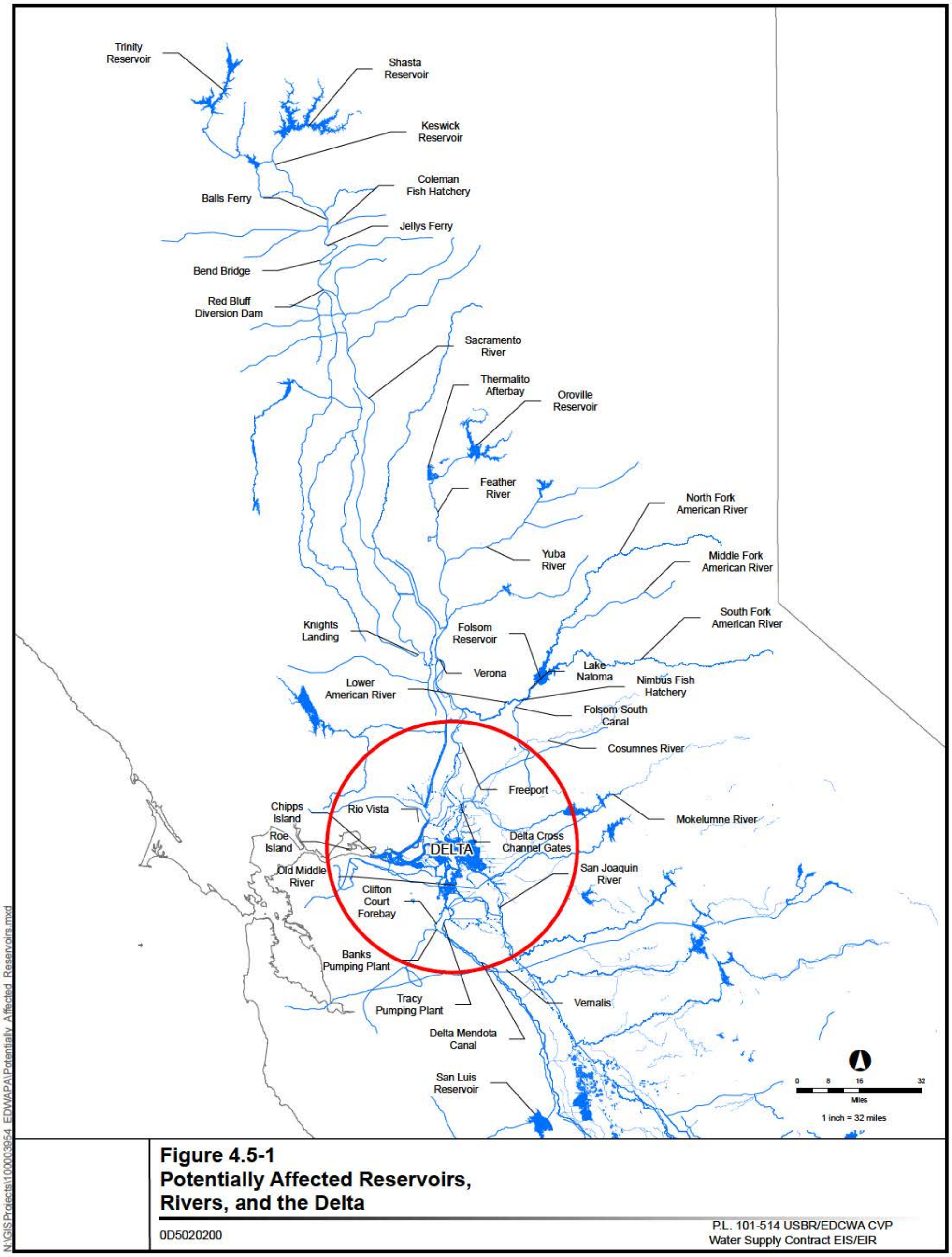
4.6.1.2.1 Shasta, Keswick, and Trinity Reservoirs

Shasta Reservoir is a deep reservoir supporting a wide variety of coldwater and warmwater fish species. Fish inhabiting the reservoir include several species of trout, landlocked salmon, Sacramento sucker, Sacramento pikeminnow, largemouth and smallmouth bass, channel catfish, white catfish, threadfin shad, and common carp. Water surface elevations in this reservoir generally fluctuate by approximately 55 feet over the course of a year. The reservoir's littoral (i.e., nearshore shallows) habitats are often subject to physical perturbations caused by the water surface fluctuations and shoreline wave action resulting from wind and boating activities.

Keswick Reservoir, the area between Shasta and Keswick dams, serves as a regulating afterbay for Shasta Reservoir. It is characterized as a coldwater impoundment that supports a rainbow and brown trout sport fishery. Keswick Dam is a complete barrier to the upstream migration of anadromous fish in the Sacramento River. Some of the migrating anadromous fish impeded at the dam are captured in a fish trap at the dam and transported to the Coleman National Fish Hatchery located on Battle Creek (southeast of the town of Anderson).

Trinity Reservoir, an impoundment resulting from Trinity Dam, lies on the Trinity River. A portion of the water from this reservoir is directed through the Clear Creek Tunnel into Whiskeytown Reservoir and then into Keswick Reservoir. This water mixes with water from Shasta Reservoir and is released in the Sacramento River from Keswick Dam. Trinity Reservoir supports both warmwater and coldwater fish species. Common species include smallmouth bass, largemouth bass, white catfish and rainbow trout.

Figure 4.6-1, Potentially Affected Reservoirs, Rivers and the Delta, shows the geographic extent of the various waterbodies and watercourses that make up, essentially, the CVP/SWP and support fisheries that could be affected by the Proposed Action and its alternatives. As noted in previous discussions regarding the hydrologic impact framework, the upper Sacramento River basin reservoirs (e.g., Shasta) are an integral component of the CVP and play an important role in coordinated CVP/SWP operations, including those as geographically distant as the Bay-Delta. Operations (i.e., coldwater pool management, flow releases, storage forecasts, etc.) in these reservoirs represent an important means of gauging downstream fisheries protection.



Source: Reclamation 2009. Draft EIS/EIR for a Proposed Water Service Contract pursuant to Public Law 101–514.

Figure 4.6-1 Potentially Affected Reservoirs, Rivers and the Delta

4.6.1.2.2 Upper Sacramento River

The upper Sacramento River is often defined as the portion of the river from Princeton (RM 163), the downstream extent of salmonid spawning in the Sacramento River and Keswick Dam, the upstream extent of anadromous fish migration. The Sacramento River serves as an important migration corridor for anadromous fish moving between the ocean and/or Delta and their upper river/tributary spawning and rearing areas. The upper Sacramento River is differentiated from the river's "headwaters", which lie upstream of Shasta Reservoir. The upper Sacramento 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.

In excess of 30 species of fish are known to use the upper 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 important to native anadromous species, and is presently utilized for spawning and early-life-stage rearing, to some degree, by all four runs of Chinook salmon (i.e., fall, late-fall, winter, and spring-runs) and steelhead. Consequently, various life stages of the four races of Chinook salmon and steelhead can be found in the upper Sacramento River throughout the year. Other Sacramento River fishes are considered resident species, which complete their life cycle entirely within freshwater, often in a localized area. Resident species include rainbow and brown trout, largemouth and smallmouth bass, channel catfish, sculpin, Sacramento pikeminnow, Sacramento sucker, hardhead, and common carp.

An important component of aquatic habitat throughout the Sacramento River system is referred to as Shaded Riverine Aquatic Cover (SRAC). SRAC consists of the portion of the riparian forest and scrub community that is directly within or overhangs the river. SRAC provides high value feeding and resting areas and escape cover for juvenile anadromous and resident fishes. SRAC can also provide some degree of local temperature moderation during the summer months due to the shading it offers nearshore habitat areas. The importance of SRAC to Chinook salmon has been known for many years. In early summer, juvenile salmon have been found almost exclusively in areas of SRAC, with none observed in nearby rip-rapped areas.

4.6.1.2.3 Lower Sacramento River

The lower Sacramento River is generally defined as that portion of the river from Princeton to the Delta, at approximately Chipps Island (near Pittsburg). 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. Much of the embankment is rip-rapped; this is where much of the current levee improvement work being undertaken by the DWR and USACE is focused.

Many of the fish species utilizing the upper Sacramento River also use the lower river to some degree, even if only as a migratory corridor to and from upstream spawning and rearing grounds. For example, Chinook salmon and steelhead primarily use the lower river as an adult immigration route to upstream spawning habitats and a juvenile (and adult steelhead) emigration route to the Delta. The lower river is also used by other fish species (e.g., Sacramento splittail and striped bass) that make little to no use of the upper river (i.e., upstream of RM 163). Overall, fish species composition in the lower river is quite similar to that of the upper Sacramento River and includes resident and anadromous cold- and warmwater species. Many fish species that spawn in the Sacramento River and its tributaries depend on river flows to carry their larval and juvenile life stages to downstream nursery habitats. Native and introduced warmwater fish species primarily use the lower river for spawning and rearing, with juvenile anadromous fish species also using the lower river, to some degree, for rearing.

4.6.1.2.4 Sacramento-San Joaquin River Delta (Delta)

The Delta (or "Bay-Delta"), along with San Francisco Bay, comprise the largest estuary on the western coast of the U.S. Its importance to fisheries resources is supported by the over 120 fish species that rely on its unique habitat characteristics for one or more of their life-stages (e.g., spawning, out-migration, immigration spawning corridor, over-summer rearing, etc.). 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) 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 life stages or resident and anadromous fishes using the Delta, 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.

4.6.1.2.5 Middle Fork American River

The Middle Fork American River supports both warmwater and coldwater fish species year-round. Operation of PCWA's MFP, constructed in 1962 (including Ralston Afterbay), results in cooler summer and fall water temperatures, thereby improving habitat suitability for rainbow trout and brown trout for a portion of the river below Ralston Afterbay.[125],[126] Brown trout are resident stream fish, meaning they spend their entire lifecycle in fresh water as distinct from anadromous fish. Spawning generally occurs during November and December.[127] Brown trout fry typically hatch in

125 Corps 1994.

126 U.S. Bureau of Reclamation, 1996.

127 P.B. Moyle, Inland Fishes of California, 1976.

seven to eight weeks, depending on water temperature, with emergence of young three to six weeks later.

Optimal riverine habitat for brown trout reportedly consists of cool to cold water, silt-free rocky substrate, an approximate 1:1 pool-to-riffle ratio, and relatively stable water flow and temperature regimes (Raleigh et al. 1986). Moyle reported that while brown trout will survive for short periods at temperatures in excess of 80.6°F, optimum temperatures for growth range from 44.6°F to 66.2°F, with a preference for temperatures in the upper half of this range.[128] Brown trout tend to utilize lower reaches of low to moderate gradient areas (less than one percent) in suitable, high gradient rivers.[129]

As with brown trout, rainbow trout also are resident stream fish whose optimal riverine habitat reportedly consists of coldwater, silt-free rocky substrate, a 1:1 pool-to-riffle ratio, and relatively stable water flow and temperature regimes (Raleigh and Duff 1980 in Raleigh et al. 1984). Moyle reported that while rainbow trout will survive temperatures up to 82.4°F, optimum temperatures for growth and completion of most life stages reportedly range from 55.4°F to 69.8°F. Rainbow trout spawning generally occurs from February to June. Rainbow trout fry emerge from spawning nests approximately 45 to 75 days after spawning, depending on water temperatures.[130]

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

4.6.1.2.6 North Fork American River

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

128 P.B. Moyle, Inland Fishes of California, 1976.
129 Raleigh et al. 1986.
130 Raleigh et al. 1986..

The PCWA American River Pump Station intake is screened. Flat panels are recessed into the invert of the new diversion channel with wedge wire at 0.5 mm spacing.

4.6.1.2.7 Folsom Reservoir

In terms of aquatic habitat, the warm epilimnion of Folsom Reservoir provides habitat for warmwater fishes, whereas the reservoir's lower metalimnion and hypolimnion form a "coldwater pool" that provides habitat for coldwater fish species throughout the summer and fall portions of the year. Hence, Folsom Reservoir supports a “two-story” fishery during the stratified portion of the year (i.e., April through November), with warmwater species using the upper, warmwater layer and coldwater species using the deeper, colder portion of the reservoir.

Black bass, sunfish, and catfish constitute the primary warmwater sport fisheries of Folsom Reservoir. The reservoir’s coldwater sport species include rainbow and brown trout (*Oncorhynchus mykiss* and *Salmo trutta*, respectively), kokanee salmon (*Oncorhynchus nerka*), and Chinook salmon (stocked). The reservoir’s coldwater pool is important not only to the reservoir’s coldwater fish species, but is also important to lower American River steelhead and fall-run Chinook salmon. Seasonal releases from the reservoir’s coldwater pool provide thermal conditions in the lower American River that support annual in-river production of these salmonid species. Reduction of the reservoir's coldwater pool may reduce the volume of coldwater that is available to be released in any given year into the lower American River to benefit the river’s steelhead and fall-run Chinook salmon populations. Folsom Reservoir’s annual coldwater pool volume is not sufficiently large to facilitate coldwater releases during the warmest months (i.e., July through September) 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 essential in order to provide the optimal thermal benefits to both steelhead and fall-run Chinook salmon, within the constraints of annual coldwater pool availability. This has been discussed previously as part of Reclamation’s coordination with the AROG.

4.6.1.2.8 Lower American River

The lower American River provides a diversity of aquatic habitats, including shallow, fast-water riffles, glides, runs, pools, and off-channel backwater ponds and related habitats. The lower American River from Nimbus Dam (RM 23) to approximately River Bend Park (RM 14) is primarily unrestricted by levees, but is bordered by some developments on high cliff scarps. The river along this reach is hydrologically controlled by natural bluffs and terraces that have formed along the channel.

The river reach downstream of River Bend Park, and extending to its confluence with the Sacramento River (RM 0) is bordered by levees. The historic construction of levees and, their continual improvements, have changed the natural channel geomorphology and have resulted in a reduction in current velocities and meanders.

The river is utilized by over 30 species of fish, including numerous resident native and introduced species, as well as several anadromous species. A number of species are of primary management concern due either to their declining status or their importance to recreational and/or commercial fisheries. These include fall-run Chinook salmon, steelhead, Sacramento splittail, striped bass, and American shad.

Historically, the majority of fall-run Chinook salmon and steelhead spawning and rearing habitat within the American River was located in the watershed above what is now Folsom Dam. The lower American River currently provides spawning and rearing habitat for fall-run Chinook salmon and steelhead below Nimbus Dam. The majority of the steelhead run is believed to be of hatchery origin. However, with the exception of an emergency release during January 1997 due to poor water quality caused by flooding, no stocking of steelhead directly into the lower American River has occurred since 1990.

Current fall-run Chinook salmon and steelhead production within the lower American River is believed to be limited, in part, by inadequate instream flow conditions and excessively high water temperatures during portions of their residency in the river. 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 spring and steelhead rearing during summer. Relatively low October and November flows, when they occur, tend to increase the amount of fall-run Chinook salmon redd superimposition, thereby limiting initial year-class strength.

4.6.1.2.9 Lake Natoma

Lake Natoma was constructed to serve as a regulating afterbay for Folsom Reservoir. Consequently, water surface elevations in Lake Natoma fluctuate three to seven feet on a daily and weekly basis. During most of the year, Lake Natoma receives controlled releases from Folsom Reservoir. Due to its small size (i.e., operating range of 2,800 AF) and rapid turnover rate, the lake has relatively little influence on water flowing through it, with the possible exception of water temperature. As residence time in the lake increases during warm summer months, warming of water released from Folsom Reservoir increases. Water released is from Lake Natoma into the lower American River at Nimbus Dam.

Lake Natoma supports many of the same fisheries found in Folsom Reservoir (e.g., rainbow trout, bass, sunfish, and catfish). Some recruitment of warmwater and coldwater fishes likely comes from Folsom Reservoir. In addition, the CDFW stocks catchable-size rainbow trout into Lake Natoma annually. Although supporting many of the same fish species found in Folsom Reservoir, Lake Natoma’s limited primary and secondary production, colder epilimnotic water temperatures (relative to Folsom Reservoir), and daily elevation fluctuations are believed to reduce the size and annual production of many of its fish populations, relative to Folsom Reservoir. Lake Natoma's characteristics, coupled with limited public access, result in its lower angler use compared to Folsom Reservoir.

4.6.1.2.10 Nimbus Fish Hatchery

The CDFW operates the Nimbus Salmon and Steelhead Hatchery and the American River Trout Hatchery, which are both located at the same facility immediately downstream from Nimbus Dam. This hatchery facility (henceforth, referred to as the Nimbus Hatchery) receives its water supply directly from Lake Natoma.

The Nimbus Hatchery is devoted to producing anadromous fall-run Chinook salmon and steelhead. Recent production goals have been 4 million smolt-sized (60 fish/lb) fish. The hatchery fish ladder is opened to fall-run Chinook salmon annually when the average daily river temperature declines to approximately 60°F, which generally occurs in October or early November. The fall-run Chinook salmon produced are released directly into the Delta. In the event that the hatchery's inventory of Chinook salmon requires reduction prior to releasing all of the year's production, Chinook salmon fry are released into the Sacramento River at either Miller Park or Garcia Bend.

Immigrating adult steelhead typically begin arriving at the hatchery fish ladder in December. Peak steelhead egg collection generally occurs during January and February, but sometimes continues through March. Recent production goals for steelhead have been 430,000 yearling (4 fish/lb) fish, which are released into the Sacramento River at either Miller Park or Garcia Bend. Steelhead are no longer stocked directly into the lower American River on a regular annual basis. In the event that water temperatures become too high to successfully rear juvenile steelhead through the summer, these fish are generally transported to rearing facilities at the hatcheries on the Feather and Mokelumne rivers.

The Nimbus Hatchery also produces non-anadromous rainbow trout stocks. In 1997, the goal was 736,000 catchable (2 fish/lb), 280,000 sub-catchable (6-16 fish/lb) and 1.4 million fingerling rainbow trout. These trout are stocked into numerous waterbodies throughout the region.

The Nimbus Hatchery receives water for its operations from Lake Natoma via a 60-inch pipeline. Water temperatures in the hatchery are dictated by the temperature of water diverted from Lake Natoma which, in turn, is primarily dependent upon the temperature of water released from Folsom Reservoir, meteorological conditions, and retention time in Lake Natoma. The temperatures of water diverted from Lake Natoma for hatchery operations is frequently higher than that which is optimal (i.e., 55-56°F) for hatchery production of rainbow trout, steelhead, and Chinook salmon. Under such conditions, more suitable temperatures may be achieved by increasing releases at Folsom Dam and/or releasing colder water from a lower elevation within the reservoir via the release shutters at the power penstocks of Folsom Dam. However, seasonal releases from Folsom Reservoir's limited coldwater pool to benefit hatchery operations must be considered together with seasonal in-river benefits from such releases.

4.6.2 Regulatory Framework

For fisheries resources and associated aquatic habitats, the regulatory framework at the federal, state, and local levels is comprehensive. Fisheries resources remain at the forefront of water resource management mandates throughout the CVP, OCAP operations, and COA. These are reflected clearly in the ongoing and new efforts and initiatives focusing on fisheries and associated ecosystem health across California.

Management of non-anadromous fish and other aquatic biological resources (including habitats) are the responsibility of USFWS. Management of anadromous fish is the responsibility of NMFS. CDFW serves as the State trustee for aquatic species. Endangered and threatened aquatic species are regulated under ESA and CESA. Some of the relevant statutes, regulations, and policy/programs affecting fisheries resources potentially affected by the Proposed Action are listed and described in Section 4.6.4 of the Draft EIS/EIR (pages 4-60 through 4-67).

Since publication of the Draft EIS/EIR in 2009, the description of the regulatory framework pertaining to the potential impact of the Proposed Action on fisheries resources was updated by Reclamation and presented in Section 7, Regulatory Setting, of the *New Central Valley Project Municipal and Industrial Water Service Contract Authorized under Public Law 101-514 (Section 206) Biological Assessment* (December 2011) referred to herein as the "2011 BA." The 2011 BA lists and describes federal and state regulations, plans, and policies that pertain to the fisheries and aquatic resources in the Study Area for the Proposed Action. As noted, several state and federal public trust resource agencies are responsible for managing the fisheries resources and aquatic habitat in the American River watershed.

Federal regulations, plans, and policies described in the 2011 BA include:

- Endangered Species Act
- Magnuson-Stevens Fishery Conservation and Management Act
- Central Valley Project Improvement Act (CVPIA)
- Long-term CVP/SWP OCAP
- CVP Long-term Water Service Contracts
- Anadromous Fish Restoration Program (AFRP)
- Coordinated Operations Agreement (COA)
- CALFED Bay-Delta Program (discontinued program)
- National Wild and Scenic Rivers Act

State and regional regulations, plans, and policies described in the 2011 BA include:

- Water Quality Control Plan for the Sacramento River and San Joaquin River Basins
- Steelhead Restoration and Management Plan of California
- Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (AFPA)
- Water Forum Fish and In-Stream Habitat Plan (FISH Plan)
- Lower American River Flow Management Standard (FMS)
- Lower American River Corridor Management Plan (RCMP)

Since the publication of the 2011 BA, The Delta Plan of the Delta Stewardship Council was authorized. The Delta Plan is a comprehensive, long-term management plan for the Delta. Required by the 2009 Delta Reform Act, it creates new rules and recommendations to further the state's coequal goals for the Delta: improve statewide water supply reliability, and protect and restore a vibrant and healthy Delta ecosystem, all in a manner that preserves, protects and enhances the unique agricultural, cultural, and recreational characteristics of the Delta. The Delta Plan was unanimously adopted by the Delta Stewardship Council on May 16, 2013. Subsequently its 14 regulatory policies were approved by the Office of Administrative Law, a state agency that ensures the regulations are clear, necessary, legally valid, and available to the public. The Delta Plan became effective with legally-enforceable regulations on September 1, 2013.

4.6.3 Impacts and Mitigation Measures

The following describes the fisheries resources and aquatic habitats, including the regional and local area affected environments, and presents an analysis of the potential effects on these resources resulting from implementation of the new CVP water service contracts.

4.6-1 Effects on warmwater fisheries in Shasta and Trinity reservoirs.

4.6.3.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios).

The long-term average end-of-month water surface areas within Shasta Reservoir under the Proposed Action (Alternative 2B) relative to the Base Condition is shown in Table 5.8-2 of the Draft EIS/EIR, page 5-45. As shown in the table, decreases in end-of-month water surface area are small and likely undetectable (e.g., relative difference as a percentage is insignificant and virtually zero). Accordingly, there would be no change in the long-term average end-of-month water surface area in Shasta Reservoir during the March through September period based on simulated CALSIM II modeling results when warmwater fish spawning and initial rearing may be expected relative to the base condition.

Hydrologically, no detectable changes in simulated reservoir operations or re-operations are anticipated as a result of the new CVP water service contracts proposed by this action. This is confirmed in CALSIM II hydrologic modeling which showed no detectable change in reservoir water surface area. Accordingly, no impacts on warmwater fisheries in Shasta Reservoir are expected.

The mean monthly water surface elevations simulated for Trinity Reservoir under the Proposed Action (Alternative 2B) relative to the Base Condition are shown in Table 5.8-3 of the Draft EIS/EIR (see page 5-46). Modeled mean monthly water surface elevations remain unchanged under the Proposed Action relative to the Base Condition.

Similarly, the CALSIM II modeling results showed that for Trinity Reservoir, there would be no long-term changes in water surface elevations under the Proposed Action relative to the Base Condition. Differences in the long-term average amount of littoral habitat potentially available to warmwater fish for spawning and/or rearing in either Shasta or Trinity reservoirs would be negligible. While small and infrequent reductions in the availability of littoral habitat would occur on an inter-annual basis, these would not be of sufficient magnitude to substantially reduce long-term average initial year-class strength of warmwater fish populations. Consequently, seasonal reductions in littoral habitat availability would constitute a less than significant impact on both Shasta and Trinity reservoir warmwater fisheries.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. This effort served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

Modeling results show no substantive difference between the No Action Alternative, the Proposed Action (all scenarios), Alternative 3, and Alternative 4 and confirmed that no significant changes in long-term water surface area or water surface elevation would result from these alternatives. The potential impacts on the warmwater fisheries in these reservoirs is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-2 Impacts on Shasta and Trinity reservoirs' coldwater fisheries.

4.6.3.2 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The long-term average in mean monthly storage in Shasta Reservoir under the Proposed Action (Alternative 2B) relative to the Base Condition is shown in Table 5.8-4 of the Draft EIS/EIR (see page 5-47). Modeling results confirm that long-term average monthly change in Shasta Reservoir storage would be immeasurable. While individual year increases would occur, relative to the Base Condition, these would be negligible over the long-term. Specifically, long-term changes for any month simulated do not exceed one-tenth of one percent, relative to the Base Condition. As such, the coldwater mass balance would likely remain unchanged. Moreover, anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base used by the reservoir's coldwater fish populations. Potential effects on reservoir coldwater fisheries would be less than significant based on these hydrologic indices relative to the Base Condition.

Modeling results show no substantive difference between the No Action Alternative, the Proposed Action (all scenarios), Alternative 3, and Alternative 4 (all scenarios) and confirmed that no significant changes in long-term water storage in Shasta Reservoir would result from any alternative evaluated in this EIS. Accordingly, the impact on the coldwater fisheries in Shasta Reservoir would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-3 Flow-related impacts on fisheries resources in the upper Sacramento River.

4.6.3.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

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

The long-term mean monthly flow releases below Keswick Dam into the upper Sacramento River for the Proposed Action (Alternative 2B) are compared to flow releases under the Base Condition in Table 5.8-5 of the Draft EIS/EIR (see page 5-49).

Based on these modeling results, it can be seen that certain months in individual years showed large variations (i.e., decreases) in mean monthly river flows, relative to the Base Condition. The maximums, in individual years, would be significant, however, these are more than offset by both the years when increases in flow releases would occur (based on simulated modeling) and, more importantly, the long-term average over the 72-year period of record. Long-term changes, as decreases as averaged mean monthly releases into the upper Sacramento River from Keswick Dam did not exceed two-tenths of one percent.

Modeling results show no substantive difference between the No Action Alternative, the Proposed Action (all scenarios), Alternative 3, and Alternative 4 and confirmed that no significant changes in long-term flows in the upper Sacramento River would result from the implementation of these alternatives. Therefore, the impact on the fisheries in the upper Sacramento as a result of instream flow (e.g. habitat conditions) would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-4 Temperature-related impacts in the upper Sacramento River.

4.6.3.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

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

The mean monthly simulated Sacramento River water temperatures at Keswick Dam under the Proposed Action (Alternative 2B) are compared to the Base Condition in Table 5.8-6 of the Draft EIS/EIR (see page 5-51). No changes in modeled long-term water temperatures in the upper Sacramento River downstream of Keswick Dam were evident as a result of the additional 15 TAF diversion from Folsom Reservoir under this Alternative. Increases in water temperatures were simulated for some years and no consistent trend in water year types for these years were observed. Individual yearly maximums (by month) were shown for August and September. In the 1935 hydrologic year, Base Condition revealed water temperatures below Keswick Dam of

59.6°F. Under the Proposed Action, water temperatures were simulated at 60.8°F; this represented the largest single year, single month increase in modeled water temperatures below Keswick Dam.

Table 5.8-7 of the Draft EIS/EIR (see page 5-52) shows the same data but for the upper Sacramento River at Bend Bridge. Again, no detectable changes resulted from the hydrologic/river water temperature modeling based on the long-term mean monthly averages. Maximum individual month and year increases occurred in August and September (consistent with the expected changes resulting from Alternative 2B modeled diversions during that period); these maximums were lower than those simulated for the upper Sacramento River below Keswick Dam.

NMFS water temperature criteria for the upper Sacramento River are as follows:

- Daily average water temperature not in excess of 56°F at Bend Bridge from April 15 through September 30; and
- Daily average water temperature not in excess of 60°F at Bend Bridge from October 1 through October 31.

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

A close inspection of the 71-year inter-annual modeled water temperatures (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR), showed that, while water temperatures under Alternative 2B often exceeded these temperatures thresholds, the increment of change was both small and infrequent. Moreover, in those months and years where the water temperatures exceeded those criteria, the Base Condition temperatures (prior to the Proposed Action) were already above the stated thresholds. The most compelling indicator of potential water temperature and related thermal effects can be seen in the long-term deviations, from the Base Condition, in mean monthly water temperatures. No measurable changes were observed based on the modeling results.

Finally, Reclamation's Sacramento River Chinook Salmon Mortality Model was used to estimate annual, early life stage losses (from egg potential) for fall-run, late-fall-run, winter-run, and spring-run Chinook salmon populations. Temperature input to the Sacramento River Chinook Salmon Mortality Model consists of monthly mean temperatures at nine locations between Shasta Dam and Vina Bridge. Mortality estimates for each of the four runs were modeled under each of the alternatives and the existing condition, which were then compared to modeled mortality estimated for each run under the existing condition. Potential impacts on the four Chinook salmon runs in the Sacramento River were evaluated using the same criteria established for the Lower American River Chinook Salmon Mortality Model (see discussion under Lower American River, Fall-Run Chinook Salmon) (see Tables 5.8-8 through 5.8-11 of the Draft EIS/EIR, pages 5-53 and 5-54).

Modeling results from Reclamation's Sacramento River Chinook Salmon Mortality Model demonstrate that, over the long-term 72-year hydrologic record, there would be no change in simulated early life-stage survival for any of the four runs of Chinook salmon under the Proposed Action relative to the Base Condition. A close inspection of the 72-year results record revealed that inter-annual deviations from the Base Condition occurred, both as decreases as well as increases in early life-stage salmon survival estimates. Overall, these deviations were both small and infrequent as confirmed by the virtual unchanging long-term 72-year estimates for any of the four Chinook salmon runs (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR).

Modeling results show no substantive difference between the No Action Alternative, the Proposed Action (all scenarios), Alternative 3, and Alternative 4 and confirmed that no significant changes in long-term annual early life-stage survival of any of the four Chinook salmon would result from the implementation of these alternatives. Accordingly, the potential impact on the fisheries in the upper Sacramento as a result of thermally induced adverse effects on early life-stage survival, under any of these alternatives, would likely result in minimal effects relative to the No Action Alternative.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-5 Temperature related impacts on fisheries resources in the lower Sacramento River.

4.6.3.5 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The mean monthly simulated water temperatures in the lower Sacramento River at Freeport under the Proposed Action (Alternative 2B) is compared to the Base Condition in Table 5.8-12 of the Draft EIS/EIR (see page 5-56). Long-term mean monthly water temperatures at this location showed no change under the modeled simulations. Individual month and yearly maximums were observed; these again, centered around the later summer months consistent with the diversion scenarios integrated into the CALSIM II and water temperature modeling (i.e., 15 TAF diverted in August through September).

Modeling results show no substantive difference between the No Action Alternative, the Proposed Action (all scenarios), Alternative 3, and Alternative 4 and confirmed that no significant changes in long-term mean monthly water temperatures in the lower Sacramento River would result from the implementation of these alternatives. Accordingly, potential impacts on fisheries resources in the lower Sacramento as a result of increased water temperatures under any of these alternatives would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-6 Effects on Delta fisheries resulting from changes in inflow hydrology and water quality changes.

4.6.3.6 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Increased surface water diversion under any of the alternatives could alter the quantity of freshwater flowing into and through the Delta. The abundance and distribution of several fish species of management concern that rely heavily upon the Delta for one or more of their life stages as discussed previously, can be affected by total Delta outflow, the location of X2, and the export/inflow ratio. From a water quality perspective, the “X2” salinity standard is a commonly used parameter to assess freshwater inflows to the Delta. X2 is assumed to be equivalent to an electrical conductivity (EC) of 2.64 mmhos/cm. As freshwater flows into the Delta are reduced, the X2 position shifts upstream, which can adversely affect certain Delta fish species.

To evaluate potential impacts on Delta fish resources, changes in monthly mean Delta outflow for the 72-year period of record under each of the alternatives were determined for each month of the year and were compared to monthly mean Delta outflow under the Base Condition. The frequency and magnitude of differences in Delta outflow were evaluated relative to life history requirements for Delta fish. In addition, changes in monthly mean X2 position were determined for all months of each year, with an emphasis on the February through June period.

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

Table 5.8-13 of the Draft EIS/EIR (see page 5-58) shows the mean monthly position of X2 under the Base Condition. As expected, during the high flow months (corresponding to Central Valley and Sierra Nevada runoff maximums), X2 is lowest (i.e., closest to Golden Gate Bridge). With the onset of summer and through the early to late fall months when tributary inflows decline, the position of X2 migrates further upstream as reduced freshwater flows are unable to maintain X2 at its spring position in the Delta.

Table 5.8-14 of the Draft EIS/EIR (see page 5-13) shows the mean monthly position of X2 under The Proposed Action (Alternative 2B), relative to the Base Condition, over the entire 72-year hydrologic simulation period. The CALSIM II modeling results show that the long-term simulated mean monthly position of X2 under The Proposed Action (Alternative 2B), relative to Base Condition, would not change over the 72-year period of record. Individual monthly maximum increases were shown (by year).

During the February to June period, these maximums were simulated at 0.3 km; representing a 0.3 km upstream migration of X2 for that month of those specific years (see Notes on Table 5.8-14). Interestingly, the 0.3 km maximum upstream shift noted for February and April occurred in two years of the 72-year period of record: 1960 and 1981, each a dry-year.

Table 5.8-15 of the Draft EIS/EIR (see page 5-59) shows the modeled mean monthly Delta outflow under The Proposed Action (Alternative 2B), relative to the Base Condition. Modeling results confirm that, over the long-term, mean monthly Delta outflow would remain virtually unchanged after the implementation of the proposed new CVP water service contract, relative to the Base Condition. Mean monthly flow changes of these magnitudes are not considered significant (e.g., relative percentages at or less than two-tenths of one percent) to Delta hydrology.

Table 5.8-16 (see page 5-60 of the Draft EIS/EIR) shows the modeled mean monthly flows in the lower Sacramento River at Freeport under the Proposed Action (Alternative 2B), relative to the Base Condition over the entire 72-year hydrologic period of record. The largest mean monthly flow change (i.e., decrease), relative to the Base Condition was simulated to be approximately 43 cfs and would occur in June; this represents three-tenths of one percent change, relative to base flows. Interestingly, both the long-term mean monthly lower Sacramento River flows for July and September showed increases, relative the Base Condition a Maximum mean monthly flow decreases would; however, be substantive in certain months of certain years, again, relative to the Base Condition.

Nevertheless, such occurrences, when viewed over the entire 72-year period of record, would be infrequent (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR). Overall, the long-term changes in mean monthly lower Sacramento River flows at Freeport would not be significant under the Proposed Action relative to the Base Condition.

Based on these modeling results, neither the physical habitat availability for fish residing in the Delta, nor immigration of juvenile or adult anadromous fish through the Delta would be substantially affected, relative to the Base Condition based on modeled instream hydrology. Consequently, flow-related potential impacts on Delta fisheries resources or migrating anadromous fish (including listed species) are reasonably expected to be minimal.

Modeling results show no substantive difference in the long-term mean monthly X2 position, delta outflow, or lower Sacramento River flows at Freeport between the No Action Alternative, the Proposed Action (all scenarios), Alternative 3, and Alternative 4. Additionally, modeling results confirmed that no significant changes in long-term mean monthly X2 position, delta outflow, and Freeport flows would result from the implementation of these alternatives. Accordingly, the potential impact on Delta fisheries under any alternative evaluated herein would likely have minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-7 Flow impacts on fisheries resources of the North Fork American River downstream of the American River Pump Station.

4.6.3.7 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The hydrology of the North Fork American River is unaffected, directly, by the operations of the integrated CVP/SWP. Its reservoirs and operations are influenced, rather, by local operations between PCWA and, to a lesser degree, by SMUD. The diversions contemplated under this action will, in part, be withdrawn from the North Fork American River. Potential hydrologic effects on downstream fisheries resources were evaluated based on instream, long-term changes in mean monthly flows in this reach of the North Fork.

Table 5.8-17 of the Draft EIS/EIR (see page 5-62) illustrates the long-term mean monthly flows in the North Fork American River under the Proposed Action (Alternative 2C) relative to the Base Condition. Alternative 2C assumes a preferential shift in total diversion allocation to GDPUD and, thereby, represents the most significant depletion from the North Fork of all of the alternative diversion scenarios under this action. This, more aggressive analysis, is considered prudent for environmental review and disclosure purposes.

The modeling results illustrate that, while simulated flow changes in the North Fork American River downstream of the American River Pump Station would be small and likely insignificant during the high flow winter months, these changes become more apparent through the summer months. For the July through September period, modeled mean monthly flow reductions approach 25 cfs or 4 percent. At flows in August and September typically between 600-700 cfs in this reach of the river, a 4 percent reduction could impart measurable effects on resident fisheries and aquatic resources. This would be a potentially significant impact when compared to the Base Condition.

When the diversion apportionment (between EID and GDPUD) is changed such that GDPUD's allocation is reduced to 7,500 AFA (as opposed to 11,000 AF), the modeling results reflect this change. Table 5.8-18 of the Draft EIS/EIR (page 5-62) shows the simulated mean monthly flows in the North Fork American River under the Proposed Action (Alternative 2A), relative to the Base Condition. Mid-summer modeled flows also show a reduction in long-term expected mean monthly flows under this allocation scenario, but not to the same extent as those under Alternative 2C. Simulated hydrology under this allocation scenario shows that the expected changes would not be large enough to represent a significant impact on resident fisheries and associated instream aquatic resources.

Modeling results under Alternatives 4A, 4B and 4C – Reduced Diversion Alternative, Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative confirmed that no significant changes in long-term mean monthly flows would occur in the North Fork American River downstream of the American River Pump Station. Under any of the Reduced Diversion Alternatives (Alternatives 4A, 4B or 4C), the diversions by GDPUD would noticeably decrease, relative to the Alternative 2A. By design, these alternatives were intended to offer a lesser hydrologic impact on the river by reducing diversions.

Accordingly, the potential impact of the Proposed Action (all scenarios) and Alternatives on the fisheries and aquatic resources in the North Fork American River, would be less than significant relative to the No Action Alternative.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

It is important to note that, as discussed above, the Draft EIS/EIR identified a potentially significant impact on fisheries and aquatic resources in the North Fork American River resulting from reduced flows with implementation of Alternative 2C. This impact is a result of the comparison of modeling results for Alternative 2C and the Base Condition in keeping with CEQA requirements. In keeping with NEPA requirements, this EIS bases its impact determination of the comparison of Proposed Action environmental consequences with those of the No Action Alternative. Because diversions made at the North Fork American Pump Station under Proposed Action (2C) would be indistinguishable from those made under the No Action Alternative, the impact is determined to be less than significant and no mitigation is proposed. This is also true when comparing Alternatives 3 and 4 (all scenarios) to the No Action Alternative.

With certification of the Final EIR for P.L. 101-514 by EDCWA and adoption of the P.L. 101-514 Mitigation Monitoring and Reporting Plan (EDCWA 2011), EDCWA is obligated to implement the measure in the event that Scenario C of the Proposed Action is carried out. Measure 5.8-7 from the Draft EIS/EIR proposes three possible measures to reduce the impact to minimize effects. These include:

1. Altered seasonal diversion pattern; thus, avoiding a peaked mid-summer diversion (August through October as modeled);
2. Re-allocating the diversion quantities between EID and GDPUD, so as to follow Alternative 2A – Scenario A; or
3. Reduction in the overall diversion total as represented by any of the Reduced Diversion Alternatives (e.g., Alternatives 4A, 4B or 4C).

With execution of the P.L. 101-514 water services contract, it is reasonable to expect the above mitigation measure will be implemented in keeping with state requirements. For purposes of this EIS however, the measure is not required to reduce potential impacts to minimize effects.

4.6-8 Flow impacts on fisheries resources of the North Fork American River upstream of the American River Pump Station site.

4.6.3.8 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Table 5.8-19 of the Draft EIS/EIR (see page 5-64) shows the modeled mean monthly flows in the North Fork American River under the Proposed Action (Alternative 2C), relative to the Base Condition. As expected, without any proposed diversions upstream of the American River Pump Station site, no changes to the anticipated instream hydrology would occur. No impacts on fisheries and aquatic resources upstream of the American River Pump Station site are expected.

Modeling results for the other Alternatives under the Proposed Action showed similar results; there would be no change in the long-term simulated mean monthly flows of the North Fork American River upstream of the American River Pump Station. Similarly, Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives, Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative also confirmed, through hydrologic modeling, that no changes in flows within this reach of the North Fork would occur. Accordingly, no impact on the fisheries resources in the North Fork upstream of the American River Pump Station is anticipated.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-9 Impacts on Folsom Reservoir warmwater fisheries.

4.6.3.9 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Changes in water surface elevation in Folsom Reservoir during the March through September period could result in measurable corresponding changes in the availability of reservoir littoral habitat containing inundated terrestrial vegetation (willows and button brush). Such shallow, near-shore waters containing physical structure are important to producing and maintaining strong year-classes of warmwater fish annually. Water surface area, in reservoirs supporting gentle sloping nearshore areas, is a good indicator of littoral habitat availability.

Table 5.8-20 of the Draft EIS/EIR (page 5-66) shows the modeled end-of-month water surface area (in acres) for Folsom Reservoir under the Proposed Action (Alternative 2B), relative to the Base Condition over the 72-year hydrologic period of record. The maximum computed decrease in any end-of-month water surface area was approximately 15 acres (representing about a two-tenths of one percent reduction, relative to the Base Condition). This reduction would occur in July.

Reductions in the availability of littoral habitat could result in increased predation on young-of-the-year warmwater fisheries, thereby reducing long-term initial year-class strength of warmwater fish populations. Unless willows and other near-shore vegetation become established at lower reservoir elevations in the future in response to seasonal reductions in water levels, long-term year class production of warmwater fisheries could be reduced. From these modeling results, such changes in water surface area would not significantly affect Folsom Reservoir's primary warmwater fish-spawning period (March through July) and initial rearing (July through September).

As previously discussed, adverse impacts on spawning from nest-dewatering are assumed to have the potential to occur when reservoir elevation decreases by more than nine feet within a given month. Modeling results from Table 5.8-21 of the Draft EIS/EIR (see page 5-67) indicate that long-term mean monthly water surface elevations would not measurably change, relative to the Base Condition for any month. Therefore, the frequency with which potential nest-dewatering events could occur in Folsom Reservoir would not increase, relative to existing or current conditions.

Consequently, no adverse effects on available littoral habitat or warmwater fish nesting success would result from Proposed Action. Therefore, impacts on Folsom Reservoir warmwater fisheries are likely to be minimal.

Modeling results for the other Alternatives under the Proposed Action scenarios showed similar results. Additionally, modeling results for Alternatives 4A, 4B and 4C – Reduced Diversion

Alternative, Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative also confirmed that no significant changes in long-term mean monthly water surface elevation or end-of-month water surface area would result from the implementation of these alternatives. Accordingly, the impact of the Proposed and Alternatives on the warmwater fisheries in Folsom Reservoir would likely be minimal.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-10 Impacts on Folsom Reservoir's coldwater fisheries.

4.6.3.10 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Coldwater habitat for fisheries in Folsom Reservoir is largely a function of reservoir storage. This assumes wet-period filling and complete stratification by the onset of summer. Anticipated reductions in reservoir storage would not typically be expected to adversely affect the reservoir's coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of most all years. Moreover, physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations, and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Nevertheless, coldwater pool volume, as a habitat characteristic is important.

Table 5.8-22 of the Draft EIS/EIR (page 5-68) shows the mean long-term simulated end-of-month storage in Folsom Reservoir under the Proposed Action (Alternative 2B), relative to the Base Condition. Long-term modeled storage does not appreciably change with the implementation of the proposed new CVP contracts, relative to the Base Condition. Maximum mean end-of-month storage decreases approximate 1,400 to 1,600 AF (or three-tenths of one percent of the Base Condition storage) and occur during the months of June through August. Coldwater pool development during these months has already been established; recent isotherm baths for Folsom Reservoir have shown that the reservoir is well stratified by this time. Total reservoir storage decreases of these magnitudes (i.e., three-tenths of one percent of the Base Condition storage) would not measurably affect coldwater pool volumes in the reservoir.

These relatively small anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir’s coldwater fisheries because coldwater habitat would remain available within the reservoir during all months of all years and anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Therefore, impacts on Folsom Reservoir coldwater fisheries are likely to result in minimal effects.

Modeling results for the other Alternatives under the Proposed Action scenarios showed similar results; there would be no measurable change in the long-term mean end-of-month storage in Folsom Reservoir. To the extent that reservoir storage influences coldwater pool volume, the insignificant changes in storage would, likewise, translate into immeasurable effects on reservoir coldwater pool volume. Similar modeling results for Alternatives 4A, 4B and 4C – Reduced Diversion Alternative, Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative also confirmed that no significant changes in reservoir storage would result from the implementation of any of these alternatives. Accordingly, impacts on the coldwater fisheries in Folsom Reservoir are reasonably anticipated to be result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-11 Impacts on Nimbus Fish Hatchery.

4.6.3.11 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Overall, water temperature modeling revealed that temperatures of water entering the Nimbus Fish Hatchery from Lake Natoma during the May through September period would remain unchanged, relative to the Base Condition. Table 5.8-23 of the Draft EIS/EIR (page 5-70) shows the long-term mean monthly water temperatures below Nimbus Dam under the Proposed Action (Alternative 2B) relative to the Base Condition. The maximum increases in mean monthly water temperatures occurred in September; a 1.6°F increase was simulated for one year (1944 hydrology). For the May through September period (when hatchery temperatures reach annual highs), the range of maximum increases in mean monthly water temperatures was 0.3 to 1.6°F, respectively. As shown in Table 5.8-23 of the Draft EIS/EIR (see page 5-70), these were single year, monthly maximums over the 72-year period of record. A close inspection of the entire period of record revealed both increases and decreases in modeled water temperatures.

Furthermore, there would be insignificant differences (up to one-month increase) in the frequency with which temperatures exceed index temperatures of 60°F, 65°F and 68°F, relative to the existing condition. Based on these modeling results, operations of Folsom Dam and Reservoir associated with implementation of the proposed water service contracts would have very little effect on the temperatures of water entering the Nimbus Fish Hatchery from Lake Natoma during the May through September period, relative to the Base Condition. Long-term average temperature of water released from Nimbus Dam would remain unchanged.

Similar changes would result under the other scenarios of the Proposed Action. These small and infrequent differences in water temperature would have little, if any, effect on hatchery operations and resultant fish production. Therefore, impacts on the operation of the Nimbus Hatchery would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-12 Impacts on fall-run Chinook salmon and steelhead in the lower American River.

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

Minimal potential changes in lower American River flows and water temperatures under any of the Alternatives – Proposed Action Scenarios or other alternatives, relative to the Base Condition, would not be expected to adversely affect fall-run Chinook salmon and steelhead immigration, spawning and incubation, or juvenile rearing and emigration.

It is important to note that, as discussed above, the Draft EIS/EIR evaluated potentially significant impacts on fisheries and aquatic resources by comparing potential project impacts on Base Conditions, i.e. environmental conditions that existed at the time of commencement of the environmental review. This approach is in keeping with state-mandated requirements under CEQA. In keeping with NEPA requirements, this EIS bases its impact determination of the comparison of Proposed Action environmental consequences with those of the No Action Alternative. The use of modeling results from the Draft EIS/EIR showing comparisons to the Base Condition is useful for purposes of this EIS, however, in that they present a conservative assessment of potential impact. As such, it is reasonable to conclude that a determination of no significant impact relative to the Base Condition would support a determination of no significant impact relative to the No Action Alternative.

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

Flows in the lower American River have rarely been at the minimums prescribed under D-893; typical flow releases follow modified D-1400 and AFRP targets as voluntarily set by Reclamation in cooperation with the Lower American River Operations (LAROPS) Group.

As assessment of flow-related impacts on Chinook salmon adult immigration is determined by reviewing projected flows at the mouth of the American River during the September through December period. This is the period when returning lower American River Chinook salmon adults migrate through the Sacramento River in search of their natal stream to spawn. The same would be true for steelhead during the December through March period. Reduced flows at the mouth are of concern primarily because less flow could result in insufficient olfactory cues for immigrating adult salmonids, thereby making it more difficult for them to "home" to the lower American River. Insufficient flow could result in higher rates of straying to other Central Valley rivers.

Table 5.8-24 of the Draft EIS/EIR (page 5-72) shows the modeled mean month flows in the lower American River measured at the mouth under the Proposed Action (Alternative 2B), relative to the Base Condition, over the entire 72-year period of record. In each of the months, with the exception of February, modeling simulations revealed a long-term decrease in mean monthly flows. These decreases range from a high of about 35 cfs (for August) to a low of about 3 cfs (for April). Inter-annual variability is high; both between years and with respect to the range of maximum flow decreases and increases. The mid-summer period (i.e., June through September) showed the largest flow decreases over the long-term.

August and September are the two months where Base Condition flows (current condition averages) are typically at their lowest. Long-term mean monthly flows at the mouth during September are typically around 1,200 cfs. Under the Alternative 2B, a 27 cfs (or 2.5 percent) decrease in flows would occur based on the CALSIM II modeling simulation. While a long-term 2.5 percent decrease in flows could be considered relatively small and, most likely represents an insignificant change in hydrology, the listed status of fall-run Chinook salmon compels a closer inspection of the modeling results over the entire 72-year period of record.

Modeled results showed that in two-thirds of the years (48 out of 72 years), decreases in mean monthly flows at the mouth would occur in September, relative to the Base Condition. Removing the largest negative outlier (i.e., a simulated 1947; with a 1,152 cfs decrease), the long-term mean monthly flow decrease is lowered to about 11 cfs (or 0.9 percent) (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR). Alternatively, however, of those 48 years, seven years revealed mean monthly flow decreases, relative to the Base Condition, greater than 3 percent; with each of these years except one, having Base Condition flows well below the 72-year mean of 1,243 cfs. Exacerbation of instream flow conditions, especially during critically low flow periods would be of concern regarding the attraction of fall-run Chinook salmon adults immigrating into the lower American River. Accordingly, this is considered a potentially significant effect when compared to the Base Condition.

For steelhead, an inspection of the December through March flow results revealed that while long-term decreases in mean monthly lower American River flows at the mouth would occur, these would not be of sufficient magnitude to affect returning adults. Average base flow conditions during this time of year are already high (e.g., over 3,200 cfs for December) and the proposed diversions would not measurably affect instream flows (see Table 5.8-24 of the Draft EIS/EIR).

Modeling results for the other Alternatives under the various Proposed Action scenarios showed similar results; there would be decreased long-term mean monthly flows in the lower American

River at the mouth for the month of September. Modeling results for Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives, Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative; however, did not show the same degree of anticipated long-term flow decreases.

For the reasons presented above, the impact of the Proposed Action (all Scenarios) relative to the No Action Alternative is considered potentially significant. Mitigation is presented below to reduce this impact to level that would likely result in minimal effects.

Mitigation Measures

4.6.3.13 Alternative 2: Proposed Action (All Scenarios)

With Implementation of the Proposed Action, reductions in simulated mean monthly flows in the lower American River at the mouth during the month of September, relative to the Base Condition and No Action Alternative were noted. Although small, these flow reductions could represent a significant impact on fall-run adult Chinook salmon immigration. Implementation of Mitigation Measure 5.8-12 from the Draft EIS/EIR would reduce this impact to minimize effects.

Implement Draft EIS/EIR Mitigation Measure 5.8-12:

1. Altered seasonal diversion pattern (e.g., a more evenly distributed monthly pattern); thus, avoiding a peaked mid-summer diversion (August through October as modeled); or,
2. Reduction in the overall diversion total as represented by the various Reduced Diversion Alternatives (Alternatives 4A, 4B or 4C) – although such reductions would not be necessary in all years.

4.6.3.14 No Action Alternative; Alternative 3; and Alternative 4 (All Scenarios)

No mitigation is required.

It is important to note that, with certification of the Final EIR for P.L. 101-514 by EDCWA and adoption of the P.L. 101-514 Mitigation Monitoring and Reporting Plan (EDCWA 2011), EDCWA is obligated to implement Mitigation Measure 5.8-12 in the event the Proposed Action is carried out. The measure is included in this FEIS to ensure that all significant impacts of the Proposed Action relative to the No Action Alternative are avoided.

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

Reclamation's Lower American River Temperature Model does not account for the influence of Sacramento River water intrusion on water temperatures at the mouth. Therefore, the temperature assessments are based on temperatures modeled at the mouth of the lower American River and at Freeport on the Sacramento River. Tables 5.8-25 and 5.8-26 of the Draft

EIS/EIR (see page 5-74) show the mean monthly water temperatures modeled at these two locations, respectively, under the Proposed Action (Alternative 2B) relative to the Base Condition.

Modeling results confirm that the long-term average water temperatures at both locations under The Proposed Action (Alternative 2B), would remain virtually unchanged, relative to the Base Condition during all months of the September through March adult immigration period. Therefore, changes in water temperature under Alternatives 2A, 2B or 2C or under any of the Reduced Diversion Alternatives (Alternatives 4A, 4B or 4C) would likely result in a minimal impact on fall-run Chinook salmon/steelhead adult immigration. Similar results would occur under Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative. Therefore, temperature-related impacts on fall-run Chinook salmon/steelhead adult immigration would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

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

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

Tables 5.8-27 and 5.8-28 of the Draft EIS/EIR (see page 5-76) show the modeled mean monthly flows at Nimbus Dam and at Watt Avenue under the Proposed Action (Alternative 2B) relative to the Base Condition.

Modeled monthly mean flows in this reach of the lower American River would remain essentially unchanged from the Base Condition. Long-term flows would not be expected to change by more than one percent. Most importantly, flows at this time of year are at their highest.

Differences in flows in the lower flow ranges are more crucial for salmon survival. During October, November, and December, flows would be nearly identical to those under the Base Condition in almost all years. Flow reductions below 2,000 cfs could reduce the amount of available Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting. For any year, minimal differences in flow would occur when flows under the existing condition are 2,000 cfs or less. Such reductions inflow, therefore, would not be expected to be of substantial magnitude or occur with sufficient frequency to have a significant adverse effect on long-term initial year-class strength of lower

American River fall-run Chinook salmon. Overall, there would be no substantial adverse effects resulting from reduced flows that would result in potential flow-related impacts on fall-run Chinook salmon spawning and incubation. The impact of the Proposed Action (Alternative 2B), therefore, would likely result in minimal effects.

Similar results would occur under the other Alternatives of the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative. Therefore, flow-related impacts on fall-run Chinook salmon/steelhead spawning and incubation would be likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.17 Temperature-Related Impacts on Fall-Run Chinook Salmon Spawning and Incubation (October Through February)

Under the Proposed Action (Alternative 2B), long-term average water temperatures would be equivalent to those under the Base Condition during October at Watt Avenue, and during the November through February period below Nimbus Dam, as shown in Tables 5.8-29 and 5.8-30 of the Draft EIS/EIR (see page 5-78). No long-term changes in mean monthly water temperatures were observed. Watt Avenue is the location of concern in October because air temperatures tend to warm the river as it moves downstream. Conversely, water temperatures below Nimbus Dam are usually warmer than water temperatures at Watt Avenue in the winter season.

The October water temperatures at Watt Avenue would be essentially equivalent or less than the Base Condition in 64 months of the 71 months included in the modeling analysis (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR). The October water temperature at Watt Avenue would increase by more than 0.3°F in up to seven months of the simulation, with the greatest increase of 0.9°F (based on 1944 hydrology). The November through February monthly mean water temperatures below Nimbus Dam would be essentially equivalent to the existing condition in 275 of the 284 months included in the water temperature modeling analysis (Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR). November water temperatures below Nimbus Dam would increase by more than 0.2°F in five years of the 71 years modeled, and by up to one year in February. However, December, January, and February water temperatures below Nimbus Dam would be below 56°F in all 71 years modeled.

The long-term average annual early life-stage survival for fall-run Chinook salmon in the American River, as shown in Table 5.8-31 of the Draft EIS/EIR (see page 5-79), would remain unchanged, relative to the Base Condition.

Based on these modeling results, any small temperature changes in the lower American River resulting from the Proposed Action (Alternative 2B), during the October through February period would not adversely affect spawning and incubation success of fall-run Chinook salmon. Therefore, potential temperature-related impacts on fall-run Chinook salmon spawning and incubation would likely result in minimal effects.

Similar results would occur under the Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative. Therefore, temperature-related impacts on fall-run Chinook salmon spawning and incubation would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.18 Flow– and Temperature-Related Impacts on Steelhead Spawning and Incubation (December Through March)

Monthly mean flows simulated over the long-term below Nimbus Dam and at Watt Avenue associated with the Proposed Action (Alternative 2B) would be virtually equivalent to the Base Condition. These data are shown in Tables 5.8-32 and 5.8-33 of the Draft EIS/EIR (see page 5-80).

In addition, monthly mean water temperatures below Nimbus Dam and at Watt Avenue would be similar to the Base Condition in 279 and 280 months of the 284 months included in the modeling analysis, respectively (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR). Moreover, under each of the alternatives, water temperatures below Nimbus Dam would remain below 56°F for all months of the 71 years modeled for the spawning and incubation period for steelhead. December, January, February, and March water temperatures at Watt Avenue would be below 56°F in all 71 years modeled. Based on these modeling results, flow- and temperature-related impacts on steelhead spawning or incubation under Proposed Action (Alternative 2B) would likely result in minimal effects.

Similar results from CALSIM II and the Reclamation Water Temperature Model were observed for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative. Therefore, flow- and temperature-related impacts on steelhead spawning or incubation would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.19 Flow-Related Impacts on Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

The majority of juvenile salmonid rearing is believed to occur upstream of Watt Avenue. Moreover, depletions generally exceed tributary accretions to the river throughout the March through June period (generally resulting in lower flows at Watt Avenue than below Nimbus Dam). Accordingly, all flow-related impact assessments for fall-run Chinook salmon and steelhead rearing are based on flows at Watt Avenue. Table 5.8-34 of the Draft EIS/EIR (see page 5-81) shows the simulated mean monthly flow at Watt Avenue under Proposed Action (Alternative 2B) relative to the Base Condition.

Small changes in monthly mean flows would be expected to occur at Watt Avenue under the other Alternatives relative to the existing condition. The long-term average flow at Watt Avenue would be within 0.9 percent of the flow under the Base Condition for any given month during the March through June period. Such flow reductions are not of sufficient frequency or magnitude (i.e., generally 50 cfs or less) to result in significant adverse effects on long-term juvenile fall-run Chinook salmon or steelhead rearing success. Therefore, potential flow-related impacts on fall-run Chinook salmon and steelhead juvenile rearing under Alternative 2B would likely result in minimal effects.

Similar results from CALSIM II were observed for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative. Therefore, flow-related impacts on either -run Chinook salmon and steelhead juvenile rearing under these alternatives would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.20 Temperature-Related Impacts on Fall-Run Chinook Salmon and Steelhead Juvenile Rearing (March Through June)

Modeling of the Proposed Action (Alternative 2B) indicated that the long-term average water temperature at Watt Avenue would not change during any month of the March through June period, relative to the existing condition (see Table 5.8-35 of the Draft EIS/EIR, page 5-83).

Monthly mean water temperatures at Watt Avenue would be essentially equivalent to the Base Condition in 281 of the 284 months included in the water temperature modeling analysis (see Proposed Action – Scenario B, Technical Appendix I, this Draft EIS/EIR). Moreover, there would not be any additional occurrences during the March through April period for all the 71 years modeled in which water temperatures would be above 65°F, relative to the Base Condition (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR). For May, there would be seven years where water temperatures would exceed 65°F; however, in each of these years, Base Condition temperatures would already be above 65°F. Alternative 2B – Proposed Action – Scenario B does not add or increase the frequency with which the 65°F temperature threshold would be exceeded. For June, Base Condition water temperatures already exceed 65°F in 21 of the 71 years modeled. Based on the modeling results, Proposed Action (Alternative B), would actually result in one less year (for June) where water temperatures would exceed 65°F.

Consequently, although infrequent temperature increases at Watt Avenue would occur during the March through June period, resultant water temperatures would not exceed threshold temperature criteria for juvenile rearing (65°F). Consequently, impacts on juvenile salmon and steelhead rearing for the Proposed Action (Alternative 2B) would likely result in minimal effects.

Water temperature modeling results for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative showed similar results. Therefore, temperature-related impacts on either -run Chinook salmon and steelhead juvenile rearing would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.21 Flow-Related Impacts on Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

The primary period of fall-run Chinook salmon juvenile emigration occurs from February to June, with the majority of juvenile steelhead emigration occurring during this same period. Generally little, if any, emigration occurs during July and August. Flow-related impacts on salmonid immigration discussed above addressed flow changes in February and March. As previously concluded for adult immigration, potential changes in flows under each of the alternatives during February through March would not adversely affect juvenile fall-run Chinook salmon or steelhead rearing and, therefore, also would not adversely affect emigration. Hence, this discussion focuses primarily on the April through June period.

Small decreases in monthly mean flows would be expected to occur at the American River mouth. Simulated long-term average flow at the mouth would decrease slightly (approximately 1 percent or less) in the April through June period (see Table 5.8-36 of the Draft EIS/EIR, page 5-84). Juvenile salmonid emigration surveys conducted by CDFG have shown no direct relationship between peak emigration of juvenile Chinook salmon and peak spring flows (Snider et al. 1997). Moreover, emigrating fish are more likely to be adversely affected by events when flows are high, then ramp down quickly (resulting in isolation and stranding). Adverse changes in flow ramping rates would not be expected to occur under The Proposed Action (Alternative 2B). Operational control for Nimbus Dam releases will still be maintained by Reclamation, through coordination and interaction with the LAROPS group. Consequently, although small flow reductions at the mouth would occur in a few years during the April through June period, resultant flows would not be expected to adversely affect the success of juvenile salmonid emigration. Therefore, potential flow-related impacts on fall-run Chinook salmon and steelhead juvenile emigration of the Proposed Action (Alternative 2B) would likely result in minimal effects.

Similar results from CALSIM II were observed for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative. Therefore, the flow-related impacts on either fall-run Chinook salmon and steelhead juvenile emigration of these alternatives would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.22 Temperature-Related Impacts on Fall-Run Chinook Salmon and Steelhead Juvenile Emigration (February Through June)

With the possible exception of a small percentage of fish that may rear near the mouth of the lower American River, potential impacts associated with elevated water temperatures at the mouth to fall-run Chinook salmon and steelhead would be limited to the several days that it takes emigrants to pass through the lower portion of the river and into the Sacramento River in route to the Delta. Water temperatures near the mouth during the primary emigration period (February into June) are often largely affected by intrusion of Sacramento River water, which is not accounted for by Reclamation's Lower American River Temperature Model. Consequently, actual temperatures near the mouth would likely be somewhere between temperatures modeled for the mouth, and temperatures modeled for the Sacramento River at Freeport (RM 46), located 14 miles downstream of the lower American River's confluence. For this reason, the long-term average temperatures are discussed for both of these locations. Tables 5.8-37 and 5.8-38 of the Draft EIS/EIR (see page 5-86) show the mean monthly water temperatures at the mouth of the American River and Freeport on the lower Sacramento River, respectively, as simulated under the Proposed Action (Alternative 2B).

Long-term monthly mean temperatures at the American River mouth would remain unchanged, relative to the Base Condition. Mean monthly water temperatures would remain essentially identical in 351 months of the 355 months included in the analysis (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR).

Long-term monthly mean temperatures at Freeport on the Sacramento River also remain unchanged, relative to the Base Condition. In only two months of two years, out of 355 months are temperature increases of 0.2°F or greater observed at Freeport (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR).

Based on the results discussed above, water temperatures would not adversely affect emigration during the February through June period, relative to the Base Condition. Therefore, potential temperature related impacts on fall-run Chinook salmon and steelhead juvenile emigration under any alternative would likely result in minimal effects.

Reclamation Water Temperature Model results for both the American and Sacramento rivers for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative revealed similar trends. Accordingly, water temperature-related impacts on either fall-run Chinook salmon or steelhead juvenile emigration during the February to June period would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.23 Flow-Related Impacts on Steelhead Rearing (July Through September)

Table 5.8-39 of the Draft EIS/EIR (see page 5-88) shows the mean monthly flows below Nimbus Dam under the Proposed Action (Alternative 2B) relative to the Base Condition.

Small decreases in the long-term monthly mean flows would be expected to occur below Nimbus Dam, relative to the Base Condition. The long-term average flow below Nimbus Dam would decrease by less than two percent, relative to the Base Condition during the July through September period. September is a month of concern since flows in the lower American River are typically at, or near their lowest for the year. The long-term 72-year average mean monthly flows at this location are approximately 1,500 cfs.

As noted previously, three significant dry-years (1947, 1981, and 1989) reveal flow reductions of 1,156, 123, and 204 cfs, respectively, relative to the Base Condition for those years. A close inspection of the 72-year modeling output for September confirms that these years represented significant outliers. Without these years, the long-term mean monthly flows below Nimbus Dam would change by less than 7 cfs or, 0.5 percent from Base Condition flows. The outlier years tend to skew the 72-year means; the mean, therefore, is not representative of the magnitude and frequency of deviation that would be expected over the entire period of hydrologic record.

Based on these findings, flow reductions are not expected to reduce juvenile steelhead rearing habitat. Further, steelhead populations in the lower American River are believed to be more limited by instream temperature conditions during the July through September period, rather than by flows. While the two are related, several factors influence their interrelated effects. Channel structure, wetted perimeter, tortuosity, and the presence of shaded riverine aquatic cover all play a role in affecting this relationship. Therefore, small and infrequent reductions in flow would not be expected to adversely affect long-term rearing success of juvenile steelhead. Therefore, potential flow-related impacts on steelhead rearing from the Proposed Action (Alternative 2B) would likely result in minimal effects.

CALSIM II modeling of river flows below Nimbus Dam for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternative 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative revealed similar trends. Accordingly, flow-related impacts on the rearing success of juvenile steelhead would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6.3.24 Temperature-Related Impacts on Steelhead Rearing (July Through September)

The long-term average water temperatures below Nimbus Dam, Watt Avenue, and the mouth would not increase during July, August and September under the Proposed Action (Alternative 2B) relative to the Base Condition. Mean monthly water temperatures, over the 71-year period of record, would remain identical to the Base Condition at each of these three locations on the lower American River. As noted previously, maximum increases would occur below Nimbus Dam. From the water temperature modeling, individual month and year increases during this time period (July through September) would occur (e.g. 0.3°F at the mouth; 0.2°F at Watt Avenue; and 1.6°F below Nimbus Dam). These magnitudes of temperature increases at the mouth, Watt Avenue, and below Nimbus Dam would be rare; occurring in one, three, and one years, respectively, out of the 71-year period of water temperature modeling record.

Therefore, the small and infrequent increases in water temperature that would occur would not be expected to adversely affect long-term rearing success of juvenile steelhead. Therefore, potential temperature-related impacts on steelhead rearing under the Proposed Action (Alternative 2B) would likely result in minimal effects.

Reclamation’s American River Water Temperature modeling of river flows below Nimbus Dam to the mouth for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternative 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative revealed similar or reduced temperature trends. Accordingly, water temperature-related impacts on the rearing success of juvenile steelhead would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-13 Impacts on splittail in the lower American River.

4.6.3.25 Alternatives 2A, 2B and 2C – Proposed Action – All Scenarios, Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives, Alternative 3 – Water Transfer Alternative, Alternative 1A – No Action Alternative

River flows at Watt Avenue can be used as an indicator of the acreage of usable riparian vegetation inundated between RM 8 and RM 9. With unchanging flows, the amount of riparian habitat inundated in the lower portion of the river can be assumed to remain unaffected. Substantial changes (i.e., reductions) in flows, both in magnitude and frequency over the entire 72-year period of record would be necessary to impart significant effects on riparian habitats relied on by splittail.

Table 5.8-40 of the Draft EIS/EIR (see page 5-90) shows the modeled mean monthly flows in the lower American River at Watt Avenue under the Proposed Action (Alternative 2B) relative to the Base Condition. Small reductions in the overall, long-term average mean monthly flows occur for the months of February through May. These reductions do not exceed one percent, relative to Base Condition flows.

Substantial changes in the frequency of habitat reductions would not be expected to occur during February, March, April, or May of any year based on these modeling results. In some years, riparian vegetation would not be inundated at all. Inter-annual variability for these months, over the 71-year period of record is high. Modeling results confirm that maximum mean monthly flow increases significantly exceed the simulated maximum mean monthly flow decreases.

During the February through May splittail spawning period, the long-term average usable inundated riparian habitat between RM 8 and RM 9 would not decrease relative to the Base Condition. In addition, flow changes would have little, if any, effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5, the reach of the river influenced by Sacramento River stage. Ultimately, these reductions in flow would not be expected to be of substantial magnitude and/or to occur with enough frequency to have a significant adverse effect on the long-term population trends of lower American River splittail.

As shown previously, long-term monthly mean temperatures at Watt Avenue under the Alternatives are essentially equivalent to or less than the Base Condition. Over the 71-year period of simulation, there would be no additional occurrences where February through May water temperatures at Watt Avenue would be above 68°F; the upper limit of the reported preferred range for splittail spawning, relative to the existing condition. Therefore, the impact on temperature-related conditions to splittail spawning resulting from the Proposed Action (Alternative 2B) would likely result in minimal effects.

Flows at Watt Avenue to the mouth simulated under the Alternatives under the various Proposed Action scenarios as well as for the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative revealed similar trends. Accordingly, flow- and temperature-related impacts on splittail spawning and riparian habitats would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-14 Impacts on American shad in the lower American River.

4.6.3.26 Alternatives 2A, 2B and 2C – Proposed Action – All Scenarios, Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives, Alternative 3 – Water Transfer Alternative, Alternative 1A – No Action Alternative

The long-term average flow at the American river mouth would be reduced by one percent or less during May and June, relative to the Base Condition (see Table 5.8-41 of the Draft EIS/EIR, page 5-92). Flow reductions in May and June could potentially reduce the number of adult shad attracted into the river during a few years. However, American shad spawn opportunistically where suitable conditions are found, so that production of American shad within the Sacramento River system would likely remain unaffected. Any flow-related impacts on American shad are considered likely to result in minimal effects.

In addition, analysis was performed to determine the frequency with which lower American River flows at the mouth in May and June would be reduced below 3,000 cfs, the flow level defined by CDFW as that which would be sufficient to maintain the sport fishery for American shad by implementation of the proposed new CVP water service contracts, relative to current conditions. The simulations showed that in May of one year (1953, a wet-year) the Proposed Action (Alternative 2B) would reduce flows from the Base Condition to levels below 3,000 cfs. In June of that same hydrologic year (1953), simulated flows increased to over 5,400 cfs; potentially offsetting any reduction below 3,000 cfs experienced during that water year. An inspection of the June record revealed no year where flows at the mouth would be below 3,000 cfs as a result of the Proposed Action (Alternative 2B). Flow-related adverse effects on American shad within the lower American are not considered significant given the hydrologic modeling results generated and relied upon.

Overall long-term monthly mean water temperatures in May and June below Nimbus Dam and at the mouth would remain unchanged from the Base Condition (e.g., 58.8°F and 62.2°F below Nimbus Dam and 61.4°F and 65.2°F at the mouth). Below Nimbus Dam, May and June water temperatures would be within the reported preferred range for American shad spawning of 60°F to 70°F in all 71years. At the mouth, the same would apply for the month of May. For June, however, in three years, water temperatures under the Proposed Action (Alternative 2B) would be above the 70°F threshold. In each of those three years, Base Condition water temperatures would already be above 70°F. The proposed new CVP water service contracts impart no additional incursions beyond the 70°F temperature threshold.

The frequency in which suitable temperatures for American shad spawning occurs would not substantially differ from the Base Condition and consequently, temperature-related impacts on American shad are considered to likely to result in minimal effects. Overall, impacts associated with the implementation of the Proposed Action (Alternative 2B) on American shad would likely result in minimal effects.

CALSIM II and Reclamation's American River Water Temperature modeling of river flows and water temperatures below Nimbus Dam to the mouth for the Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative revealed similar data trends. Accordingly, flow- or temperature-related impacts on American shad would be less than significant under these scenarios or alternatives.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.6-15 Impacts on striped bass in the lower American River.

4.6.3.27 Alternatives 2A, 2B and 2C – Proposed Action – All Scenarios, Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives, Alternative 3 – Water Transfer Alternative, Alternative 1A – No Action Alternative

The flow-related impact assessment conducted for fall-run Chinook salmon and steelhead adequately addresses potential flow-related impacts on striped bass juvenile rearing, which occurs during the months of May and June. In addition, analysis was performed to determine the frequency with which lower American River flows at the mouth in May and June would be reduced below 1,500 cfs, the attraction flow index level defined by CDFW as that which would be sufficient to maintain the sport fishery for striped bass.

The simulations showed that in May, the Proposed Action (Alternative 2B) would impart no flow reductions below 1,500 cfs from the Base Condition. For June, two years (1959, a Below Normal Year and 1981, a Dry Year), simulated flows decreased under The Proposed Action (Alternative 2B), to below 1,500 cfs. In all other simulations, resultant flows below 1,500 cfs would only occur where the Base Condition flows had already been below 1,500 cfs. The proposed new CVP water service contracts are attributable to two additional years, in June, where flows at the mouth of the lower American River would be reduced to levels below 1,500 cfs. Neither the frequency nor magnitude of these occurrences would suggest a potentially significant flow-related impact (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR).

Flows at the mouth of the lower American River are believed to be at sufficient levels to maintain the striped bass fishery under current conditions, and would be met or exceeded in most years during both May and June. Furthermore, substantial changes in the strength of the striped bass fishery would not be expected to occur when May and/or June monthly mean flows periodically fall below 1,500 cfs, and consequently, flow-related impacts on the striped bass fishery resulting from the Proposed Action (Alternative 2B) would likely result in minimal effects.

The number of years that monthly mean water temperatures would be within the reported preferred range for striped bass juvenile rearing of 61°F to 73°F would not change substantially, relative to the Base Condition. For both the river reaches below Nimbus Dam and at the mouth of the lower American River, there would be no additional years, when the mean monthly May of June water temperatures would exceed the 73°F threshold (see Proposed Action – Scenario B, Technical Appendix I, of the Draft EIS/EIR).

Thus, the frequency of suitable water temperatures for juvenile striped bass rearing in the lower American River would remain essentially unchanged. Accordingly, temperature-related impacts on juvenile striped bass rearing are considered to be less than significant, relative to current conditions. Overall, potential flow- or temperature-related impacts on striped bass under the Proposed Action (Alternative 2B) would likely result in minimal effects.

CALSIM II and Reclamation's American River Water Temperature modeling of river flows and water temperatures below Nimbus Dam to the mouth for the other Alternatives under the various Proposed Action scenarios as well as the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative revealed similar results. Accordingly, flow- or temperature-related impacts on the striped bass fishery under these scenarios or alternatives would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7 RIPARIAN RESOURCES (DIRECT EFFECTS STUDY AREA)

This section of the Final EIS describes existing riparian resources, i.e., riparian and wetland vegetation and associated species that use it for habitat, and the effects on those resources of the Proposed Action and Alternatives. The regional setting for riparian resources includes: Shasta Reservoir and the Sacramento River downstream of Shasta Dam, Trinity Reservoir, Folsom Reservoir and the American River below Folsom Dam, the portion of the North Fork American River between the American River Pump Station and Folsom Reservoir, and the Sacramento-

San Joaquin Delta. The discussion provides the context for various species and critical habitat. Special-status species include those that are listed as threatened or endangered under ESA and/or CESA, species proposed for State or federal listing, species designated as "species of concern" by USFWS or "special concern species" by CDFW, and species tracked by the CNDDB or California Native Plant Society (CNPS). The methodologies for evaluating the environmental consequences of the Proposed Action and Alternatives, and the impact determinations presented in the Draft EIS/EIR are duplicated herein unless otherwise noted. Additional analysis in support of the Final EIS is also provided.

4.7.1 Affected Environment

This section describes riparian/terrestrial resources that may be directly affected by implementation of the new CVP water service contract where changes to CVP system operations, including its numerous reservoirs and rivers, may occur. Certain CVP facilities and associated waterways are included in the regional study area. These facilities include: Trinity and Shasta reservoirs, the upper and lower Sacramento River, and the Delta. Detailed descriptions of the terrestrial resources associated with these facilities are provided below.

4.7.1.1 Shasta and Trinity Reservoirs

4.7.1.1.1 Vegetation Surrounding Reservoirs

Habitats associated with these reservoirs include ponderosa pine forest, non-native grassland, oak-pine woodlands, and chaparral. Much of the vegetation surrounding the reservoirs consists of forested habitats, with small enclaves of oak woodland, grassland, and chaparral. Pine forest habitats are located on the upland banks, and slopes of the reservoirs are dominated by ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*Pinus jeffreyi*), Douglas fir (*Pseudotsuga menziesii*), madrone (*Arbutus menziesii*), and incense cedar (*Calocedrus decurrens*). Chaparral occurs in openings in the forest, and is characterized by several native shrubs such as manzanita (*Arctostaphylos* sp.) and various species of ceanothus (*Ceanothus* sp.). Non-native grasslands and oak-pine woodlands are similar to habitats described for Folsom Reservoir (see local project area description). The drawdown zone of these reservoirs is generally devoid of substantial vegetation and contiguous riparian communities are not present due to constantly changing water levels and hence, constantly changing water availability; therefore, the drawdown zones do not support or promote the establishment of high-value riparian plant communities or wildlife habitat.

4.7.1.1.2 Wildlife of Reservoirs

Ponderosa pine forest and chaparral habitats associated with the reservoirs support a variety of birds, including western tanager (*Piranga ludoviciana*) and white-breasted nuthatch (*Sitta carolinensis*). Raptors that use these habitats near water include osprey (*Pandion haliaetus*) and bald eagle (*Haliaeetus leucocephalus*). Mammal species likely to occur in these habitats include mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), mountain lion (*Felis concolor*), ringtail

(*Bassariscus astutus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), black bear (*Ursus americanus*), and beaver (*Castor canadensis*).

4.7.1.2 Upper and Lower Sacramento River

4.7.1.2.1 Vegetation of the Sacramento River

For the purpose of the riparian resources effects analysis, the Sacramento River is divided in to upper and lower segments. The upper Sacramento River is defined as the river and associated riparian resources between Shasta Dam and the confluence with the American River. The lower Sacramento River is defined as the river and associated riparian resources between the confluence with the American River and the Delta.

Much of the Sacramento River, including all of the lower 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 upper and lower reaches of the Sacramento River, but is less common in the upper portion above the City of Red Bluff. The upper Sacramento River supports stringers of riparian forest on river banks and large patches of riparian forest associated with old oxbows and oxbow lakes, particularly between Red Bluff and the confluence with the Feather River. . The riparian communities consist of Valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), wild grape (*Vitis californica*), box elder (*Acer negundo*), elderberry (*Sambucus mexicanus*), and willow (*Salix* sp.). Freshwater, emergent wetlands occur in the slow moving backwaters and oxbow lakes and are primarily dominated by tules (*Scirpus acutus* var. *occidentalis*), cattails (*Typha* sp.), rushes (*Juncus* sp.), and sedges (*Carex* sp.) (SAFCA and USBR, 1994). Although such riparian vegetation occurs along the lower Sacramento River, it is confined to discontinuous, narrow bands between the river and the river side of the levee and its habitat function for wildlife and fisheries is limited.

4.7.1.2.2 Wildlife of the Sacramento River

The wildlife species inhabiting the riparian habitats along the Sacramento River include, but are not limited to, wood duck (*Aix sponsa*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), green heron (*Butorides virescens*), black phoebe (*Sayornis nigricans*), ash-throated flycatcher (*Myiarchus cinerascens*), sora (*Porzana carolina*), great horned owl (*Bubo virginianus*), Swainson's hawk (*Buteo swainsoni*), California ground squirrel (*Spermophilus beecheyi*), and coyote (*Canis latrans*). The freshwater emergent wetlands provide habitat for many wildlife species, including reptiles and amphibians such as the western pond turtle (*Clemmys marmorata*), bullfrog (*Rana catesbeiana*), and Pacific tree frog (*Hyla regilla*). Agricultural areas adjacent to the river also provide foraging habitat for many raptor species. The larger more complex riparian habitats along the upper Sacramento River have higher wildlife diversity and abundance than the more limited riparian habitats along the lower Sacramento River.

4.7.1.3 Sacramento-San Joaquin Delta

4.7.1.3.1 Vegetation of the Delta

Most of the vegetation in the Delta consists of irrigated agricultural fields and associated ruderal (disturbance-adapted or weedy), non-native vegetation fringes that border cultivated fields. Throughout much of the Delta, these areas border the levees of various sloughs, channels, and other waterways within the historic floodplain. Native habitats include remnant riparian vegetation that persists in some areas, mainly in the form of tidal freshwater marshes. These tidal freshwater marshes consist of Cattails (*Typha spp*.), bulrushes (*Schoenoplectus americanus* and *Bolboschoenus maritimus*), tules (*Schoenoplectus californicus* and *S. acutus*), and common reed (*Phragmites australis*). These wetlands are very sensitive to fluctuations in water salinity, which are determined by freshwater flows into the Delta from the Sacramento River and other rivers and saltwater and brackish tidal flows from San Pablo and Suisun bays (San Francisco Estuary Project, 1993).

4.7.1.3.2 Wildlife of the Delta

The wetlands of the Delta represent habitat for a number of shorebirds and waterfowl species including killdeer (*Charadrius vociferous*), California black rail (*Laterallus jamaicensis coturniculus*), western sandpiper (*Calidris mauri*), long-billed curlew (*Numenius americanus*), greater yellow-legs (*Tringa melanoleuca*), American coot (*Fulica americana*), American wigeon (*Anas americana*), gadwall (*Anas strepera*), mallard (*Anas platyrhynchos*), canvasback (*Aythya valisineria*), and common moorhen (*Gallinula chloropus*). These areas also support a number of mammals such as coyote, gray fox (*Urocyon cineroargenteus*), muskrat (*Ondatra zibethicus*), river otter (*Lontra canadensis*), and beaver. Several species of reptiles and amphibians also occur in this region.

4.7.1.4 Folsom Reservoir

4.7.1.4.1 Vegetation of Folsom Reservoir

Habitats associated with Folsom Reservoir include non-native grassland, blue oak-pine woodland, and mixed oak woodland. Non-native grassland occurs around the reservoir, primarily at the southern end. The reservoir rim is surrounded by a barren band (the drawdown zone) as a result of frequent fluctuations in water elevations. The majority of this zone is generally devoid of vegetation, although arroyo willows (*Salix lasiolepis*) and narrow-leaved willows (*Salix exigua*) have established in some areas (USFWS, 1991a). The only contiguous riparian vegetation occurs along Sweetwater Creek at the southern end of the reservoir (USFWS, 1991a). 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. Consequently, the drawdown zone does not possess consistent or substantial habitat value.

Non-native grassland consists of wild oat (*Avena fatua*), soft chess brome (*Bromus hordeaceus*), ryegrass (*Lolium multiflorum*), mustard (*Brassica sp*.), and foxtail (*Hordeum murinum ssp. leporinum*). The oak woodland habitat located on the upland banks and slopes of the reservoir is dominated by interior live oak (*Quercus wislizenii*), blue oak (*Quercus douglasii*), and foothill pine (*Pinus sabiniana*) with several species of understory shrubs and forbs including poison oak (*Toxicodendron diversilobum*), manzanita (*Arctostaphylos sp.*), California wild rose (*Rosa californica*), and lupine (*Lupinus sp.*).

4.7.1.4.2 Wildlife of Folsom Reservoir

Oak-pine woodlands and non-native grasslands in the reservoir area support a variety of birds, including acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), western wood pewee (*Contopus sordidulus*), scrub jay (*Aphelocoma californica*), Bewick's wren (*Thryomanes bewickii*), plain titmouse (*Parus inornatus*), hermit thrush (*Catharus guttatus*), loggerhead shrike (*Lanius ludovicianus*), black-headed grosbeak (*Pheucticus melanocephalus*), dark-eyed junco (*Junco hyemalis*), and Bullock's oriole (*Icterus bullockii*). A number of raptors will also use oak woodlands for nesting, foraging, and roosting. These include red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), great horned owl, and long-eared owl (*Asio otus*). Mammal species likely to occur in the woodland habitat include mule deer, coyote, bobcat, gray fox, Virginia opossum (*Didelphis virginiana*), raccoon, striped skunk, black-tailed jackrabbit (*Lepus californicus*), California ground squirrel, and a variety of rodents. Amphibians and reptiles that may be found in oak woodlands include California newt (*Taricha torosa*), Pacific tree frog (*Hyla regilla*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), common kingsnake (*Lampropeltis getulus*), and western rattlesnake (*Crotalus viridis*).

The non-native grassland surrounding Folsom Reservoir supports 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 (*Zonotrichia leucophrys*), lesser goldfinch (*Carduelis psaltria*), western meadowlark (*Sturnella neglecta*), and several raptor species. Migratory waterfowl are known to feed and rest in the grasslands associated with the north fork of Folsom Reservoir (USFWS, 1991a). Several of the reptiles and amphibians that inhabit the oak woodlands will also occur in the adjacent non-native grasslands.

4.7.1.5 Lower American River

4.7.1.5.1 Vegetation of the Lower American River

The lower American River (between Folsom Dam and the confluence with the Sacramento River) provides a diverse assemblage of vegetation communities, including freshwater marsh and emergent wetland, riparian scrub, riparian forest, and in the upper, drier areas further away from the river, oak woodland and non-native 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 on-going 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 river bank.

In general, willow scrub and alders tend to occupy areas within the active channel of the river, which are repeatedly disturbed by elevated winter and spring river flows. 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 seasonal disturbance by occasional large flows influence community structure. Fremont cottonwood dominates these riparian forest zones. Other species associated with this habitat include willow, poison oak, wild grape, blackberry (*Rubus ursinus*), northern California black walnut (*Juglans californica var. hindsii*), and white alder (*Alnus rhombifolia*). Alder-cottonwood forest is typical of the steep, but moist banks along much of the river corridor. Valley Oak Woodland occurs on upper terraces composed of fine sediment where prolonged availability of 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. Non-native 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 (*Scirpus sp*.), rush, barnyard grass (*Echinochloa crus-galli*), slough grass (*Paspalum dilatatum*), and lycopus (*Lycopus americanus*).

4.7.1.5.2 Wildlife of the Lower American River

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 bird 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 (*Callipepla californica*), killdeer, belted kingfisher (*Ceryle alcyon*), western scrub jay, ash-throated flycatcher, tree swallow (*Tachycineta bicolor*), and American robin (*Turdus migratorius*). Additionally, more than 30 species of mammals reside along the river, including beaver, striped skunk, Virginia opossum, brush rabbit (*Sylvilagus bachmani*), raccoon, western gray squirrel (*Sciurus griseus*), California ground squirrel, meadow vole (*Microtus pennsylvanicus*), muskrat, black-tailed deer, gray fox, coyote, and infrequently, mountain lion.

The most common reptiles and amphibians that depend on the riparian habitats along the river include western toad (*Bufo boreas*), Pacific tree frog, bullfrog, western pond turtle, western fence lizard, common garter snake (*Thamnophis sirtalis*), gopher snake, and western rattlesnake.

Along with providing food, cover, and nesting habitat for several species, the lower American River functions as a wildlife corridor for the movement of animals between the valley floor and the foothills of the Sierra Nevada.

4.7.1.5.3 River Channel Hydrology and Riparian Vegetation Relationships along the Lower American River

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.

4.7.1.5.4 History of Events Affecting the Riparian Corridor

From Folsom Reservoir to the confluence with the Sacramento River, the lower American River has undergone tremendous change over the past 100 years. The combination of gold mining, gravel dredging, levee building, land clearing, water diversion projects, and reservoir construction have dramatically altered the riverbed and channel, as well as overall flow regimes. Specifically, the construction of flood control levees reduced the width of the riparian corridor by isolating the floodplain from the river; these levees also changed channel erosion patterns and reduced migration. In addition, the construction of the Folsom and Nimbus Dams has significantly altered both the flow and sediment regime of the lower American River. In particular, the magnitude and frequency of flood flows has been effectively reduced, causing a reduction in the frequency of overbank flows that deposit sediments, conducive to seed germination and seedling establishment of riparian plants, on the higher terraces. The dam complex also significantly reduced the amount of sediment supplied to the lower reaches of the river from its watershed.

The existing channel morphology of the lower American River spans a continuum from a meandering belt confined within relatively resistant terraces and bluffs in the upper reaches to a low gradient and semi-confined floodplain channel in the lower reaches (Watson 1985). Channel pattern and morphology in the upper 11 miles of the river, to the Folsom and Nimbus dam complex, is largely controlled by resistant bedrock exposures that characterize this portion of the river. Bank erosion and deposition of sediments is relatively minor, with most sediment being transported through or temporarily stored in the river channel. Point bars within this reach are forming in some areas, but are typically small. Prior to urbanization and levee construction, the American River deposited sediment in a floodplain belt that widens toward the confluence with the Sacramento River. Lateral migration of the river channel was slowly occurring over time. However, channel realignment and levee construction have confined the river to a substantially narrower belt. The low gradient and blockage of channel migration has allowed for the formation of gravel bars and sediment deposits throughout this portion of the river. Terraces, once commonplace and complex as a result of extensive overbank flooding, now only occur in specific areas between the levees.

The current composition of the riparian plant communities along the lower American River is a function of the resulting set of hydrologic, geomorphic, and substrate conditions that have become established there over time; it is also a result of the adaptations of the riparian system to these conditions. In the upper reaches of the river near Nimbus Dam, steep banks of resistant soils and bedrock allow only a very slow rate of erosion and sediment deposition. In these areas, alder-dominated vegetation occurs as stringers along portions of the channel, particularly along the base of bluffs and steep banks. Further down the river where gravel bars and point bars occur as a result of sediment transport and storage along the channel bed, regeneration of willows occurs on scoured gravel bar sites. Cottonwoods also form small stringers on freshly deposited sediment on point bars as well as on less steep terraces with suitable seed beds, where even-aged stands of older cottonwoods occur.

Most of the riparian forest habitat immediately adjacent to the lower American River is dominated by cottonwood intermixed with willows. In addition, several backwater and off-river ponds occur at some of the bars along the river. Riparian zones support a greater abundance and diversity of wildlife than any other terrestrial habitat in California (Sands, et al., 1985). In addition, previous studies have determined that the riparian vegetation surrounding the backwater channels and off river ponds ranked very high in overall wildlife diversity and species richness (Sands, et al., 1985). The following discussion focuses on the relationship of changes in river flows to both cottonwood trees and river-associated ponds, because of the biological importance of these areas.

4.7.1.5.5 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. Cottonwood seed release and establishment has adapted over time to the flow regime and fluvial process of the lower American River, and consequently, 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 and appropriate soil moisture levels to germinate and establish successfully (Stromberg, 1995). Cottonwoods disperse seeds over a 2- to 6-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 same-year 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., 1993). 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, et al., 1991; Segelquist, et al., 1993). Sufficient summer flows are critical to the continued survival of newly established seedlings and provide necessary moisture when evapotranspiration is highest (Scott, et al., 1993). Long-term survival of established cottonwoods is generally related to the depth of 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 groundwater table, which is recharged by adequate river flows.

While few studies have been conducted on the long-term flow regimes necessary for continued cottonwood regeneration and growth maintenance along the lower American River, several relatively short-term studies have provided insights into the relationship between river flows and cottonwood growth. In one study, the annual radial growth rate of young cottonwoods along a particular segment of the lower American River was found to be significantly related to the groundwater depth and to river flows during the March through October growing season (Stromberg 1995). The study found that cottonwoods had little or no radial growth when average river flows during the growing season dropped below 1,765 cfs. Monthly mean flows of 1,765 cfs are recommended by Stromberg (1995) as necessary for maintenance of radial growth. In order to assure some growth of cottonwoods, the USFWS recommends that an average minimum streamflow of 2,000 cfs occur during the March through October growing season.

A USFWS study concluded that an average flow of 3,000 cfs is required to provide "reasonable" growth and maintenance conditions for riparian vegetation (USFWS 1996). The USFWS (1997) correlated monthly mean flows of 3,000 cfs from April through June to peak inundation flows of 5,000 to 13,000 cfs, levels deemed critical to establishment of seedlings on riverine terraces.

4.7.1.5.6 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 lower American River 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 (Sands, et al., 1985). These backwater ponds and lagoons 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. Water is slower moving in backwater ponds, and these areas are isolated from human disturbances; consequently, backwater ponds tend to be of higher value to wildlife (Sands, et al., 1985). Wildlife species that have been recorded in these areas include: pied-billed grebe (*Podilymbus podiceps*), American bittern (*Botaurus lentiginosus*), green heron, common merganser (*Mergus merganser*), white-tailed kite (*Elanus leucurus*), wood duck, yellow warbler (*Dendroica petechia*), warbling vireo (*Vireo gilvus*), dusky-footed woodrat (*Neotoma fuscipes*), western gray squirrel, Pacific tree frog, and western toad.

Studies have been conducted to determine how these backwater ponds are influenced by flows in the lower American River (Sands et al., 1985). These ponds are located at varied distances from the river channel, have varied depths, and are at different elevations along the river. Ponds were studied in the spring 1985 at flow regimes of 1,300 cfs and 2,750 cfs. In general, these studies concluded the following: 1) while the interrelationships of the ponds with the river is complex, the ponds do respond to changes in water levels in the American River; 2) the response of ponds to changes in water flows and river levels is dependent upon the distance of the ponds from the river channel, the permeability of the soils surrounding the ponds, and the nature of intervening soils and gravels; 3) the impact of changes in pond water levels on vegetation and wildlife may differ in intensity between sites depending on local soil compaction and root distribution of individual plants; 4) flows of at least 2,700 cfs are required to adequately recharge the ponds closest to the river; 5) at sustained flows of 1,300 cfs or below, many of the ponds would become more shallow and smaller, hold very little water, and become choked with willows;

6) further reductions in river flows, to levels in the 500 cfs range, would result in these ponded areas becoming completely dry, resulting in deterioration of the riparian vegetation and quality wildlife habitats associated with the ponds; and 7) to provide continued recharge of off-river ponds, flows in the range of 2,750 to 4,000 cfs are needed (Sands et al., 1985; Sands 1986).

An important consideration for the maintenance of backwater pond habitats is the frequency and duration of the necessary recharge flows. Past studies have not come to definitive conclusions about specific frequency and duration needs. Historically, however, the flows high enough to allow recharge have occurred most often either in the winter or spring. This pattern allows the backwater ponds to be recharged prior to the important spring and summer growing seasons. Therefore, it appears that regular recharge flows during most of the winter or spring months are sufficient to maintain backwater pond habitats.

4.7.1.6 Special-Status Species

This section provides a discussion of plant and wildlife species that have been afforded special recognition by federal, State, or local resource agencies and organizations. This discussion focuses on, and summarizes, species addressed in previous biological studies of the study area, and those species that have been added to State and federal special-status species lists since the time those studies were conducted. Special-status biological resources also include unique habitats or plant communities that are of relatively limited distribution, or are of particular value to wildlife. Sources for determination of the status of these biological resources are: Plants – CDFG (1996a), CNPS (1994), and Hickman (1993); and Wildlife – CDFG (1996b), CNDDB (1994), and Williams (1986).

A number of special-status plant and wildlife species are known to occur within the study area (USFWS, 1991a; USFWS, 1996). The following discussion focuses only on those species occurring or potentially occurring within the study area that could potentially be affected by the increases in diversions. A brief summary of the life history requirements of each species, and their occurrence within the study area, is included below.

4.7.1.6.1 Special-Status Plants

4.7.1.6.1.1 Sanford's Arrowhead (*Sagittaria sanfordii*)

This plant is a CNPS List 1B species, it has no federal or State status. Sanford's arrowhead (also known as Valley sagittaria) is a perennial herb that blooms from May to August and grows in shallow, slow-moving or standing water in ponds and ditches. This species is found in two locations along the American River, near Watt Avenue and Rio Americano High School (SAFCA and Reclamation 1994).

4.7.1.6.2 Special-Status Invertebrates

4.7.1.6.2.1 Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

Valley elderberry longhorn beetle was listed as Federally Threatened in 1980. It has no State status. Adult beetles feed and lay eggs on elderberry shrubs, where the larvae remain within the elderberry stems until they emerge as adults through newly formed exit holes. USFWS has designated the American River Parkway as critical habitat for this beetle (USFWS 1996). This species has been recorded in elderberry shrubs near backwater ponds along the lower American River.

4.7.1.6.3 Special-Status Amphibians

4.7.1.6.3.1 Foothill Yellow-legged Frog (*Rana boylii*)

Foothill yellow-legged frog is a Federal Species of Concern and California Species of Special Concern. This frog occurs in relatively fast moving shallow rocky streams. It is typically absent from areas where bullfrogs have been introduced. Potential habitat may occur along portions of the American River upstream of Folsom Reservoir, particularly in smaller tributaries off of the main channel. This species has occurred historically throughout the Sierra Nevada foothills. Although Sierra Nevada populations have greatly declined, this species may still be present in portions of the service area.

4.7.1.6.3.2 California Red-legged Frog (*Rana aurora draytonii*)

California red-legged frog is Federally Listed as Threatened and California Species of Special Concern. This frog typically occurs in deeper, slow moving portions of streams and in ponds and marshes. It is typically absent from areas where non-native fish (i.e., catfish, bass, sunfish) and bullfrogs are present.

4.7.1.6.4 Special-Status Reptiles

4.7.1.6.4.1 Western Pond Turtle (*Clemmys marmorata*)

Western pond turtle is a California Species of Special Concern. This aquatic turtle generally occurs in still waters of ponds, freshwater marshes, and lakes, and in slow moving streams with sand bars or in stream emergent woody debris for basking sites. The western pond turtle is known to occur along the American and Sacramento rivers (Jennings and Hayes 1994).

4.7.1.6.5 Special-Status Birds

4.7.1.6.5.1 Bald Eagle (*Haliaeetus leucocephalus*)

Bald Eagle was de-listed from threatened status under the ESA in August 2007, however, the species status is being monitored for a 20-year period post delisting. Even though they are de-listed, bald eagles are still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act and are listed as Endangered under CESA. Bald eagles winter throughout California, excluding the southern desert areas, and generally breed in the northern portion of the State. While most of the bald eagles in California are residents, many bald eagles migrate to the State for the winter. This species prefers mature wooded areas adjacent to or near large bodies of water or flowing rivers. Bald eagles feed primarily on fish, but will also eat birds, mammals, and carrion. Bald eagles are a common winter visitor to Folsom Reservoir and have been observed foraging along the lower American River (SAFCA and Reclamation 1994). Historically, bald eagles nested along the lower American River; however, there are no recent nest records for this species within the study area (USFWS 1991a).

4.7.1.6.5.2 Swainson's Hawk (*Buteo swainsoni*)

Swainson's hawk is listed as Threatened under CESA. The species is not listed under ESA. Swainson's hawk is a migratory raptor that breeds in western North America and winters primarily in South America. This species is associated with riparian corridors adjacent to agricultural fields and grasslands in the Central Valley. They nest in trees, forage over pastures and agricultural fields, and prey largely on small mammals and insects. Both foraging and nesting habitat for Swainson's hawk exist throughout the study area (USFWS 1991a). There are no recent records of nesting Swainson's hawks along the lower American River, most likely because of the predominance of developed urban areas and general lack of large grassland and agricultural areas along the river. However, a number of active nests occur along the Sacramento River, including some nest sites near the confluence of these two rivers (CNDDB 1994). Mature cottonwood, walnut, and willow trees along the Sacramento River, adjacent to agricultural areas, provide optimal nesting habitat for this species.

4.7.1.6.5.3 Bank Swallow (*Riparia riparia*)

Bank Swallow is listed as Threatened under CESA. The species is not listed under ESA. Bank swallows winter in northern and central South America and migrate to the United States and Canada to breed. Nesting colonies are present in the Sacramento Valley along the Sacramento and Feather rivers. This species occurs almost exclusively along watercourses that have steep, vertical banks and bluffs for nesting. Preferred nesting sites are sandy-loam soils or compatible gravels. Bank swallows have occasionally nested along the lower American River. In 1985, nesting colonies were reported along the river north of Rancho Cordova and, in 1986, a colony was observed on the south side of the American River near Cal Expo (SAFCA and Reclamation 1994). As a result of major physical changes in the hydrology and stream channel conditions of the lower American River, limited steep cut-bank habitat is present (USFWS 1991a). The most suitable habitat for bank swallows now occurs along the river's edge near Discovery Park (USFWS 1991a).

4.7.1.6.5.4 Tricolored Blackbird (*Agelaius tricolor*)

Tricolored Blackbird was identified as a Candidate for listing as threatened or endangered under CESA in December 2015. It is a California Species of Special Concern. A resident species in California, the tricolored blackbird is common locally throughout the Central Valley and in coastal districts south from Sonoma County. Preferred nesting habitat is dense cattails or tules associated with marsh and pond habitats. However, thickets of willows, blackberry, and wild rose may also be suitable (Zeiner 1990).

Tricolored blackbirds are known to occur in the riparian habitats along the lower American River (SAFCA 1994). Most reported nesting occurrences have been in canals, ponds, and marshes located adjacent to the river channel (SAFCA 1994).

4.7.1.6.5.5 Yellow-breasted Chat (*Icteria virens*) and Yellow Warbler (*Dendroica petechia*)

Yellow-breasted chat and yellow warbler are California Species of Special Concern. These migratory species are summer visitors to riparian habitats. Both of these species are known to occur in the riparian habitats along the lower American River.

4.7.1.6.6 Other Raptors

Raptors (birds of prey, including hawks, falcons, eagles, and owls) are considered sensitive by the CDFW. Removal or destruction of individual birds or active raptor nests is a violation of the California Fish and Game Code Section 3503.5. In addition to the above-mentioned bald eagle and Swainson's hawk, raptors that are known to nest, or could potentially nest, in the study area include red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), white-tailed kite, American kestrel (*Falco sparverius*), and great horned owl (*Bubo virginianus*).

4.7.1.6.7 Special-Status Mammals

4.7.1.6.7.1 River Otter (*Lontra canadensis*)

River Otter is a California Species of Special Concern. River otters are an uncommon, yearlong resident of rivers, large streams, lakes, wetlands, estuaries, and coastal areas. Optimal habitat consists of riparian and other wetland vegetation associated with a large, permanent water source (Zeiner, et al. 1990). They feed primarily on fish, crayfish, and other crustaceans, but also eat amphibians, some mammals, and aquatic invertebrates. River otters are known to occur along both the Sacramento and American rivers (CNDDB 1994).

4.7.2 Impacts and Mitigation Measures

This section evaluates and describes the potential effects of changes in reservoir water levels and river flows that would directly result from the Proposed Action and Alternatives on riparian vegetation, habitats, and associated sensitive species. For the analysis in the Draft EIS/EIR, CALSIM II modeling output was used to assess hydrologic changes in CVP system waterbodies using the comparative methodology of gauging the long-term 72-year differences between the Base Condition and the proposed implementation of the new CVP water service contracts and the various alternative actions. As discussed in Section 4.1.4 of this Final EIS (under “2016 CALSIM Model Verification Process”), additional CALSIM II modeling was conducted by ECORP

Consulting, Inc. (ECORP 2016) and in keeping with NEPA requirements, this Final EIS addresses the potential impact of the Proposed Action and Alternatives by comparing the effects of that action to the effects of the No Action Alternative. In relation to the evaluation of "diversion-related" direct impacts, however, that comparison is moot in most instances because annual diversion of up to 15,000 acre-feet from the American River and/or Folsom Reservoir would occur under both the No Action Alternative and the Proposed Action. Therefore, no distinction can be made between either alternative relative to potential impacts on various diversion-related resources.

While not required under by NEPA, new CALSIM II modeling runs were conducted for the Proposed Action and Alternatives using an "Alternate Basis of Comparison." This evaluation is provided for informational purposes only and compares the potential direct effects of the Proposed Action and Alternatives (including the No Action Alternative) with conditions likely to occur by 2030 without the additional diversion of up to 15,000 AFA that would occur under the Proposed Action and No Action Alternative.

This effort also served to verify the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative and Alternatives 3 and 4 (all scenarios).

4.7-1 Effects on vegetation associated with changes in water surface elevations in Folsom, Shasta, and Trinity reservoirs.

4.7.2.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Folsom, Shasta, and Trinity reservoirs have water levels that fluctuate frequently on an annual basis due to joint operational prescriptions aimed at maintaining multiple beneficial uses. Non-native, disturbance-adapted (or "weedy") vegetation becomes established in areas below the high water line during the growing season. The drawdown zone at each of these reservoirs due to flood control operations and seasonal depletions to consumptive demands and downstream releases is vegetated primarily with weedy herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community. These areas are not considered to have high habitat value for typically associated terrestrial wildlife species. Due to the inherent fluctuations in reservoir water levels, quality nearshore vegetation, and the habitat it would provide, rarely establishes itself or persists. This condition is identical for all Alternatives including the various scenarios under the Proposed Action, Alternative 3 – Water Transfer Alternatives, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C) and Alternative 1A – No Action Alternative. Accordingly, inherent conditions in these reservoirs with respect to weedy herbaceous plants and willow shrubs are not expected to be affected by the new CVP water service contracts; the impacts are considered likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-2 Effects on riparian vegetation of the upper Sacramento River.

4.7.2.2 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The analysis for riparian vegetation of the upper Sacramento River addresses potential changes in flows under any of the alternatives during the peak growing season. The peak growing season for riparian vegetation is typically March through July with the remainder of the growing season extending from August through October. The analysis of effects on riparian vegetation of the upper Sacramento River is based on changes in monthly mean river flows below Keswick Dam resulting from the implementation of the new CVP water service contracts.

Table 5.9-1 of the Draft EIS/EIR (see page 5-97) shows the modeled mean monthly flows in the upper Sacramento River below Keswick Dam under the Proposed Action (Alternative 2B), relative to the Base Condition over the entire 72-year period of simulated hydrologic record. Flow changes under the Proposed Action (Alternative 2B) are very minor; with mean monthly average changes, across the year, generally less than two-tenths of one percent, relative to Base Condition flows. These changes are considered negligible and immeasurable in the context of their potential effects on riparian vegetation and the species that depend on them within the upper Sacramento River.

CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternative 4A, 4B and 4C), and Alternative 1A – No Action Alternative revealed similar inconsequential changes in mean monthly simulated flows in the upper Sacramento River, relative to Base Condition flows (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Based on these modeling results and the discussions herein, there would be no anticipated effect on riparian vegetation communities along the upper Sacramento River.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-3 Effects on riparian vegetation in the lower Sacramento River and Delta.

4.7.2.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The analysis of potential effects on riparian vegetation of the lower Sacramento River and the Delta is based on changes in river flows below Freeport caused by the implementation of the new CVP water service contracts. As discussed previously, the growing season for riparian vegetation is typically from March through October, with peak growing periods associated with the months of March through July. In addition to lower Sacramento River flows, the Delta wetlands are sensitive to fluctuations in water salinity, which are determined by river flows into the Delta relative to tidal action that pushes brackish and salt water from San Pablo and Suisun bays into the Delta. The long-term position of X2 can also be examined to assess any changes in salinity that would potentially affect Delta vegetation.

Table 5.9-2 of the Draft EIS/EIR (see page 5-99) shows the modeled mean monthly flows in the lower Sacramento River at Freeport under The Proposed Action (Alternative 2B), relative to the Base Condition, for those growing season months (March through October) over the 72-year period of record. Overall, changes in mean monthly flows under The Proposed Action (Alternative 2B), relative to Base Condition flows are negligible. There is no appreciable difference or change in mean monthly flows, over the long-term, throughout the growing season months or during the peak growing season months.

Table 5.9-3 of the Draft EIS/EIR (see page 5-99) reveals the mean monthly position of X2 under the Proposed Action (Alternative 2B), relative to the Base Condition, during the growing season, over the entire 72-year hydrologic period of simulation.

CALSIM II modeling results show that, over the long-term, shifts in X2 upstream was undetectable. The data also indicate that the maximum shifts occurred only infrequently. Anticipated changes in Delta salinity; at least as reflected in simulated X2 positioning, would be virtually undetectable and would, therefore, have an insignificant effect on Delta vegetation and wetlands.

The CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), and Alternative 1A – No Action Alternative revealed similar inconsequential changes in mean monthly X2 position, relative to Base Condition flows (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Based on these modeling results and the discussions herein, there would be no anticipated effect on riparian vegetation communities within the Delta insofar as changing salinity effects and decreased inflows from the Sacramento River is concerned. Accordingly, this impact is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-4 Effects on Delta habitats of special-status species (non-fisheries).

4.7.2.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

A number of special-status species are known to occur in a range of Delta habitats. As discussed previously, Table 5.9-2 of the Draft EIS/EIR (see page 5-99) revealed the negligible extent to which flows in the lower Sacramento River (measured at Freeport) would be affected under the proposed new CVP water service contracts. Additionally, Table 5.9-3 of the Draft EIS/EIR (page 5-99) showed the immeasurable extent to which X2 would also be affected. Table 5.9-4 shows the mean monthly changes in Delta outflow under Proposed Action – Scenario B, relative to the Base Condition, over the entire 72-year period of hydrologic record.

Consistent with the other CALSIM II modeling results, Table 5.9-4 confirms the inconsequential effect of the proposed new CVP water service contract on Delta outflow. Changes (i.e., decreases) in Delta outflow under The Proposed Action (Alternative 2B), relative to the Base Condition are small (e.g., no individual mean monthly average, over the 72-year period, exceeded two-tenths of one percent of the corresponding Base Condition flows). Based on these hydrologic indices and, to the extent that Delta habitats for special-status species are influenced by water conditions, it is concluded that Delta habitats would not be significantly affected.

The CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), and Alternative 1A – No Action Alternative revealed similar inconsequential changes in hydrology having potential influence and implications to Delta habitats (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Based on these modeling results and the previous discussions, there would be no anticipated significant effect on special-status species habitats within the Delta insofar as changing salinity, decreased inflows from the Sacramento River, and decreased Delta outflow are concerned. Accordingly, this impact is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-5 Effects on riparian vegetation of the lower American River.

The analysis of potential effects on riparian vegetation of the lower American River is based on changes in river flows below Nimbus Dam caused by the implementation of the new CVP water service contracts. Table 5.9-5 of the Draft EIS/EIR (see page 5-102) shows the number of months of the May through September growing season when mean monthly flows in the lower American River would be below the 1,750 cfs threshold considered the minimum necessary to support the continued radial growth of cottonwoods. A comparison was made between the Base Condition and the Proposed Action (Alternative 2B), over the entire 360-month period of record (five months over each of the 72-years). These results were derived from the same CALSIM II modeling simulations used to generate other hydrological impact indices.

The results showed that from Nimbus downstream to the mouth of the lower American River, the frequency with which mean monthly flows would be below the 1,750 cfs threshold during the May through September growing season would increase. On average, between 25-36 percent of the time, under current conditions, mean monthly flows in the lower American River (depending on location) are already below 1,750 cfs during the growing season. The proposed new CVP water service contracts would increase this frequency by less than one percent (i.e., 0.8 percent) (see Table 5.9-5 of the Draft EIS/EIR). It should be noted that mean monthly flows are generally indicative of the overall flow conditions that occurred during that particular time period; however, operational fluctuations at Folsom Dam and Reservoir dictate that daily and even hourly flow changes occur (largely dictated by LAROPS Group ramping rate criteria; these conditions also have significant bearing on instream fisheries resources which have been previously discussed).

As noted previously, an average flow of 3,000 cfs is thought to provide "reasonable" growth and maintenance conditions for riparian vegetation (USFWS 1996). Higher flows earlier in the growing season (i.e., April through June) are often critical to the establishment of riparian species seedlings on riverine terraces. Table 5.9-6 of the Draft EIS/EIR (see page 5-103) tabulates the number of years, for each month, when mean monthly flows in the lower American River below Nimbus Dam would be within the flow range considered optimal (i.e., between 2,700 and 4,000 cfs).

The modeling results show that in only one month, July, would The Proposed Action (Alternative 2B), result in a fewer number of years, relative to the Base Condition, when mean monthly flows would be outside of the optimal flow range. A close inspection of the 72-year CALSIM II modeling output revealed that these two years (for July) occurred in 1947 (a dry-year) and 1958 (a wet-year). Base Condition flows in both cases were slightly above 2,700 cfs, but were decreased with the new contract diversions to flow levels below this threshold. The reductions in mean monthly flows for these two years represented a 2.5 and 1.2 percent decrease, respectively, for the simulated 1947 and 1955 hydrology (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR). Despite the fact that, under the Proposed Action (Alternative 2B), two less years would provide mean monthly flows in the optimal range, relative to the Base Condition, the simulated flow reductions for these two years were small and considered likely to result in minimal effects.

The CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternative 4A, 4B and 4C) and Alternative 1A – No Action Alternative revealed similar inconsequential changes in hydrology that would negate any significant effects on riparian vegetation growth along the lower American River (see Alternatives 2A and 2C – Proposed Action – Scenarios A and C, Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Based on these modeling results and the previous discussions, there would be no anticipated significant effect on the hydrology necessary to maintain riparian communities in good health in the lower American River. Accordingly, this impact would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-6 Effects on backwater pond hydrology in lower American River and its subsequent effect on pond vegetation.

The analysis of potential effects on backwater ponds of the lower American River is based on changes in river flows below Nimbus Dam caused by the implementation of the new CVP water service contracts. . It has been determined that flows of at least 2,700 cfs are required to adequately recharge the ponds closest to the river. At sustained flows of 1,300 cfs or less, many of the ponds become more shallow and smaller, hold very little water, and become choked with willows. A minimum of 1,300 cfs is considered essential. Overall, it is acknowledged that in order to provide continuous recharge of off-river ponds, flows in the range of 2,750 to 4,000 cfs are needed (Sands et al., 1985; Sands 1986).

Table 5.9-7 of the Draft EIS/EIR (see page 5-105) shows the number of years, for each month, when mean monthly flows in the lower American River below Nimbus Dam would be within the threshold criteria for minimum backwater pond sustenance and continuous recharge under The Proposed Action (Alternative 2B), relative to the Base Condition. Flows were set from the minimum, 1,300 cfs to 4,000 cfs. Tabulated years from CALSIM II hydrology output for the lower American River at this location show the variation between current conditions (Base Condition) and the simulated hydrology under the Proposed Action (Alternative 2B).

The results showed that, on average, over the period of record, the Proposed Action (Alternative 2B) would impart very little change to the number of years of similar months when the mean monthly flows below Nimbus Dam would be outside of the 1,300 to 4,000 cfs threshold. The months of August and September revealed changes. Again, a careful inspection of the CALSIM II modeling output was made to determine the conditions surrounding these occurrences. In all cases, the variations existed as flow decreases to a level below the 1,300 cfs threshold. Water-year types covered most all categories, so no relationship could be drawn with water-year type. Most importantly were the magnitude of flow changes modeled; changes were small (i.e., less than 2 percent; see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR). Table 5.9-8 of the Draft EIS/EIR (see page 5-106) shows similar results, but for the lower American River at H Street.

The CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), and Alternative 1A – No Action Alternative revealed similar small and likely undetectable changes in hydrology. Such changes are unlikely to lead to significant effects on backwater pond recharging (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Based on these modeling results and the previous discussions, there would be no anticipated significant effect on backwater pond recharging and the associated benefits to riparian and pond vegetation communities in those off-river areas of the lower American River. Accordingly, this impact would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-7 Effects on special-status species dependent on lower American River riparian and open water habitats.

Bank swallow, yellow warbler, yellow-breasted chat, river otter, and several other species are special-status species known to occur, nest, or periodically forage in open water and cottonwood forest habitats along the lower American River. The de-listed bald eagle is also known to occur here. Potential impacts on cottonwood forests are commonly used to determine whether special-status species dependent on this habitat would be affected by project alternatives.

As discussed above, there would be no significant impact on the maintenance, growth, and establishment of cottonwood communities along the lower American River under any of the alternatives, relative to the Base Condition. This was based on CALSIM II hydrological modeling output that revealed no detectable change in river flows. The potential impacts on cottonwood radial growth maintenance, maximum growth, and establishment are less than significant under any alternative. Moreover, modeling output also showed that off-river open water habitats such as backwater ponds would not be significantly affected, relative to the Base Condition. Therefore, impacts on special-status species associated with riparian and open water habitats would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-8 Effects on species dependent on Folsom Reservoir near shore and open water habitats.

Bald eagle and other raptor species use Folsom Reservoir's open water or nearshore habitats. CALSIM II modeling data was generated to look at the potential changes in reservoir water surface area that could affect raptor species.

Table 5.9-9 of the Draft EIS/EIR (see page 5-108) shows the end-of-month water surface area of Folsom Reservoir under The Proposed Action (Alternative 2B), relative to the Base Condition, over the 72-year hydrologic period of record. With the new CVP water service contracts, water surface areas (in acres) were shown to decrease with the magnitude of area loss increasing into the summer months. The simulated acreage losses, however, are very small and likely undetectable. The maximum acreage loss, as a percent, is two-tenths of one percent of the total reservoir water surface area (and this would occur during July and August).

Based on these hydrologic modeling results, little change would occur in Folsom Reservoir's water surface area. While individual months, in certain years, showed large acreage losses, a corresponding number of equally large acreage gains were also shown for certain months. It is difficult to precisely ascribe an overall effect based on individual years when, there is such variability between years. Folsom Reservoir operations, as part of a coordinated CV/SWP system and, as captured in CALSIM II operational modeling, show years where individual months will either gain or lose water (i.e., water surface area), relative to the Base Condition.

The CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), and Alternative 1A – No Action Alternative revealed similar small and likely undetectable changes in Folsom Reservoir water surface area over the long-term. Such changes are unlikely to lead to significant effects on foraging habitat or foraging behavior of the bald eagle and other raptor species dependent on open water and nearshore habitats (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Based on these modeling results and the previous discussions, there would be no anticipated significant effect on Folsom Reservoir's open water or nearshore habitats and therefore no effect on special-status species, especially raptors, that use these habitats. Accordingly, the impact on special-status species that use open water or nearshore habitats at Folsom Reservoir would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.7-9 Direct impacts on the California red-legged frog and Foothill yellow-legged frog.

4.7.2.5 Diversion-Related Impacts

Under Alternatives 2A, 2B and 2C – Proposed Action – All Scenarios, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative, GDPUD is assumed to divert from the North Fork American River at the site of the current American River Pump Station. Downstream of this location, there is the potential for altered flow regimes to affect both the California red-legged frog and Foothill yellow-legged frog, to the extent that these species are present. As noted previously, potential habitat exists for both species upstream of Folsom Reservoir along these riparian corridors.

Table 5.9-10 of the Draft EIS/EIR (see page 5-110) shows the mean monthly flows in the North Fork American River below the American River Pump Station under the Proposed Action (Alternative C) relative to the Base Condition. This Alternative was initially addressed since it represents the allocation split between EID and GDPUD where the latter would hold the largest proportion of the new CVP water service contract, therefore, holding the highest potential for hydrological effects on that part of the North Fork American River downstream from their diversion point. The model run for Alternative 2C assumed a GDPUD diversion of 11,000 AFA.

Modeling results showed that simulated mean monthly flows in the North Fork American River downstream of the American River Pump Station would decrease, relative to the Base Condition, with the largest decreases occurring during the June through August period. Interestingly, the maximum flow decreases identified for individual years (over the 72-year period of record) were similar to the long-term modeled changes in mean monthly flows. This implies that the overall mean monthly flow decrease is representative of a nearly consistent inter-annual lowering of flows over the entire period of record and not just a few years, with extremely large variations (see Proposed Action – Scenario C, Technical Appendix I of the Draft EIS/EIR).

The modeling results indicate that during the summer months, the long-term average decrease in mean monthly flows, relative to the Base Condition would approximate 3-4 percent. Flow changes approaching 5 percent of the Base Condition begin to impart increasingly significant implications to sensitive-species dependent on flow-based habitat conditions relative to the Base Condition. To the extent the California red-legged frog and Foothill yellow-legged frog are present in and around the areas downstream of this diversion location, there could be adverse impacts on these species in comparison to the Base Condition.

As noted previously, marginally suitable habitat for the California red-legged frog occurs along the North Fork American River downstream of the PCWA pumping plant. Minimal riparian and herbaceous streamside cover and the presence of exotic predators reduce the habitat values for the California red-legged frog and the likelihood for occurrence. While summer surveys (non-protocol) did not reveal the presence of the California red-legged frog, a final determination of presence or absence cannot be made until the completion of spring surveys for adults and egg masses. Should the California red-legged frog occur in areas downstream of the American River Pump Station, then direct impacts from reduced river flows could negatively affect the species and could lead to its decline in those areas downstream from the diversion point. Under the simulated hydrology of Alternative 2C – Proposed Action – Scenario C, this is considered as a potentially significant impact when compared to the Base Condition.

Table 5.9-11 of the Draft EIS/EIR (page 5-111), alternatively, shows the same mean monthly flows in the North Fork American River at this same location but under the Proposed Acton (Alternative A). Under this alternative allocation scenario, both EID and GDPUD would share equally, the water made available by the new CVP water service contract with GDPUD taking an assumed 7,500 AFA instead of 11,000 AFA. Modeling results showed that, under this diversion scenario, long-term changes in flows were less, than those simulated under Alternative 2C.

Based on these hydrologic modeling results, mean monthly flows in the North Fork American River would not change significantly. While individual months, in certain years, showed flow decreases approximating 20 cfs, the over-all long-term decrease in mean monthly flows would be less than 3 percent.

The CALSIM II modeling results for the Proposed Action (Alternative 2B), along with Alternative 3 – Water Transfer Alternative, the Reduced Diversion Alternatives (Alternatives 4A, 4B and 4C), and Alternative 1A – No Action Alternative revealed similar small changes in North Fork American River flows over the long-term. Such changes would unlikely lead to significant effects on California red-legged frog and Foothill yellow-legged frog or their sensitive habitats (see Proposed Action – Scenario B, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR). Accordingly, this impact would likely result in minimal effects.

Mitigation Measures

4.7.2.6 Alternative 2C (Proposed Action: Scenario C)

As discussed above, the Draft EIS/EIR identified a potentially significant impact California red-legged frog resulting from reduced flows with implementation of Alternative 2C relative to the Base Condition. This impact is a result of the comparison of modeling results for Alternative 2C and the

Base Condition in keeping with CEQA requirements. In keeping with NEPA requirements, this EIS bases its impact determination of the comparison of Proposed Action environmental consequences with those of the No Action Alternative. Because diversions made at the North Fork American Pump Station under Proposed Action (2C) would be indistinguishable from those made under the No Action Alternative, the impact is determined to be less than significant and no mitigation is proposed. This is also true when comparing Alternatives 3 and 4 (all scenarios) to the No Action Alternative.

With certification of the Final EIR for P.L. 101-514 by EDCWA (EDCWA 2016) and adoption of the P.L. 101-514 Mitigation Monitoring and Reporting Plan, EDCWA is obligated to implement Mitigation Measure 5.9-9 in the event that Scenario C of the Proposed Action is implemented. Potential impacts on the California red-legged frog and Foothill yellow-legged frog could be significant in the portion of this reach of the North Fork American River. Implementation of Mitigation Measure 5.9-9 would require the following:

> Avoidance of Alternative 2C altogether (by selecting Alternatives 2A or 2B); or,
>
> Adjusting the summer diversion pattern assumed in the modeling to a more typical annual demand pattern (i.e., flatten the July – September peaks)

4.7.2.7 No Action Alternative; Proposed Action (Scenarios A and B); Alternative 3; and Alternative 4 (All Scenarios)

No mitigation is required.

4.7.2.8 Construction-Related Impacts

As noted in the Draft EIS/EIR, there is no legal authority requiring EDCWA to take action related to such speculative future projects that could be implemented by GDPUD to divert and/or convey water made available to GDPUD under P.L. 101-514. The obligation to adopt feasible mitigation measures only arises when an agency proposes to approve a project with significant environmental impacts. The obligation to adopt feasible mitigation measures only arises when an agency proposes to approve a project with significant environmental impacts.

Future and specific mitigation measures would be prepared at the time project-specific actions are initiated and would become a part of the project-level environmental documentation for that action. The Draft EIS/EIR does not provide the environmental analysis necessary to support all of the new facilities ultimately required by GDPUD, at the location of the American River Pump Station to divert water made available by the new CVP water service contract for GDPUD. At present, no details are available as to the nature of these required facilities that would lend themselves to a project-specific analysis.

Nevertheless, in the interest of full disclosure, the Draft EIS/EIR determined it prudent to identify the types of mitigation measures that would benefit and help offset the potential hydrological effects revealed by the simulation modeling, if Alternative 2C were chosen. In the future, when GDPUD actively proceeds with this new facility project, mitigation measures addressing the potential hydrological effects on either California red-legged frog and Foothill yellow-legged frog could include:

- The EDCWA shall ensure that a spring survey in accordance with all applicable USFWS survey protocols is conducted by a qualified biologist during the appropriate spring survey window in areas with suitable habitat that will be affected.
- Should no California red-legged frog adults or egg masses be observed during the spring survey, then no further mitigation shall be required. If California red-legged frog are determined to be present, then the following mitigation measure could be implemented:
  - Either an ESA Section 7 no jeopardy biological opinion or an ESA Section 10 incidental take permit shall be obtained from the USFWS for potential impacts on the California red-legged frog. All the terms and conditions of the biological opinion or the incidental take permit from the USFWS shall be implemented.
  - While at the discretion of the USFWS, the above-mentioned terms and conditions will likely include a requirement to avoid and minimize habitat impacts and measures to restore impacted areas and enhance other areas along the creeks or reservoirs to benefit the California red-legged frog.
  - Regardless of USFWS direction, however, GDPUD, at a minimum, commits to a no net loss [of California red-legged frog habitat] performance standard, but shall defer to the USFWS to determine if a higher mitigation ratio is required, and to determine how the performance standard will be satisfied.
- Implementation of the above mitigation measure would reduce the potential impacts under Proposed Action – Scenario C, and likely result in minimal effects.

4.8 WATER-RELATED RECREATIONAL RESOURCES (DIRECT EFFECTS STUDY AREA)

This subsection addresses existing recreational uses within the regional and local study areas that could be directly affected by the Proposed Action and its Alternatives. It provides the context upon which the analysis of potential diversion-related effects on water-related recreational resources can be made. The methods for evaluating the environmental consequences of the Proposed Action and Alternatives, and the impact determinations presented in the Draft EIS/EIR are duplicated herein unless otherwise noted.

4.8.1 Affected Environment

The following describes the environmental setting related to recreation resources in areas potentially affected by the Proposed Action and alternatives. This subchapter addresses local environmental conditions that could be affected by diversions from the North Fork American River and Folsom Reservoir. Recreational and riverine parkway resources that could be affected by the diversions contemplated under the P.L.101-514 contract also include the upper and lower Sacramento River, lower American River and Sacramento-San Joaquin Delta.

4.8.1.1 Shasta/Trinity Reservoirs

Shasta, Keswick, Whiskeytown, and Trinity reservoirs are part of the Whiskeytown-Shasta-Trinity National Recreation Area administered by the U.S. Forest Service and National Park Service. Whiskeytown and Keswick reservoirs are regulating reservoirs for Shasta Reservoir and Trinity and Lewiston Reservoirs, respectively, providing a relatively stable shoreline that is minimally affected by changes in upstream diversion and storage.

At full pool, Shasta Reservoir has 370 miles of shoreline. Recreational uses at Shasta Reservoir averages about 2.4 million visitor days per year, with an estimated 75 percent of the uses taking place between May and September. Recreation facilities include seven public boat ramps, 22 developed campsites, picnic areas, and numerous private marina resorts. Trinity Reservoir has many public and private recreation facilities including campgrounds, picnic areas, resorts, and marinas. Facilities at Trinity, Whiskeytown, and Keswick Reservoirs include boat ramps, campgrounds, picnic areas, and resorts.[131]

4.8.1.2 Upper and Lower Sacramento River

On the upper Sacramento River, water-dependent activities (swimming, boating, and fishing) account for approximately 52 percent of the recreation uses. While fishing is a year-round activity, boating, rafting, and swimming uses take place in summer months when temperatures are high. Between Colusa and Sacramento, major recreation facilities are located at Colusa-Sacramento River Recreation Area, Colusa Weir access, Tisdale Weir access, River Bend access, Knights Landing, Sacramento Bypass, and Elkhorn Boating Facility.

Recreational uses in the lower Sacramento River, between the American River confluence and the Delta, are closely associated with recreational use of Delta waterways. This reach of the river,

131 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, p.3-161, included as Appendix D in PCWA American River Pump Station Project Draft EIR/EIS (SCH #1999062089), August 2001.

which is influenced by tidal action similar to the Delta, is an important boating and fishing area with several private marinas.[132]

4.8.1.3 Sacramento-San Joaquin River Delta

As a complex of waterways affected by both fresh water inflows and tidal action, the Delta is an important recreation resource that provides a variety of water-dependent and water-enhanced recreation opportunities. The Delta supports about 12 million user days of recreation per year. Parks along the mainstem of the Sacramento River and Delta sloughs provided access for water-oriented recreation as well as picnic sites and camping areas. Brannan Island State Park and Delta Meadows River Park are major water-oriented recreational areas. Peak usage in the parks is typically in July.

Boating is the most popular activity in the Delta region, accounting for approximately 17 percent of the visits, with other popular uses including fishing, relaxing, sightseeing, and camping. Boating and related facilities are located throughout the Delta and include launch ramps, marinas, boat rentals, swimming areas, camping sites, dining and lodging facilities, and marine supply stores. [133]

4.8.1.4 Folsom Reservoir

The California Department of Parks and Recreation (CDPR) manage the Folsom Lake State Recreation Area (SRA) and surrounding facilities. The area's primary recreational uses are boating and fishing. In addition, the reservoir features approximately 75 miles of shoreline and 80 miles of trails that provide opportunities for hiking, horseback riding, nature studies, camping, and picnicking.

The water surface elevation of the reservoir can vary considerably, from 466 feet when its gross pool is full, to less than 375 feet during multiple dry years occur in a row. Reclamation attempts to maintain storage in Folsom Reservoir throughout the summer at sufficient levels to accommodate marina and boat access as much as possible. When full, Folsom Reservoir extends nearly 15 miles up the North Fork American River and 10.5 miles up the South Fork American River. Folsom Reservoir has 75 miles of undeveloped shoreline.

The primary commercial recreation facility on Folsom Reservoir is the Folsom Reservoir Marina on Brown's Ravine on the east side of the reservoir. Other major use areas are located at Granite Bay, Beal's Point, Folsom Point, Peninsula, and Rattlesnake Bar. The predominant recreational

132 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, p.3-162, included as Appendix D in PCWA American River Pump Station Project Draft EIR/EIS (SCH #1999062089), August 2001.

133 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, p.3-162, included as Appendix D in PCWA American River Pump Station Project Draft EIR/EIS (SCH #1999062089), August 2001.

activities at Folsom Reservoir are water-dependent uses, such as boating, water-skiing, personal watercraft use, swimming and fishing. The upper (easternmost) arms of the reservoir are designated as slow zones for quiet cruising, fishing, and nature appreciation.

The Folsom Lake (Reservoir) SRA is one of the most heavily used recreational facilities in the State Park system, with two to three million visitor days per year. The Folsom Reservoir SRA is an important regional resource because of its proximity to a heavily populated metropolitan area, the area's summer climate, the surrounding population's high interest in outdoor recreation, and the decrease in open space and recreational resources in neighboring areas.[134]

Water-enhanced activities (picnicking, relaxing, camping, and trail use) account for approximately 15 percent of the total recreational demand at the reservoir while water-related activities (boating, windsurfing, swimming, wading, rafting, boat camping, fishing) account for the remaining 85 percent. Of these recreational uses, boating (trailer and non-trailer launched) is the most popular and accounts for nearly 30 percent of the total recreational demand at Folsom Reservoir.

Lake Natoma is the downstream end of the Folsom Reservoir SRA and serves as a regulating reservoir for the releases from Folsom Reservoir. Recreation facilities and activities at Lake Natoma are operated by CDPR and include the California State University Sacramento Aquatic Center, day use areas, a campground, boat ramp, and an 8.4-mile segment of the American River Bicycle Trail.

The predominant recreational activity at Lake Natoma is trail use (e.g., jogging, bicycling, hiking and horseback riding). Due to the lake's stable water surface conditions, it is a popular destination for boating, rowing, canoeing, and wind surfing activities. Summer water temperatures are generally lower than Folsom Reservoir since water released into Lake Natoma generally comes from the deeper portions of Folsom Reservoir; therefore, it is typically less intensely used for swimming and wading. The beaches at Negro Bar and Nimbus Flat are the primary swimming areas of the lake.

4.8.1.5 Lower American River

The lower American River begins below Nimbus Dam and flows along the valley floor until it reaches the Sacramento River at the City of Sacramento. The flow regime in the lower American River has been significantly altered since the completion of Folsom and Nimbus dams. The American River Parkway extends from Folsom Reservoir to Discovery Park in Sacramento. The Parkway consists of

134 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, pp.3-156 to 3-160, included as Appendix D in PCWA American River Pump Station Project Draft EIR/EIS (SCH #1999062089), August 2001.

14 interconnected parks, a continuous trail system, and approximately 5,000 acres of total land. Owned and managed by the County of Sacramento, the Parkway is linked to additional park lands, from Nimbus Dam to Folsom Reservoir which is managed by CDPR. Over five million visitors each year are estimated to use the parkway.[135]

Considered one of the nation's premiere urban parkways, the American River Parkway consists of 32 miles of paved bicycle and pedestrian trail along the American River from Discovery Park to Folsom Reservoir, known as the Jedediah Smith Memorial Bicycle Trail. Additional recreational facilities, including pedestrian and equestrian trails and picnic areas are located throughout the Parkway. No commercial recreational facilities are located within the Parkway, although raft rental outfitters are located near the Parkway at Sunrise Boulevard.

Water-enhanced (picnicking, camping, equestrian staging, and bicycle and pedestrian trails) and water-dependent (boat launching) facilities are provided throughout the Parkway, from Discovery Park upstream to Sailor Bar. The Parkway accommodates over 6 million visitors each year with visits projected to increase to almost 10 million by the year 2020. Peak use is typically from May through September with public use and visitations influenced by not only season, but also by air temperatures and river flow conditions. Water-enhanced activities account for about 70 percent of all recreation activities, with the remaining 30 percent geared towards water-dependent activities. The most popular activity of the Parkway is the category represented by nature study and site seeing, accounting for approximately 30 percent of the total recreational use. Within the Parkway, trail use (e.g., jogging, bicycling, hiking, and equestrian) accounts for approximately 27 percent of the remaining recreational use, with picnicking at 12 percent, boating at 11 percent, and swimming and fishing at 10 percent.

Rafting on lower American River is supported by commercial outfitters who provide services such as daily tours, shuttle buses, instructional services, and rental equipment for rafting, boating, and fishing activities. Two major outfitters, both located near Sunrise Boulevard, put-in rafts just downstream of Sunrise Boulevard and use either River Bend Park and/or the Harrington Drive access as the primary take-out points. The boating and rafting season is generally between April and October, with peak raft rentals occurring during the June through August period.

135 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, p.4-86, included as Appendix D in PCWA American River Pump Station Project Draft EIR/EIS (SCH #1999062089), August 2001.

4.8.1.6 Middle and North Forks American River

Whitewater recreation in the Auburn State Recreation Area (ASRA) is very popular on both forks of the river, with Class II, III and IV runs. Over 30 private outfitters are licensed to offer whitewater trips in Auburn SRA.[136]

ASRA is comprised of forty miles of river canyon along the North and Middle Forks of the American River (CDPR 2016). California Department of Parks and Recreation (CDPR) is collaborating with Reclamation to prepare a joint General Plan/Resource Management Plan (GP/RMP) for ASRA. California State Parks manages ASRA through a Managing Partner Agreement (MPA) with Reclamation.[137] . . . Other recreation opportunities along the North Fork American River include hiking, mountain bicycling, and horseback riding on the Auburn-to-Cool Trail and Western States Trail.

4.8.2 Regulatory Framework

4.8.2.1 National Wild and Scenic Rivers Act

The National Wild and Scenic Rivers System was established in 1968 with the enactment of P.L. 90-542 (16 USC 1271 et seq.). The congressional declaration of policy stated the following:

> It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."

The North Fork American River from below Lake Clementine to the former location of the old Auburn Dam bypass tunnel is eligible for listing for its recreational values. The lower American River from Nimbus Dam to its confluence with the Sacramento River was added to the National Wild and Scenic Rivers System based on the State's petition in 1981 and is designated a "recreational river." Recreational rivers are ones "that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past" (16 USC 1273[6][3]).

As a result of its designation under the act, federally assisted projects affecting the lower American River are subject to the Secretary of the Interior's determination that the project "will not invade the area or unreasonably diminish" the river's recreational value (16 USC 1278[a]; see also Swanson Mining Corporation v. VERC, 1790 F.2d 96 [D.C. Cir. 1986]; and the American River

136 www.cal-parks.ca.gov.

137 Alternative 1A California Department of Parks and Recreation. http://www.parks.ca.gov/?page_id=24325. Screenshot taken August 13, 2016.

Parkway Plan). When seeking authorization or appropriations for a project that affects the protected values of the lower American River, the relevant federal agency must notify the Secretary of the Interior of its intent, and report to Congress on the project's conformity with the act and its effect on the protected values of the river (16 USC 1278[a]).

4.8.2.2 State Wild and Scenic Rivers Act

The State Wild and Scenic Rivers Act was passed by the California Legislature in 1972 (Public Resources Code (PRC) Section 5093.50 et seq.). The Legislature declared that it was the State's intent that "certain rivers which possess extraordinary scenic, recreation, fishery, or wildlife values shall be preserved in their free-flowing state, together with their immediate environments, for the benefit and enjoyment of the people of the state." The Act restricts the construction of dams, reservoirs, diversions, and other water impoundments. A diversion facility may be authorized if the Secretary of the Resources Agency determines that (a) it is needed to supply domestic water to the residents of the county through which the river flows, and (b) it will not adversely affect the natural character of the river (PRC Section 5093.33[a]; DWR 1994).

The North Fork American River from below Lake Clementine to location of the former the old Auburn Dam bypass tunnel is eligible for listing for its recreational values. The Middle Fork American River from Oxbow Dam to the confluence with the North Fork American River is eligible for listing for its scenic values (City of Sacramento 1993). The lower American River was included in the State Wild and Scenic River System and was given the classification of "recreational river" (PRC Sections 5093.54[e], 5093.545[h]). The State defines a recreational river as a river "readily accessible by road or railroad, that may have some development along [its] shorelines, and that may have undergone some impoundment or diversion in the past" (PRC Section 5093.53[c]).

4.8.2.3 Auburn State Recreation Area Interim Resource Management Plan

As noted above, the CDPR, through a management agreement with Reclamation, manages the public use of the Reclamation lands in the ASRA. CDPR is currently collaborating with Reclamation to prepare a joint General Plan/Resource Management Plan (GP/RMP) for ASRA. The GP/RMP will define a long term vision for the park unit, provide guidelines for the protection and management of natural and cultural resources, determine management of many recreation activities which will occur here, and identify any additional facility improvements. The GP/RMP is a programmatic document that will outline broad goals and guidelines for management of ASRA and will provide the basis for developing future focused management plans, specific project plans, and other proposals which implement the GP/RMP goals. The area supports and offers the potential for unique and diverse recreational opportunities. The Auburn Interim Resource Management Plan provides planning goals and objectives to address agency and public concerns of protection and enhancement of recreation and natural resources of the area. These efforts will include reassessment of existing resources, public interests, and possible improvements to accommodate recreation while protecting the natural resources and primitive setting of the upper American River reaches.

It should be noted that since publication of the Draft EIS/EIR California State Parks began collaboration with Reclamation to prepare a joint General Plan/Resource Management Plan (GP/RMP) for ASRA. Currently, public scoping for this future project is scheduled for fall 2016.[138]

4.8.2.4 American River Parkway Plan

The American River Parkway Plan was adopted by the County of Sacramento in 1985 (Sacramento County 1985). The plan is an element of the Sacramento County General Plan. It establishes goals and policies for the parkway, presents a description of parkway resources, and provides area plans to guide resource protection and development. Policy 3.1 of the plan discusses flow issues, as follows:

> Water flow in the lower American River should be maintained at adequate levels to permanently sustain the integrity of the water quality, fisheries, waterway recreation, aesthetics, riparian vegetation, wildlife, and other river-dependent features and activities of the Parkway. The required flow levels of the lower American River should be established at higher levels than those required under D-1400 of the SWRCB. State and federal policy should provide for the maintenance of flows in the optimum range in the lower American River.

The Plan explains that D-1400 flows (e.g. 1,500 cfs for recreation) are inadequate and that the decision has no legal effect without the completion of the Auburn Dam. It acknowledges that research is ongoing to establish adequate flows for the lower American River, including recreation flows. When required flows are determined, the plan states that “those flows will be incorporated into the policies of this Plan.”

4.8.3 <u>4.8.3 Impacts and Mitigation Measures</u>

This subchapter addresses existing recreational uses within the regional and local study areas that could potentially be directly affected by the Proposed Action and its Alternatives. It presents an analysis of the potential effects on water-related recreational resources. Mitigation measures for any impacts found to be significant are identified if feasible. Potential indirect effects of implementation of the Proposed Action and Alternatives on recreational resources within the Subcontractor service areas are addressed later in Section 4.10, below.

138 California Department of Parks and Recreation. http://www.parks.ca.gov/?page_id=24325 . Screen capture dated July 17, 2016.

4.8-1 Result in a substantial conflict with established water-dependent or water-enhanced recreational uses in Folsom Reservoir, the lower American River, upper Sacramento River reservoirs, upper and lower Sacramento River, and the Delta, or result in activities inconsistent with the American River Parkway Plan.

4.8.3.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

As presented in the Draft EIS/EIR, the Proposed Action (Alternatives 2A, 2B and 2C) as well as the other Alternatives, including Alternative 1A – No Action Alternative, would result in increased diversions from CVP reservoirs when compared to the Base Condition. These new diversions, however, would not necessarily conflict with any established water-dependent or water-enhanced recreational uses but would depend on the extent of hydrological changes in the reservoirs and watercourses associated with these actions.

For purposes of this FEIS, modeling results presented in the Draft EIS/EIR show no distinction in the operation of CVP reservoirs, lower American River, upper Sacramento River reservoirs, upper and lower Sacramento River, and the Delta outflow between the No Action Alternative, the Proposed Action, and Alternative 3. Reduced diversions under the three scenarios identified for Alternative 4 would generally result in slightly improved flow conditions and enhanced reservoir operational flexibility. As such, this impact is considered ***less than significant*** for all alternatives.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.8-2 Result in a substantial change in river access or channel conditions that would decrease water-based recreational activities. For purposes of this analysis, the following thresholds are applicable:

1. **Substantial decrease in the duration of Middle Fork American River flows below the 850 cfs threshold for boating.**
2. **Substantial change in lower American River flows above or below the 1,750 to 6,000 cfs minimum/maximum range of adequate recreational flows; substantial change in lower American River flows above or below the 3,000 to 6,000 cfs optimum range of adequate recreational flows.**

4.8.3.2 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

For the lower American River, the maximum and minimum monthly mean flows over the 72-year simulation were compared between the Base Condition and each of the alternatives. In order to estimate the magnitude and frequency of bank exposure and bank inundation along the lower

American River, two locations were assessed: Nimbus Dam and the river mouth (confluence with the Sacramento River). A stage/discharge relationship has not been developed for the entire reach of the lower American River and such data have yet to be incorporated into CALSIM II modeling output. For this reason, it is difficult to quantify precisely the potential for exposure or inundation of recreation facilities along the banks of the lower American River. It is generally accepted, however, that higher water surface elevations occur under higher flows and lower water elevations occur under lower flows. A comparison of flows under the existing condition and each of the alternatives provides an estimate of the relative changes in river stage that could result. River flows, therefore, are used as surrogates for river stage (water surface elevations).

4.8.3.3 North Fork and Middle Fork American River Above and Below the American River Pump Station

Upper basin modeling showed that the long-term average mean monthly flows above the American River Pump Station would not change under any of the Alternatives, including the various Proposed Action scenarios, relative to the Base Condition (see Proposed Action – Scenarios A, B and C, and All Alternatives, Technical Appendix I of the Draft EIS/EIR). Below the American River Pump Station, modeling results indicated that under the Proposed Action (Alternative 2A), there would be slight, albeit undetectable changes in long-term mean monthly flows, relative to the Base Condition (see Table 5.10-1 of the Draft EIS/EIR, page 5-116).

Under The Proposed Action (Alternative 2B), where the total diversions modeled are shifted completely to EID's intake on Folsom Reservoir, these changes in upper American River flows below the American River Pump Station are reduced to zero (see Proposed Action – Scenarios B, Technical Appendix I, this Draft EIS/EIR). As discussed previously, under Alternative 2C, the modeled changes in long-term mean monthly flows would decrease more substantively than those under Scenario A (see Table 5.10-2 of the Draft EIS/EIR, page 5-117). With a larger GDPUD diversion (i.e., 11,000 AF) under this particular modeling scenario, these results are not unexpected. Under Alternatives 4A, 4B and 4C – Reduced Diversion Alternatives, there were simulated decreases in long-term mean monthly flows; however, these changes were less than those reported under Alternative 2A – Proposed Action – Scenario A (see Table 5.10-1 of the Draft EIS/EIR). Likewise, for Alternative 1A – No Action Alternative which assumed a corresponding water supply allocation (from a presumed water right acquisition or transfer), the modeled results were similar to those under Alternative 2A – Proposed Action – Scenario A (see Proposed Action – Scenarios A, Technical Appendix I of the Draft EIS/EIR).

While changes in mean monthly flows, over the 72-year period of record were observed in the hydrologic modeling output, these changes were small. From a recreational use perspective, long-term changes in river flows of these magnitudes would unlikely be observable or affect, in any measurable way, the water-enhanced activities that occur within this reach of the river. Therefore, changes in the upper American River would result in a minimal impact on recreation resources downstream of the American River Pump Station.

Recognizing the importance of rafting above the American River Pump Station, long-term changes in mean monthly flows were shown to have no effect on river hydrology, upstream of this site. The hydrologic modeling incorporated diversions at the site, as a reflection of GDPUD's future diversions from the American River Pump Station at this location. No changes in upstream hydrology would occur. The frequency with which flows would be below, at, or above the 850 cfs threshold considered necessary for rafting would not change between the Base Condition and any of the Alternatives.

4.8.3.4 Lower American River

CALSIM II modeling results confirmed that for the 5-month recreation season (May through September), The Proposed Action (Alternative 2B) would result in virtually the identical number of months, relative to the Base Condition, where mean monthly flows in the lower American River (below Nimbus Dam) would be less than 1,750 cfs. A careful examination of the entire 72-year period of record for these months (360 months in total) revealed that this would apply to all dry and critically-dry periods as well (see Proposed Action – Scenario B, Technical Appendix I, this Draft EIS/EIR). At the mouth of the lower American River, modeling results showed that, under Alternative 2B, 130 months of the 72-year recreational period would result in mean monthly flows below 1,750 cfs. This represents one additional month, relative to the 129 months simulated for the Base Condition. With such small changes in frequency the impact on water-enhanced or water-dependent recreational activities is considered likely to result in minimal effects.

Table 5.10-3 of the Draft EIS/EIR (page 5-118) shows the mean monthly simulated CALSIM II flows for the lower American River below Nimbus Dam under the Proposed Action (Alternative 2B), relative to the Base Condition. Long-term changes in mean monthly flows are small; flow changes, as a percent difference would be undetectable from a recreational water-enhanced and water-dependent activities perspective. Under Alternative 2A, with an equitable split of diversion between EID and GDPUD, the modeling results showed a similar variation in magnitude and frequency, relative to the Base Condition.

A careful examination of the individual year model results over the 72-year hydrologic record for the months of April through September showed that the number of months, under the Base Condition where, mean monthly flows in the lower American River below Nimbus Dam would be above the 3,000 cfs minimum boundary (defining the optimum flow range for recreational flows) would remain virtually unchanged with The Proposed Action (Alternative 2B). Under the Base Condition, 432 months of the recreational season maintained mean monthly flows at or above 3,000 cfs. Under Alternative 2B, 431 months maintained these flows (see Proposed Action – Scenarios B, Technical Appendix I of the Draft EIS/EIR). With such small changes in the frequency with which the lower American River below Nimbus Dam would meet optimal recreational flow requirements, relative to the Base Condition, such impacts were found to be likely to result in minimal effects.

Table 5.10-4 of the Draft EIS/EIR (page 5-119) shows the comparable results for the Water Transfer Alternative, relative to the Base Condition. Under this alternative, mean monthly flows in the lower American River below Nimbus Dam would be reduced, relative to the Base Condition. The impact of these mean monthly long-term changes on recreational uses and facilities; however, from a relative percent perspective, would likely result in minimal effects*.*

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.8-3 Result in a substantial decrease in upper or lower Sacramento River flows below 5,000 cfs.

4.8.3.5 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Table 5.10-5 of the Draft EIS/EIR (page 5-120) shows the modeled flows in the upper Sacramento River below Keswick Dam under the Proposed Action (Alternative 2B), relative to the Base Condition for the recreational months of May through September. Changes in mean monthly flows over the 72-year period of hydrologic record are unchanged. Long-term mean monthly flows under the Base Condition are over 5,000 cfs. For upper Sacramento River flows, these immeasurable changes in hydrology as demonstrated by CALSIM II modeling results under the Proposed Action (Alternative 2B), indicate that no potential impacts on recreational uses and activities, both water-enhanced and water-dependent would occur.

CALSIM II modeling results confirm that for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, similar, undetectable changes in mean monthly flows in the upper Sacramento River would occur. Simulated flows under Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative are similar to those of Alternatives 2A, 2B and 2C (see Water Transfer Alternative and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

For the lower Sacramento River, similar modeling results are evident. Table 5.10-6 of the Draft EIS/EIR (page 5-121) presents the long-term mean monthly flows in the lower Sacramento River at Freeport under the Proposed Action (Alternative 2B), relative to the Base Condition, again, for those recreational months (May through September).

Long-term simulated mean monthly river flow changes under The Proposed Action (Alternative 2B), would be imperceptible, relative to the Base Condition. Flows in the lower Sacramento River during these months are typically in the 12,000 to 19,000 cfs range, well above the threshold for water-dependent and water-enhanced recreational impact significance.

Simulated flows under Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative are similar to those of Alternative 2B, and the other various alternative Proposed

Action scenarios (see Water Transfer Alternative and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Accordingly, the potential impacts on water-dependent and water-enhanced recreational uses, activities and facilities in both the upper and lower Sacramento River reaches, for any of the Alternatives, would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.8.4 Shasta Reservoir boat launching criteria (reservoir elevation in msl; point at which boat launches must be closed):

1. **Sacramento Arm: Antlers (995 ft) Sugarloaf #1 (955 ft) Sugarloaf #2 (918 ft).**
2. **McLeod Arm: Baily Cover (1,017 ft) Hirz Bay #1 (1,020 ft) Hirz Bay #2 (973 ft) Birz Bay 2 #3 (941 ft).**
3. **Pit Arm: Packers Bay (951 ft) Centimundi #1 (943 ft) Centimundi #2 (876 ft) Centimundi #3 (848 ft) Jones Valley #1 (980 ft) Jones Valley #2 (924 ft) Jones Valley #3 (856 ft).**

4.8.3.6 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Table 5.10-7 of the Draft EIS/EIR (page 5-122) illustrates the long-term mean monthly water surface elevations at Shasta Reservoir under the Proposed Action (Alternative 2B), relative to the Base Condition for the summer recreational months. Mean monthly reservoir water surface elevations are all over 1,000 ft msl, except for the months of August and September when the long-term averages are 989 and 982 ft msl, respectively. The modeling data indicate that no measurable change, relative to the Base Condition would occur in summer period water surface elevations under Alternative 2B. Boat launch availability, therefore, would remain unaffected at the reservoir. Current conditions do, however, show that some boat launches are unusable on a long-term average, based on mean water surface elevations over the 72-year modeling simulation period. Still, boaters would have other options, primarily moving to those launches on the Pit Arm of the reservoir where all boat launches would have increased access, based on long-term hydrologic modeling.

CALSIM II modeling results confirm that for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, similar, undetectable changes in mean monthly water surface elevations at Shasta Reservoir would occur. Simulated water surface elevations under Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative are similar to those of Alternatives 2A, 2B and 2C (see Water Transfer Alternative and No Action Alternative, Technical Appendix I of the

Draft EIS/EIR). Accordingly, the potential impacts on boat launch availability at Shasta Reservoir under any of the Alternatives would likely result in minimal effects..

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.8-5 Trinity Reservoir boat launching criteria (reservoir elevation in msl; point at which boat launches must be closed):

1. **Fairview – Trinity Dam area (2,310 ft)**
2. **Main Arm – Trinity Center (2,295 ft)**
3. **Stuart Fork Arm – Minersville (2,170 ft)**

4.8.3.7 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Table 5.10-8 of the Draft EIS/EIR (page 5-124) illustrates the long-term simulated mean monthly water surface elevations at Trinity Reservoir under the Proposed Action (Alternative 2B), relative to the Base Condition, for the summer period (May through September). Similar to Shasta Reservoir, Alternative 2B would impart no measurable or detectable change in water surface elevation at the reservoir, relative to current or Base Conditions. This is based on a 72-year period of record for simulated hydrologic modeling of the reservoir's mean monthly water surface elevations. Nevertheless, even under existing conditions today, not all boat launches remain operable during all months of all water years. Over the long-term, as depicted by the data in Table 5.10-8, the Trinity Center and Minersville boat launches would be operable over approximately the entire summer recreation period. The boat launch at Fairview in the Trinity Dam area, however, would typically only be available during the earlier portion of the summer (i.e., May and June). Overall, boating access at Trinity Reservoir would not be measurably affected by the Proposed Action and Alternatives.

2A, 2B or 2C. Water surface elevations in the reservoir, as modeled, would remain unaffected. Simulated water surface elevations under Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative are similar to those of Alternatives 2A, 2B and 2C (see Water Transfer Alternative and No Action Alternative, Technical Appendix I of the Draft EIS/EIR). Accordingly, the potential impacts on boat launch availability at Trinity Reservoir under any of the Alternatives would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.8-6 Folsom Reservoir recreational thresholds (reservoir elevation in msl) including:

1. **When all boat ramps are usable (420 feet or higher).**
2. **When the marina wet slips are usable (412 feet or higher).**
3. **When the swimming beaches are usable (420 feet to 455 feet).**

4.8.3.8 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

CALSIM II modeling output showed that under the Proposed Action (Alternative 2B), there would no change in the number of months, during the summer recreational period, when water surface elevations at Folsom Reservoir would be below 412 ft msl, relative to the Base Condition. Under both the Base Condition and Alternative 2B, there would be 75 months (out of 442 total months) or 17 percent of the time, when this condition would occur (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR). Over the five-month recreational season, reservoir elevations would be, on average, below 412 ft msl in one month.

Table 5.10-9 of the Draft EIS/EIR (page 5-125) shows the simulated mean monthly water surface elevations in Folsom Reservoir under the Proposed Action (Alternative 2B), relative to the Base Condition, for the summer recreation period (May through September). Over the long-term, there would be no measurable or detectable change in water surface elevations, based on modeled simulations. In some months, of some years, a more substantial change in water surface elevation would occur, but these occurrences would be infrequent and even when the maximum decreases are noted for any of the summer months, the relative percent changes are small (i.e., approximately 1 percent, relative to the Base Condition).

Folsom Reservoir, not unlike other CVP/SWP reservoirs which serve multiple functions, is typically at its highest storage volume at the end of the flood operating season (e.g., April/May). From this point forward, and depending on the demands placed on the reservoir for consumptive water demands, downstream flow release/thermal management, and weather conditions, reservoir volumes can diminish rapidly.

The data in Table 5.10-9 illustrate this clearly. Long-term mean monthly water surface elevations in Folsom Reservoir decline from over 451 ft msl in May, to about 425 ft msl in September; a 25 ft vertical drop in elevation over the course of the summer recreation season. The same data trends are true for Alternatives 2A and 2C. Based on these hydrologic data, recreational activities, facilities, and use of the reservoir for both water-dependent and water-enhanced activities would not be significantly affected by any of the scenarios under the Proposed Action.

Simulated water surface elevations under Alternative 3 – Water Transfer Alternative and Alternative 1A – No Action Alternative are similar to those of Alternatives 2A, 2B and 2C (see Water Transfer Alternative and No Action Alternative, Technical Appendix I of the Draft EIS/EIR).

Accordingly, the potential impacts on boat launch availability, marina wet slips, and swimming activities at Folsom Reservoir under any of the Alternatives would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.9 WATER-RELATED CULTURAL RESOURCES (DIRECT EFFECTS STUDY AREA)

Section 4.9 of this FEIS addresses existing cultural resources within the regional and local study areas and presents the affected environment context upon which an analysis of potential diversion-related effects of the proposed new CVP water service contract on water-related cultural resources can be made.

A Class I survey of the area of potential effects was conducted in 2008. This survey consisted of a literature review and records search; no field reconnaissance was conducted for the action described in the Draft EIS/EIR. This Class I survey does not qualify as full compliance with the National Historic Preservation Act (NHPA) process for identifying cultural resources 36 CFR Part 800), but serves to aid in the initial stages of identification of cultural resources. As per NHPA provisions, no site locations are provided in the public version of the Draft EIS/EIR; however, the document has been prepared for and reviewed by Reclamation’s cultural resources staff.

4.9.1 Affected Environment/Setting

The following describes the affected environment/setting related to cultural resources in areas potentially affected by the proposed project and alternatives. This discussion addresses local environmental conditions that could be affected by a new diversion of water from the North Fork American River and Folsom Reservoir, as well as regional conditions that could be affected by way of hydrological changes that occur as a result of coordinated CVP/SWP operations.

4.9.1.1 Local Setting

4.9.1.1.1 Folsom Reservoir

Many studies have been carried out in and adjacent to the Folsom Reservoir basin, beginning with the Smithsonian Institution River Basin Surveys[139] and continuing into the 1990s.[140] These studies, and the sites recorded for them, are summarized in Scott, 1995, and Waechter and Mikesell, 1994. The consensus among these researchers was that the nature and extent of the

139 Drucker, 1948.

140 Waechter, S.A., Folsom Reservoir Reoperation Study, El Dorado, Placer, and Sacramento Counties, California: Cultural Resources Survey, 1992 and 1993.

effects on cultural resources from reservoir operation depended on several factors, most notably the location of a cultural property within the reservoir basin. Sites within the zone of seasonal fluctuation or drawdown suffered the greatest impacts, primarily in the form of erosion/scouring, deflation, hydrologic sorting, and artifact displacement, caused by waves and currents. Sites located lower in the reservoir, within the deep pool (including those adjacent to old river floodplains), were more likely to be covered with silt, which sometimes formed a protective cap. Sites at or near the high water line, and sites exposed during drawdown, suffered both erosion and vandalism. The various reservoir studies also indicated, however, that even sites that have been inundated for a few decades may still contain viable research data.[141]

There have nearly 200 sites recorded at the reservoir, and many more undoubtedly lie beneath the waterline. Among these are 126 prehistoric sites or components, some with remnant patches of midden.[162] Human burials are noted on a few of the early (1940s and 1950s) site records, but the present status of these burials is unknown. The 59 historic-period sites recorded at the reservoir are mostly related to Gold Rush-era mining, settlement, and transportation. Many of the sites show signs of adverse effects from wave action, inundation, and/or recreation use at the reservoir.[142] Any changes in water levels caused by increased or decreased diversions from the reservoir, or from points upstream, have the potential to impact many important or unevaluated cultural resources within the reservoir basin. It is also the case, however, that many of the cultural deposits in the upper part of the reservoir, where water-level fluctuation is greatest, have been scoured down to bare granitic sand. Conversely, sites below this zone have suffered much less from seasonal water-level fluctuations.

There are two kinds of potentially significant impacts/adverse effects on cultural resources from changes in water levels in Folsom Reservoir: increased cycles of inundation and drawdown, resulting in more erosion and scouring of sites, and more rapid breakdown of organic materials through more frequent wetting and drying; and exposure of previously inundated resources, subjecting these resources to increased weathering, vandalism, and other factors.[143] Under current operating conditions, the zone of greatest seasonal water-level fluctuation, and thus of greatest impact on cultural sites, is approximately 395-466 feet, where fluctuation events often

141 Waechter, S.A. and S.D. Mikesell, Research Design for Prehistoric, Ethnographic, and Historic Cultural Resources at Folsom Reservoir, California, 1994. 162 Waechter, S.A. and S.D. Mikesell, Research Design for Prehistoric, Ethnographic, and Historic Cultural Resources at Folsom Reservoir, California, 1994.

142 Waechter, S.A., Folsom Reservoir Reoperation Study, El Dorado, Placer, and Sacramento Counties, California: Cultural Resources Survey, 1992 and 1993; Waechter, S.A. and S.D. Mikesell, Research Design for Prehistoric, Ethnographic, and Historic Cultural Resources at Folsom Reservoir, California, 1994.

143 Waechter, S.A. and S.D. Mikesell, Research Design for Prehistoric, Ethnographic, and Historic Cultural Resources at Folsom Reservoir, California, 1994.

exceed one per year. What this means, among other things, is that cultural sites at or above 395 feet already have suffered serious impacts that have greatly compromised their integrity and destroyed much of their data potential. Large-scale surveys by Far Western[144] observed that many, though not all, of the cultural deposits within this zone have been scoured down to bare granitic sand.

4.9.1.1.2 Lower American River

A 1999 records search revealed 36 recorded sites (22 prehistoric, 13 historic, 1 multi-component) on the American River between Folsom Dam and the Sacramento River. Of the 22 prehistoric sites, 4 have been determined eligible for the National Register of Historic Places (NRHP), 3 are ineligible, and 15 are unevaluated. These sites include village mounds and village middens, small camps, bedrock mortar stations, and flaked stone scatters. Several ethnographic Maidu settlements were located along the river, especially on the north bank;[145] at least some of the recorded villages undoubtedly represent these settlements.

> Historic sites recorded on the American River consist of dredge tailings, segments of the Western and Transcontinental railroads, bridge abutments, a pump house, features associated with the Folsom hydroelectric power system (CA-SAC-429H), stone foundations, a cemetery (CA-SAC-192/H), and segments of the historic levee system (LAR-16, LAR-18). Segment LAR-16 has been recommended as eligible to the NRHP; segment LAR-18 remains unevaluated (Nilsson, et al., 1995). In general, the lower American River is considered highly sensitive for archaeological and historical resources, especially historic mining remains.

4.9.1.2 Regional Setting

4.9.1.2.1 Shasta Reservoir

Archaeological records indicate that Native Americans used the forests and waters in the Shasta area for at least 7,000 years prior to European occupation. The Pit River and Wintu Indians were the predominant groups inhabiting the area around Shasta and Keswick reservoirs. Numerous prehistoric sites are known within the drawdown zone of Shasta Reservoir. Small camps in particular are known to exist within this zone, and with fluctuating water levels and the lack of vegetation, they are periodically exposed to wave and wind action that deteriorates the sites. Looting of exposed sites is also a problem in this area.[146]

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144 Waechter, S.A., Folsom Reservoir Reoperation Study, El Dorado, Placer, and Sacramento Counties, California: Cultural Resources Survey, 1992, and 1993. . . . .

145 Wilson, N. and A. Towne, “Nisenan,” in Handbook of North American Indians, Volume 8: California, edited by R.F. Heizer, 1978, p. 387-397.

146 M. Arnold, U.S. Forest Service, personal communication, 1994. 168 U.S. Bureau of Reclamation 1991.

In 1991, Reclamation consulted with the State Historic Preservation Officer regarding historical archaeological sites potentially affected by the Shasta Outflow Temperature Control Project.168 It was determined that the dam itself, constructed in 1938, is eligible for inclusion in the National Register of Historic Places because of its historical and engineering significance.

4.9.1.2.2 Trinity Reservoir

Prior to the construction of Trinity Dam, the valley below Trinity Reservoir was inhabited by the Upper Trinity Wintu Indians. Prehistoric evidence dates back 2,000 to 3,000 years, although the area was probably inhabited even before that. Archaeological surveys during the 1950s documented very large village sites that are believed to have been inhabited year-round. These sites were destroyed when the valley was flooded after construction of the dam. As at Shasta Reservoir, many known prehistoric sites at Trinity Reservoir are subject to ongoing damage as a result of fluctuating water levels, which exposes them to wind and wave action, and consequently, looting.[147]

Extensive gold mining and logging took place in the Trinity Reservoir area during the historic period. The valley inundated by the construction of Lewiston Dam contains several large homestead areas and two, or possibly three, historic communities (M. Arnold, U.S. Forest Service, pers. comm. 1994).

4.9.1.2.3 Sacramento River

The Sacramento River region is rich in historic and prehistoric resources. Considerable archaeological research has been conducted in the area, including early work that defined central California’s prehistory. Of particular importance are the region’s large, deep midden sites, which provide information on prehistoric culture extending over thousands of years. Historic archaeological sites and architectural resources are plentiful because this area was settled early in California’s history. As in other parts of the Central Valley, resources related to agricultural development are prevalent.

4.9.1.2.4 Lower Sacramento River

At least 31 cultural resources studies have been conducted for the lower segment of the Sacramento River, and a minimum of 27 sites and 42 historic structures have been recorded. Three of the prehistoric sites, all burial mounds, are considered eligible for the National Register of Historic Places (NRHP): CA-SAC-16, CA-SAC-43, and CA-SAC-164. Burials were noted at two other prehistoric mound sites, but their status is unknown at this time. A 1990 survey of prehistoric site CA-SAC-268, originally recorded by Riddell in 1960, revealed no cultural material, and no further work was recommended.[148] The remaining 17 prehistoric sites, recorded in the 1930s and

147 M. Arnold, U.S. Forest Service, personal communication, 1994.

148 Bouey, P.D., Intensive Cultural Resources Survey and National Register Evaluation: Sacramento

1950s, were not relocated during more recent surveys/augering, and are believed to have been destroyed during levee construction.

The Natomas Main Drainage Canal (CA-SAC-430H) meets the Sacramento River on its northern bank, roughly 3/4 mile west of its confluence with the American River. This historic feature has not been evaluated. Two segments of the levee system at the confluence have been recorded as historical features (LAR-16 and LAR-18); the first has been determined eligible and the other is unevaluated.[149] In addition to these features, the tiny river town of Freeport, founded in the 1860s as an early tidewater railroad terminal,[150] has the potential to be determined an important historical resource.

Other eligible or potentially eligible historic resources along the lower Sacramento include a rural historic landscape district,[151] Washington Water Company Water Tower, Sacramento Weir and Yolo Bypass, St. Joseph's Church and Rectory, Leonidas Taylor Monument, and 37 houses built between 1855 and 1900. Fifteen of these houses are part of the historic Lisbon District (YOL-HRI-9/287-301), a community settled by Portuguese immigrants during the 1850s. This district, which is characterized by early pioneer-style houses, became the largest Portuguese community in the area by 1900.[152] Of the 37 houses along this stretch of the river that are listed in the Historic Property Data File for Yolo County,[153] only one (John White House) was not recommended for the National

Register; the other 36 are listed as "appears eligible" or "may become eligible," either as separate properties or as contributors to a National Register district. All of these properties are on South River Road, adjacent to the river, but the distance of each from the riverbank cannot be determined at this time. It is safe to assume that they are located outside the river levees. The banks of the lower Sacramento River are considered highly sensitive for archaeological and historical resources.

4.9.2 Regulatory Framework

Cultural resources, also termed "historical resources" or "historic properties," consist of remains and sites associated with past human activities. These include prehistoric and protohistoric Native American archaeological sites, historic archaeological sites, and historic sites, buildings, structures, or objects. Another category of cultural resources includes traditional cultural

Urban Area Flood Control Project, 1990.

149 Nilsson et al., 1995.

150 Thompson, J., The Settlement Geography of the Sacramento-San Joaquin Delta, California, 1957.

151 Reclamation District-1000.

152 K. Les, 1986.

153 State Historic Preservation Officer [SHPO].

properties. These are areas that have been, and often continue to be, of economic and/or religious significance to peoples today. Traditional cultural properties may include Native American sacred areas where religious ceremonies are practiced, or landscapes, which are central to their origins or history as a people. Some historical resource sites may also be of cultural significance to contemporary Native Americans or other ethnic groups because they contain objects or elements important to their cultural heritage.

Significant historical resources and traditional cultural properties are afforded protection under existing federal, State and local laws. These laws and regulations were designed to protect significant cultural resources that may be affected by actions that they undertake or regulate. The National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA) are the basic federal and State laws governing preservation of historic and archaeological resources of national, regional, State and local significance. As previously noted, a Final EIR on PL 101-514 was completed and certified in 2011, thus fulfilling EDCWA's CEQA obligation for environmental review and with state law pertaining to the protection of cultural resources. This Final EIS, therefore, focuses on compliance with federal law pertaining to those resources.

4.9.2.1 Federal Laws

Federal laws for cultural resources are governed primarily by Section 106 of the NHPA of 1966 (amended 2006). The Code of Federal Regulations (CFR) includes specific information on the protection of historic resources. A historic property is defined to mean any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria. The term eligible for inclusion in the National Register includes both properties formally determined as such in accordance with regulations of the Secretary of the Interior and all other properties that meet the National Register criteria (36 CFR 800.16).

Section 106 of NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and affords the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The Council's implementing regulations, "Protection of Historic Properties" are contained in 36 CFR Part 800. The goal of the Section 106 review process is to offer a measure of protection to sites which are determined eligible for listing on the National Register of Historic Places. National Register criteria define an important cultural resource as one that is associated with important persons or events, or that embodies high artistic or architectural values, or that has scientific value (36 CFR 60.4). Amendments to the Act (1986 and 1992) and subsequent revisions to the implementing regulations have, among other things, strengthened the provisions for Native American consultation and participation in the Section 106 review process. For the proposed new CVP water service contracts, compliance with the NHPA will occur through Reclamation's coordination with the Advisory Council on Historic Preservation.

4.9.3 Impacts and Mitigation Measures

4.9.3.1 Impact Analysis Methodology

This section of the Final EIS analyzes the potential effects of the proposed new CVP water service contract on water-related cultural resources. As presented in the Draft EIS/EIR, hydrologic modeling results from CALSIM II were used to determine whether the magnitude and frequency of changes in reservoir water surface elevations or river flows would adversely affect known or potential historical resources, or unique archaeological resources. The standards of impact significance, therefore, included the following:

- result in substantial elevation or lowering water level fluctuation zone, relative to the basis of comparison, which would result in increased inundation of previously exposed areas or exposure of previously inundated lands with sufficient frequency to adversely affect historic properties; or
- result in substantial increase in maximum monthly mean river flows or decrease in minimum monthly mean river flows, relative to the basis of comparison, which would result in increased inundation of previously exposed areas or exposure of previously inundated lands with sufficient frequency to adversely affect historic properties.

Fluctuations in surface water levels are considered an existing, and accepted, hydrological operation of reservoirs and river flows that could be affected by implementation of the new CVP water service contracts. A stage/discharge relationship, however, has not yet been developed for the entire reach of the lower American River as well as other rivers. For this reason, it is difficult to quantify precisely the potential for exposure or inundation of cultural resources along the banks of rivers. It is generally accepted that higher water surface elevations occur under higher flows and lower water elevations occur under lower flows. A comparison of flows under the current conditions and each of the Alternatives provides an estimate of the relative changes in river stage that could result. River flows, therefore, are used as surrogates for river stage (water surface elevations).

4.9-1 Effects of changes in water surface elevations in Folsom, Shasta, and Trinity reservoirs on cultural resources.

Prehistoric and historic sites within the zone of seasonal fluctuation or drawdown in reservoirs suffer the greatest affects under existing conditions, primarily in the form of erosion/scouring, deflation, hydrologic sorting, and artifact displacement, caused by waves and currents. Looting is also a problem. Studies at Folsom Reservoir have shown there are generally two kinds of potentially significant impacts/adverse effects on cultural resources that can occur from changes in water levels: increased cycles of inundation and drawdown, resulting in more erosion and scouring of sites, and more rapid breakdown of organic materials through more frequent wetting and drying; and exposure of previously inundated resources, subjecting these resources to increased weathering, vandalism, and other factors.

Folsom, Shasta, and Trinity reservoirs have water levels that fluctuate frequently on an annual basis. Tables 5.11-1 through 5.11-3 of the Draft EIS/EIR (see pages 5-128 and 5-129) show the mean monthly simulated water surface elevations for Folsom, Shasta, and Trinity reservoirs under The Proposed Action (Alternative 2B), relative to the Base Condition over the entire 72-year period of hydrologic simulation record.

The modeling results indicate that maximum mean monthly water surface elevations for any month over the 72-year simulation period would not change, relative to the Base Condition. Of the three reservoirs, Folsom Reservoir shows the largest inter-annual variation in maximum and minimum changes in water surface elevation, relative to the Base Condition. These changes, however, would not change by more than 5 feet (the maximum annual changes in Shasta and Trinity reservoirs are smaller). Such changes, at any of the reservoirs, are infrequent as confirmed by the 72-year modeling spread (see Proposed Action – Scenario B, Technical Appendix I of the Draft EIS/EIR).

For Folsom Reservoir, each of the mean monthly average water surface elevations under both the Base Condition and The Proposed Action (Alternative 2B), are well within the 395 to 466 ft msl zone of historic maximum fluctuation as discussed earlier. Cultural sites at or above 395 ft msl already have suffered serious impacts that have greatly compromised their integrity and destroyed much of their data potential. These modeling results confirm that, long-term changes in water surface elevation, which could contribute to increased inundation or desiccation of cultural sites, would not occur at Folsom Reservoir; unchanging mean monthly water surface elevations are indicative of uniform operating conditions within those specific months. No additional increment of impact would result from the diversions contemplated under The Proposed Action (Alternative 2B).

CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative revealed similar inconsequential changes in mean monthly simulated water surface elevations at all three reservoirs (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR). Changes in water surface elevation under any of Alternatives 4A, 4B or 4C would be less than those of Alternative 2B.

Thus, there would be no increase in exposure or inundation of cultural resources within the drawdown zone, relative to the existing condition. Consequently, impacts on cultural resources at Folsom, Shasta, or Trinity reservoirs resulting from changes in maximum and minimum water levels would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for any of the Proposed Action – Scenarios or Alternatives.

4.9-2 Effects of changes in flows in the Sacramento River and Delta on cultural resources.

CALSIM II modeling confirmed the insignificant changes in mean monthly flows under The Proposed Action (Alternative 2B), relative to the Base Condition over the 72-year simulation period (see Tables 5.11-4 and 5.11-5 of the Draft EIS//EIR, pages 5-131 and 5-132). While some individual inter-annual fluctuations for specific months are large, these are infrequent occurrences as indicated by the virtually unchanging long-term mean monthly flows. Sacramento River flows in either the upper or lower reaches are substantive, given that this river represents the main northern California mainstem tributary to the Delta. Flows, by the time they reach Freeport are commonly in the 10,000 cfs range.

Unlike reservoirs, river channel flows are constrained within well-defined channels. Their area of effect is much more limited than reservoirs, whose surface area is much more prone to changes in water elevation due to the more sloping bathymetry, relative to rivers. Changes in river flows, therefore, would have a much more limited effect on either inundating (through water elevation rise) or desiccating (through water level decline) cultural resource sites along the channel embankments.

More importantly, it is well known that over the 72-year hydrologic period of record, there have been episodes of extremely high flows within the Sacramento River and Delta. The mean monthly flow at Freeport in February 1986 for example, was over 78,000 cfs. At flows eight times higher than the long-term average for the month of February, any cultural resource sites along the channel would have historically been inundated through substantial river stage increases. Alternatively, in critically dry-years such as 1977 and 1991, mid-winter mean monthly flows in the Sacramento River at Freeport were less than 8,000 cfs. Cultural resources sites along the channel during these times would have been at risk to exposure and the adverse effects of desiccation. While the Delta represents a much more dynamic water system and, to be sure, receives inflows from a number of additional tributaries, the data results from the Sacramento River at Freeport are noteworthy and applicable. For the Sacramento River side, flows at Freeport represent a good indicator of northern Delta inflows. The 72-year hydrologic record would impart similar effects on the Delta during these same corresponding periods of extreme wet-years and critically dry-years.

CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative revealed similar inconsequential changes in mean monthly simulated flows in the upper and lower Sacramento River (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR). Changes in river flows under any of Alternatives 4A, 4B or 4C would be less than those of Alternative 2B.

Based on these modeling results and the discussions herein, there would be no anticipated increase in exposure or inundation of cultural resources resulting from changing river flows, relative to the Base Condition. Consequently, impacts on cultural resources within the channel confines of the upper and lower Sacramento River, including the Delta that could result from changes in maximum and minimum water levels would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for any of the Proposed Action – Scenarios or Alternatives.

4.9-3 Effects of changes in flows in the lower American River on cultural resources.

For the lower American River, the maximum and minimum monthly mean flows over the 72-year simulation were compared between the existing condition and each of the alternatives. In order to estimate the magnitude and frequency of bank exposure and bank inundation along the lower American River, two locations were assessed: Nimbus Dam and the river mouth (confluence with the Sacramento River).

As noted previously, a comparison of flows under the existing condition and each of the Alternatives provided an estimate of the relative changes in river stage that could result because of the new CVP water service contracts; river flows, therefore, were used as surrogates for river stage (water surface elevations). Table 5.11-6 of the DEIR/EIS (see page 5-134) shows the simulated mean monthly flows in the lower American River below Nimbus Dam under the Proposed Action (Alternative 2B), relative to the Base Condition over the entire 72-year hydrologic period of record.

No significant sites are expected to have survived within the riverbed itself near Nimbus Dam because of the major impacts at this location from dam construction. Accordingly, lower flows would not expose previously submerged (and intact) cultural resources. It is possible that historic-era (post-1869) shipwrecks lie beneath the silty river bottom near the mouth, and that very low river flows could expose these resources; several nineteenth- and early twentieth-century shipwrecks have been documented immediately to the south in the Sacramento River channel (California State Lands Commission 1988). At least one wreck is documented in the lower

American River: the *Pearl*, January 27, 1885.[154] However, the magnitude of the changes predicted is so small that this is highly unlikely. Also, known resources along the riverbank (two historic levees, a portion of the Natomas East Main Drainage Canal and prehistoric mound CA-SAC-26) lie outside the present river channel, and decreases in river flows would have no impact on these resources. Therefore, lower flows are not a concern with regard to cultural resources.

Higher flows, using the same rationale previously described, would also be applicable for the lower American River. Again, using February 1986 as an example, mean monthly flow during that period was over 30,000 cfs below Nimbus Dam. The daily or hourly instantaneous peaks within that month, however, were significantly higher (approaching 115,000 cfs; the channel design capacity). At these extreme flows, any cultural resources along the river channel that would have normally been above the mean water surface elevation would have been at a severe risk of inundation. Other wet years (such as 1980, 1982, and 1983) also produced high flows, well above the mean monthly averages.

CALSIM II modeling results for Alternatives 2A and 2C – Proposed Action – Scenarios A and C, along with Alternative 3 – Water Transfer Alternative, and Alternative 1A – No Action Alternative revealed similar inconsequential changes in mean monthly simulated flows in the lower American River (see Proposed Action – Scenarios A and C, Water Transfer Alternative, and No Action Alternative, Technical Appendix I of the Draft EIS/EIR). Anticipated changes in lower American River flows under any of Alternatives 4A, 4B or 4C, with markedly reduced diversions, would be less than those of Alternative 2B.

Based on these modeling results and the discussions herein, there would be no anticipated increase in exposure or inundation of cultural resources within the riverine drawdown zone in the lower American River, relative to the Base Condition. Consequently, impacts on cultural resources within the channel confines of the lower American River that could result from changes in maximum and minimum water levels would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for any of the Proposed Action – Scenarios or Alternative.

4.10 INDIRECT IMPACTS – SUBCONTRACTOR SERVICE AREAS

4.10.1 Introduction

Section 4.10 of this Final EIS addresses the indirect effects of the Proposed Action and Alternatives that would occur within the subcontractor service areas as a result of water made available to those areas through execution of the P.L. 101-514 or the proposed alternatives.

154 http://www.martimeheritage.org/ships/wrecks.html

Specifically, this section addresses the physical changes to the environment that may occur, primarily within the EID and GDPUD service areas, when new water supplies are made available to those providers. Such changes would occur as a result of future development within the EID and GDPUD service areas made possible by improved water availability relative to the No Action Alternative.

The 2009 P.L. 101-514 Draft EIS/EIR addressed indirect study area effects in Sections 4.10 through 4.18 (Affected Environment) and Sections 5.12 through 5.20 (Environmental Consequences). As noted previously, the Draft EIS/EIR, in its entirety, is incorporated by reference in this Final EIS. Section 4.10 of this Final EIS summarizes the affected environment and environmental consequences discussions presented in Chapters 4 and 5 of the Draft EIS/EIR and includes text revisions made in response to public comments on the Draft EIS/EIR and pertinent informational updates made at the NEPA Lead Agency's discretion.

Environmental issue areas addressed below include: Land Use; Transportation; Air Quality; Noise; Geology, Soils, Mineral, and Paleontological Resources; Recreation; Visual Resources; Cultural Resources; and Terrestrial and Wildlife Resources. The project effects addressed in this section are distinct from those evaluated in Sections 4.2 through 4.9, above, which address the *direct* impacts of water diversions under the Proposed Action and alternatives.

It is important to reiterate that the 2009 Draft EIS/EIR for P.L. 101-514 was a joint NEPA/CEQA document, and as such, presented information and analysis to fully comply with both NEPA and CEQA requirements for environmental review. A Final EIR was completed and certified by EDCWA in January of 2011 after the conclusion of the Draft EIS/EIR public review period. With certification of the Final EIR, EDCWA's obligation under CEQA was fully met. This Final EIS, therefore, is intended as a NEPA-only document. As such, the focus and structure of this document is somewhat different from that of the 2011 Final EIR. Whereas CEQA requires an EIR to evaluate project impacts relative to the environmental conditions as they exist at the start of the environmental review process, NEPA requires the EIS to evaluate the impact of the project relative to future conditions likely to occur in the absence of the project. These future conditions are typically reflected in the No Action Alternative.

The Draft EIS/EIR evaluated the impacts of the Proposed Action in relation to both the No Project (CEQA) and the No Action (NEPA) alternatives. For the purposes of this Final EIS, the potential indirect impacts of the Proposed Action and alternatives are evaluated relative to the No Action Alternative, exclusively. Given that the No Action Alternative assumes that an alternative water supply of up to 15,000 AFA would be acquired by EDCWA in the event the Proposed Action is not approved, water available to serve growth and development within the EID and GDPUD service areas under the No Action Alternative would be indistinguishable from that provided under the Proposed Action.

As noted previously, no new diversion facilities or improvements to existing water infrastructure are proposed as part of the Proposed Action or alternatives. To the extent that construction of certain facilities is required to fully implement the P.L.101-514 contract, appropriate project-level environmental documentation would be prepared by agencies responsible for that construction at such time in the future when those decisions would be made. Any construction-related impacts and site-specific facility impacts would be the responsibility of those agencies proposing such future projects. Accordingly, in the Draft EIS/EIR and this Final EIS, the impact of future facilities construction are discussed in limited detail and, only where relevant.

Impacts related to future construction and development in areas served by new water supplies are addressed below. The Draft EIS/EIR and this Final EIS do not attempt to re-examine the precise impacts of growth on the environment anticipated to occur as a result of future development. This is because the physical environmental effects of urban development have already been appropriately evaluated in the El Dorado County General Plan and accompanying EIR. EID and GDPUD, the recipients of water under this action, do not have the power to make land use planning decisions because they are an irrigation district and a public utility district, respectively, whose powers are limited to doing "any act necessary *to furnish* sufficient water." Water Code § 22075; see Public Utilities Code §§ 16407, 16461. The law bars EID and GDPUD from seeking to restrict population growth and development by refusing to augment its water supply. Only a county or city government vested with land use planning power may control growth and development. Inherent in EID's and GDPUD's objectives is the goal of ensuring that sufficient water is available to meet the demand resulting from the land use planning decisions made by El Dorado County. EID and GDPUD's mission statements recognize their responsibility to meeting the needs of existing ratepayers and its obligation to accommodate additional customers contemplated under the County General Plan.

4.10.2 Land Use (Indirect Effects: Subcontractor Service Areas)

Section 4.10.2 of this Final EIS addresses the potential indirect, service-area-related impacts on existing land use that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes and supplements information and analysis presented in sections 4.10 (Affected Environment: Land Use) and 4.12 (Land Use Environmental Consequences) of the Draft EIS/EIR.

4.10.2.1 Affected Environment

Section 4.10 of the Draft EIS/EIR presents an overview of the population and primary communities of El Dorado County. As noted in the Draft EIS/EIR, two of the most rapidly growing areas are El Dorado Hills and Cameron Park, along the western slopes of the county. With its proximity to Folsom Reservoir, EID's intended use of this water made available under the Proposed Action would likely occur in the El Dorado Hills and Bass Lake Tank's service area (in the western portion

Cameron Park). Similarly, for GDPUD, its allocation would likely be used within the western portion of its service area in the vicinity of Cool, Pilot Hill, Auburn Lakes Trail, and Greenwood.

The following describes existing and planned land use in those Subcontractor service areas where this new water allocation would be used.

4.10.2.2 General Land Use Designations

Historically, growth in El Dorado County resulted in compact development patterns. Communities such as Cool, Georgetown, Mt. Aukum, and Placerville were small, mixed-use communities where residents lived, worked, and shopped. Recently, urban-like development has continued in the foothills; large lot, low-density residential development, while urban in character, has maintained the feeling of a rural lifestyle throughout the County and has slowly transformed traditional rural areas into areas characterized with dispersed residential uses.

In general, the land use pattern in El Dorado County concentrates urban uses in the vicinity of U.S. Highway 50 in the portion of the county west of the City of Placerville. Rural residential and agricultural uses are located throughout the non-urbanized western portion of the County.

Since the Proposed Action consists of an M&I contract, which cannot be served to agricultural land, only areas with a designation consistent with those that can receive M&I water are included in the proposed Subcontractor service areas. The only land use designations within the proposed Subcontractor service areas are low-, medium- and high-density residential,[155] commercial, industrial, and public services (e.g., firehouses, schools).

4.10.2.2.1 Specific Approved/Planned Land Uses in EID Proposed Subcontractor Service Area

Section 4.10 of the Draft EIS/EIR presents an overview of approved and planned development projects in the EID Service Area as known at the time of Draft EIR/EIS circulation. At that time, El Dorado County had approved and construction had begun on six specific plans including: Serrano El Dorado Hills; the Promontory Specific Plan; the Carson Creek Specific Plan; the Valley View Specific Plan; Bass Lake Hills; and the Northwest El Dorado Hills Specific Plan. In addition, the Draft EIS/EIR stated that approximately 1,500 single-family lots in the Cameron Park/Shingle

155 It should be noted that El Dorado County has different definitions for the low-, medium- and high-density residential land use designations than those used in most areas. According to the El Dorado County 2004 General Plan, high-density residential areas are suitable for one to five dwelling units per acre, the medium-density residential designation permits one dwelling unit per 1- to 5-acre parcel, and low-density residential designation allows one dwelling unit per 5- to 10-acre parcel. The rural residential designation allows a density of one dwelling unit per 10 to 160 acres. 177 Government Code Section 65560(b).

Springs area were are expected to be built out in the 2000 to 2010 timeframe, along with a planned 80-unit multi-family apartment complex (Cameron Park Village).

Since circulation of the Draft EIS/EIR, El Dorado County has prepared the El Dorado County Targeted General Plan Amendment/Zoning Ordinance Update (TGPA/ZOU) Draft Program EIR, which proposed targeted amendments to the General Plan policies and land use designations and a comprehensive update to the Zoning Ordinance to ensure that the County's zoning regulations are consistent with the General Plan.[156] This EIR was partially recirculated in January 2015 to revise sections in response to comments and cover additions to the proposed project consisting of proposed adoption of Community Design Standards and limited additions to the ZOU. The document was subsequently adopted December 2015. The TGPA/ZOU EIR identifies three additional approved and planned development projects in the EID service area including Promontory Specific Plan, El Dorado Hills Specific Plan, and the Meyers Community Plan[157]. Furthermore, according to the El Dorado County Long Range Planning website, there are three other additional proposed specific plans not described in the TGPA/ZOU EIR and include the Central El Dorado Hills, Lime Rock Valley, and Village of Marble Valley Specific Plans; all of which are located within the EID service area[158].

Proposed changes regarding the TGPA relevant to Land Use within the TGPA/ZOU EIR include the addition of several policies amending land use designations to encourage infill development, increase the maximum allowable density for distinct land uses, amending policies for connection to public water and wastewater systems, and revising the policy prohibiting hillside development on 30 percent or greater slopes to allow development where it does not preclude use of the property. Furthermore, the TGPA proposes redefining the Camino-Pollock Pines Community Region with the proposal to divide the existing community region into three separate Rural Communities and expand the boundaries of the Garden Valley-Georgetown, Coloma, Camino-Fruitridge, Gold Hill, Oak Hill, Pleasant Valley, and Fair Play-Somerset Agricultural Districts. The purpose of these changes is to allow development to occur in a manner that reflects the distinct character of each of these regions. The policies as described in the TGPA/ZOU EIR are shown below:

156 El Dorado County Community Development Agency, Long Range Planning, El Dorado County Targeted General Plan Amendment/Zoning Ordinance Update (TGPA/ZOU) Draft Program Environmental Impact Report (SCH # 2012052074), March 2014, pp. 3.6-1-3.6.3

157 El Dorado County Community Development Agency, Long Range Planning, El Dorado County TGPA/ZOU Partial Recirculated Draft Program EIR, January 2015

158 El Dorado County, Long Range Planning (LRP) Proposed Specific Plans. http://www.edcgov.us/LongRangePlanning/ProposedSpecificPlans/Proposed_Specific_Plans.aspx. Accessed April 2016.

Policy 2.1.1.3: Commercial/Mixed Use (in Community Regions). This would increase the maximum density for the residential portion of mixed use projects in Community Regions from 16 dwelling units per acre to 20 dwelling units per acre to be consistent with 2009 amendments to State planning law (Government Code Section 65583.2(c)(B)(3)). The maximum residential density of 20 dwelling units per acre may only be achieved where adequate infrastructure, such as water, sewer and roadway are available or can be provided concurrent with development.

Policy 2.1.2.5: Commercial/Mixed Use (in Rural Centers). Increase the maximum density for the residential portion of mixed use projects in Rural Centers from 4 dwelling units per acre to 10 dwelling units per acre.

Policy 2.2.1.2: Multifamily Residential (MFR). The minimum allowable density for the MFR designation in the current General Plan is 5 dwelling units per acre, with a maximum density of up to 24 dwelling units. The project would increase the designation's minimum density to 8 units per acre with an optional review. The project would amend the MFR designation to encourage a full range of housing types including small lot, single-family detached design without a requirement for a planned development. The project would specify that mixed use development within Community Regions and Rural Centers which combine commercial and residential uses shall be permitted under the MFR designation.

Policies 2.2.3.1 and 2.2.4.1: Open Space. Amend the 30 percent open space requirement for Planned Development to exempt certain types of residential development from that requirement and to allow high density residential planned developments to provide for half of the 30 percent open space requirement to be in private yards.

Policy 2.4.1.5: Infill Development. A proposed new policy encouraging infill development on sites of up to 5 acres in size in existing communities where, among other limitations, the site does not have habitat value for endangered, rare, or threatened species. Infill would be required to be consistent with the General Plan and zoning provisions applicable to the given site. Because of the rural nature of the county, infill development of this size may have the potential to adversely affect biological resources when the project site adjoins existing development or the site itself supports biological resources.

Policy 5.2.1.3 would be revised such that medium-density residential, high-density residential, multifamily residential, commercial, industrial and research and development projects may be required to connect to public water systems if reasonably available when located within Community Regions and to either a public water system or to an approved private water system in Rural Centers. The current policy requires *such development to be connected to public water systems in Community Regions.*

Policy 5.3.1.1 would be revised such to state that high-density and multifamily residential, commercial, and industrial projects may be required to connect to public wastewater collection facilities if reasonably available as a condition of approval. The current policy requires such development to be connected to public collection facilities.

Policy 7.1.2.1 amends the current prohibition of development (except where the prohibition would deny reasonable use of the property) on slopes over 30 percent to a restriction on development of slopes over 30 percent. The standards under which slopes could be developed are set out in proposed Section 17.30.060 (Hillside Development Standards) of the ZOU described below.

The purpose of the proposed changes in the ZOU as described in the TGPA/ZOU EIR are to make the zoning classifications on each property consistent with the property's General Plan designation. Below are the revised Chapters/Sections of the Zoning Ordinance that have been updated as described in the TGPA/ZOU EIR:

Section 17.30.060 (Hillside Development Standards) establishes standards regulating development on portions of existing lots where the natural gradient (i.e., slope) exceeds 30 percent.

Development could proceed with an erosion and sediment control plan in place. Development would be prohibited on sites where the slope has a vertical height of 50 feet or more and exceeds 30 percent, except "where reasonable use of an existing lot or parcel would otherwise be denied." In those cases, stricter development standards would apply.

Chapter 17.21 (Agricultural, Rural Lands and Resource Zones) would expand the allowable uses in these zones (relative to allowable uses in the current agricultural and timberland zones) to include activities intended to support agriculture by allowing compatible uses such as agricultural homestays (Section 17.040.170), Health Resort and Retreat Centers (Section 17.040.170), Agricultural and Timber Resource Lodging (Section 17.040.170), and Ranch Marketing (Section 17.040.260) that can include outdoor entertainment and concerts on parcels of 10 acres or larger. The matrix in Section 17.21.020 also would allow a number of intensive land uses in these zones: Industrial, General in the FR and TPZ zones by conditional use permit (CUP); Off-Highway Vehicle Recreation Area in the FR and TPZ zones by CUP; Ski Area by CUP in the RL, FR, and TPZ zones; and Public Utility Services Facilities, Intensive in the PA, AG, RL, FR, and TPZ zones by CUP.

Chapter 17.24 (Residential Zones) would expand the list of uses potentially allowed in the current zoning ordinance upon approval of a CUP to include Public Utility Services Facilities, Intensive.

Chapter 17.25 (Recreational Facilities) would expand the types of uses currently allowed in the recreational facilities zone to include: Ski Area by CUP; Large Amusement Complex in RFH zone by CUP; outdoor entertainment by CUP in the RFL and administrative permit in the RFH zones; and a Hotel/Motel in the RFH zone by CUP. The RFL zone would be consistent with all General Plan residential designations, as well as Open Space and Tourist Recreational. The RFH zone would be consistent with the General Plan multi-family and high-density residential designations, as well as Open Space (within a Community Region) and Tourist Recreational designations.

4.10.2.3 Environmental Consequences

This section addresses potential indirect, service area-related impacts on the existing land uses that could result from the implementation of the Proposed Action and alternatives relative to the No Action Alternative.

The Proposed Action, as defined, does not include construction of any new facilities, and thus there are no direct land use impacts resulting from the action. Any facilities such as specific diversion intakes, pipelines, storage facilities, pumping plants, and water treatment plants, to the extent they are needed in the future will exist as separate and independent projects from this action. Land use impacts from the construction and operation of any future facilities will be examined at a project-specific level in later, more detailed environmental documentation.

The Proposed Action and alternatives would have the following indirect effects on land use within the Subcontractor service areas:

4.10.2-1 Result in land uses that are incompatible with existing land use practices or land use policies.

4.10.2.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Under the Proposed Action and each alternative addressed in this EIS, the use of water made available to serve existing and future municipal and industrial uses would be restricted to deliveries within the proposed Subcontractor service areas. Since these areas are already zoned for residential, commercial, and industrial uses, the delivery of M&I water in these areas would not necessitate any changes to current land-use zoning. Moreover, the new water supplies would be used only to supply areas where residential growth is already anticipated under the current General Plan, as amended by the TGPA/ZOU. In and of itself, the proposed new CVP water service contracts, regardless of allocation and total quantities, will not affect current land uses. All future growth within these areas would occur in a planned manner, consistent with General Plan zoning and in full consideration of land use impacts already evaluated as part of the 2004 General

Plan Update, 2015 TGPA/ZOU and associated EIR processes. For these reasons, the Proposed Action and Alternatives would have no impact on existing or planned land uses.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.2-2 Result in alteration of the region's planned capacity to accommodate projected future population growth.

4.10.2.5 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

To ensure that projected housing needs can be accommodated, the County must maintain an adequate supply of suitable sites that are properly located based on environmental constraints, community facilities, and adequate public services. The 2004 General Plan and the 2015 TGPA/ZOU provide important requisites for planned growth with the County. The Proposed Action and alternatives (including the No Action Alternative) would accommodate part of the long-term water needs of the County. Based on the El Dorado County Water Agency's 2014 West Slope Update Water Resources Development and Management Plan, even without the P.L.101-514 CVP water service contracts, the County will require approximately an additional 34,000 AFA to meet its ultimate projected water supply needs by 2025 and over 100,000 AFA by buildout. The Proposed Action and alternatives would not affect the region's planned capacity. The Proposed Action and Alternatives, therefore would have no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.2-3 Result in a physical change to the environment from changes in employment patterns.

4.10.2.6 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Providing a water supply, regardless of source, location, or quantity, has no causal effect on employment patterns. Employment patterns are dictated by commercial, industrial, administrative and agrarian opportunities within the context of a stable and growing economic framework. Employment is further prompted by the intricate relationship between housing availability, transportation efficiency, reliable and cost effective public services, and a readily qualified employee base. A new reliable water supply, as a public service, is an important element in developing overall community structure, but it cannot influence or be affected by employment patterns. For this reason, the Proposed Action and Alternatives would not cause any changes to the physical environment due changes in employment patterns and, therefore, would have no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.2-4 Result in substantial conversion of agricultural lands to non-agricultural uses.

4.10.2.7 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

As previously stated, water from the proposed CVP M&I water service contract would be delivered to the proposed Subcontractor service areas consistent with existing zoning entitlements for residential, commercial, and industrial land uses only. Under the No Action Alternative and Alternative 3, a like amount of water would be made available, through other sources, to serve the same uses. While each diversion scenario under Alternative 4 assumes reduced diversions of CVP water relative to the Proposed Action, it is assumed that future development under the County's General Plan and TGPA/ZOU would be allowed to proceed through the acquisition of alternative water supplies. Therefore, the No Action Alternative would have no impact on the future conversion of agricultural resources that are not currently allowed under the County General Plan and TGPA/ZOU. Because water provided by the Proposed Action and alternatives to serve future M&I uses within the project service areas would be identical to that of the No Action Alternative, the Proposed Action and alternatives would have no impact on agricultural land conversions relative to the No Action Alternative.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives

4.10.3 Transportation and Circulation (Service Area Indirect Impacts)

Subsection 4.10.3 of this Final EIS addresses the potential indirect, service-area-related impacts on transportation and circulation that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This subsection summarizes and supplements information and analysis presented in sections 4.11 (Affected Environment: Transportation and Circulation) and 5.13 (Environmental Consequences: Transportation and Circulation) of the Draft EIS/EIR.

4.10.3.1 Affected Environment

Section 4.11 of the Draft EIS/EIR presents an overview of the affected environment relative to traffic and transportation within the EID and GDPUD Subcontractor service areas. As noted in the Draft EIS/EIR, the primary roadways serving the EID and GDPUD service areas are U.S. Highway

50, State Route 49, and State Route 193. U.S. Highway 50 serves east-west traffic through El Dorado County and is the main east-west transportation facility in the county. State Route 49 runs north-south through El Dorado County at the northern boundary of the county, near Auburn, to the southern boundary of the county, north of Plymouth. State Route 193 runs from Placerville to Cool, via Georgetown. Regional roadways in the service areas (U.S. Highway 50, State Route 193, State Route 49) are maintained by the California Department of Transportation (Caltrans).

With its proximity to Folsom Reservoir, EID's intended use of this water made available under the Proposed Action would likely occur in the El Dorado Hills and Bass Lake Tank's service area (in the western portion Cameron Park). Similarly, for GDPUD, its allocation would likely be used within the western portion of its service area in the vicinity of Cool, Pilot Hill, Auburn Lakes Trail, and Greenwood.

4.10.3.1.1 Regional Road and Highway System

Major arterials and connectors in the Subcontractor service areas include El Dorado Hills Boulevard, Cameron Park Drive, Salmon Falls Road, Deer Valley Road, Green Valley Road, Bass Lake Road, Country Club Drive, and, State Route 193 and 49, along with Garden Valley Road and Wentworth Springs Road. These roadways serve development in the El Dorado Hills, Bass Lake and Cameron Park areas. The El Dorado County Department of Transportation manages local transportation routes and enforces roadway standards for the unincorporated areas of the county.

4.10.3.1.2 Roadway Capacity and Level of Service

Level of Service (LOS) is a general measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. Caltrans has completed transportation or route concept reports for a number of State highways in El Dorado County. These reports identify long-range improvements for specific State highway corridors and establish the "concept," or desired, LOS for specific corridor segments. The reports also identify long-range improvements needed to bring an existing facility up to expected standards needed to adequately serve 20-year traffic forecasts. Additionally, the reports identify the ultimate design concept for conditions beyond the immediate 20-year design period. El Dorado County highways that have concept reports are U.S. Highway 50, State Route 49, State Route 193, and State Route 153.

The *State Route 50 Transportation Concept Report and Corridor System Management Plan* (Caltrans 2014) is a combination TCR and CSMP with the CSMP providing short- to mid-term planning for the urban section of US 50, and the TCR providing long-term planning for the rural section of the highway. The combined TCR/CSMP document coordinates planning for the entire length of US 50 in California. The planning horizon for the TCR/CSMP begins with the base year of 2012 and extends through 2035. The TCR/CSMP calls for the construction of high-occupancy vehicle, auxiliary, and merge lanes, and the installation of Intelligent Transportation Systems along various segments of US 50 in El Dorado County by the year 2035.

4.10.3.1.3 County Roadway-Related Initiatives and Programs

In November 1998, an initiative measure was approved by voters that modified the 1996 General Plan Policies relating to transportation. Measure Y prohibits discretionary approvals of residential development with five or more units that would result in LOS F conditions during weekday, peak-hour periods on any highway, roadway, interchange, or intersection, or further deteriorate operation where operation is already at LOS F. Measure Y was reaffirmed via a county-wide vote in 2008.[159] That vote extended the measure by ten years and amended to provide: (1) Traffic from major single-family residential subdivisions shall not result in, or worsen, Level of Service F (gridlock) traffic congestion; (2) No additional county roadways may operate at Level of Service F without voter approval or 4/5ths vote of County Supervisors; and (3) Developer-paid traffic fees, combined with any other funding source, shall pay to build necessary road improvements.

In June 2016 county voters passed “Measure E” which, modified and expanded on some of the original provisions of Measure Y pertaining to the impact on traffic from new development. Under the measure, the board of supervisors would no longer be able to approve projects that would lead to certain levels of traffic congestion with a four-fifths vote. Other provisions in the measure require growth-caused traffic impacts to be addressed before new projects are approved, and require developers to pay for those improvements rather than the county, unless voters declare otherwise.[160]

4.10.3.2 Traffic Impact Fee Programs

The County has adopted four developer-funded traffic impact fee programs:

- The El Dorado Hills/Salmon Falls Area Road Impact Fees (RIF), Resolution 175-96, was adopted by the Board of Supervisors in July 1996 with major revisions adopted in December 2000.
- The West Slope Area of Benefit Traffic Impact Mitigation (TIM) Fees, Resolution No. 201-96, was adopted by the Board of Supervisors in August 1996.
- The Transportation Impact Fee for the State System’s Capacity & Interchanges (State TIM), Resolution No. 202-96, was adopted by the Board of Supervisors in August 1996.
- The Interim Transportation Impact Fee for Highway 50 Corridor Improvements (Interim 50

159 http://www.smartvoter.org/2008/11/04/ca/ed/meas/Y/. Screenshot taken May 19, 2016.
160 California Business Journal. El Dorado County splits on two land-use measures. June 8, 2016. http://www.bizjournals.com/sacramento/news/2016/06/08/el-dorado-county-splits-on-two-land-use-measures.html. Screenshot taken 8/14/2016.

TIM), Resolution 247-2002, was adopted by the Board of Supervisors in October 2002.[161]

Funds from these programs will pay a portion of the cost of transportation improvements in the County. However, complete funding has not yet been identified to cover the gap caused by the Measure Y restriction of the use of tax revenues to pay for traffic and road improvements to serve new development.

On May 19, 2016, the County released a Notice of Availability (NOA) for the Draft Programmatic Environmental Impact Report (DEIR) for the Western Slope Roadway Capital Improvement Program (CIP) and Traffic Impact Mitigation (TIM) Fee Program for El Dorado County.[162] The proposes CIP is the 20-year long range plan for all individual capital improvement projects and funding sources in the County. It is used as a planning tool and updated periodically (as required by the County's General Plan Policy TC-Xb and Implementation Measure TC-A). The TIM Fee funded improvements are a part of the CIP and the proposed TIM Fee Update would provide funding for project including roadway widening, new roadways, roadway intersection improvements, and transit improvements necessary as a result of growth in the county to operate at an acceptable Level of Service (LOS) under the General Plan 20-year time horizon conditions, in accordance with the County's General Plan.[163]

4.10.3.3 Other Transport Systems

Public transportation in western El Dorado County consists of the El Dorado County Transit Authority (EDCTA), commercial bus services, taxi service, vanpools and carpools, and park-and-ride facilities.[164] The County also contains a number of regional bikeways and trails, although these are used primarily for recreation, rather than for commuting. In 2005, the County adopted the *El Dorado County Bicycle Master Plan* to provide a blueprint for the development of a bicycle transportation system on the western slope of El Dorado County. This plan was updated by the County's adoption of the *El Dorado County Bicycle Transportation Plan* in 2010. The plan was developed with the overall goal of providing a safe, efficient, and convenient network of bicycle

161 El Dorado County Planning Department, El Dorado County General Plan Draft Environmental Impact Report (SCH #2001082030), May 2003, pp. 5.4-16.

162 http://www.edcgov.us/Government/LongRangePlanning/Transportation/TrafficImpactMitigationFeeProgram.aspx. Screenshot taken May 19, 2016.

163 El Dorado County. Notice of Availability: Draft Environmental Impact Report El Dorado County Western Slope Roadway Capital Improvement Program (CIP) and Traffic Impact Mitigation (Tim) Fee Program Update State Clearinghouse # 2016022018. May 19, 2016.

164 El Dorado County Planning Department, El Dorado County General Plan Draft Environmental Impact Report (SCH #2001082030), May 2003, pp. 5.4-8 to 5.4-10.

facilities that establish alternative transportation as a viable option in El Dorado County and neighboring regions.[165]

There are four general-aviation airports within the County, three of which are in the vicinity of the Subcontractor service areas: the Georgetown Airport is owned and operated by the County, the Placerville Airport which is a County-owned public use airport, and the Cameron Airpark Airport which is operated by a special, non-County district. The airports are used by local residents and visitors for recreational purposes, and for training, rescue, and fire-suppression activities by government agencies and military personnel.[166][167]

4.10.3.4 Environmental Consequences

Transportation and circulation impacts related to the proposed new CVP water service contracts and the water delivered to the EID and GDPUD service areas were evaluated qualitatively by reviewing land use, growth, and transportation/circulation information developed for the El Dorado County General Plan, as amended. The Proposed Action and alternatives would have the following indirect effects on transportation and circulation within the Subcontractor service areas:

4.10.3-1 Result in increased traffic that is substantial in relation to the existing traffic load and capacity of the street system.

4.10.3.5 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The Proposed Action and alternatives include no changes to land uses or transportation and circulation policies in the El Dorado County General Plan. The Proposed Action and alternatives would have no direct effect on traffic and circulation levels, patterns, or long-ranging planning initiatives. As discussed above, the County, through its various General Plan policies and implementation measures have adequately evaluated, planned, and incorporated mechanisms to continuously gauge the effects of traffic and circulation levels within the County. Any future increases in traffic due to growth and development accommodated by the Proposed Action or Alternatives would be consistent with current approved policies and implementation measures.

As water supplies made available to EID and GDPUD under the No Action Alternative, the Proposed Action, and Alternatives would be indistinguishable, there would be no discernable difference in future traffic load accommodated by each of the alternatives evaluated herein. The

165 http://www.edctc.org/C/Non-Motorized/EDC_bike_plan/Exec_summary.pdf Screenshot taken May 9, 2016.

166 http://www.edcgov.us/Airports/. Screenshot recorded July 17, 2016

167 El Dorado County Planning Department, El Dorado County General Plan Draft Environmental Impact Report (SCH #2001082030), May 2003, pp. 5.4-11.

impact of the Proposed Action and alternatives relative to the No Action Alternative is likely result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.3-2 Result in the exceedance of the level of service standard established by the county congestion management agency for designated roads or highways.

4.10.3.6 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Increasing traffic congestion is a concern within the County. With ongoing new development and population growth, exceedance in the level of service standards for designated roads and highways is carefully monitored. The County, through its General Plan has acknowledged the importance of ensuring that ongoing planned development in the County does not exceed available road capacities.

With U.S. Highway 50 serving such a vital function for El Dorado County, proper coordination with other neighboring agencies is important to ensure that this thoroughfare remains efficient. General Plan Policy TC-Xi, for example, acknowledges the need for planned the widening of U.S. Highway 50. Such an effort must be consistent with the policies of this General Plan and shall be a priority of the County. Under this Policy, the County shall coordinate with other affected agencies, such as the City of Folsom, the County of Sacramento, and Sacramento Area Council of Governments (SACOG) to ensure that U.S. Highway 50 capacity enhancing projects are fully and properly coordinated with these agencies with the goal of delivering these projects on a schedule to meet the requirements of the policies of this General Plan. As noted above, the 2014 Caltrans TCR/CSMP identifies improvements to US 50 within El Dorado County to be carried out by 2035.

El Dorado County has a relatively complex highway and road transportation system, serving cars, heavy trucks, agricultural and commercial vehicles, buses, transit, bicycles, and pedestrian traffic. Coordinating these many forms of transportation is critical to achieving maximum road efficiency and minimizing costly road expansion or construction. Accordingly, the County has adopted a Transportation Systems Management (TSM); where the use of techniques to manage traffic circulation to maximize existing facilities and provide for the effective planning of new facilities is sought.

In general, TSM techniques are intended to provide economical, short-term improvements to increase efficiency and reduce congestion. Techniques include increasing the number of buses and routes, improving transit shelters, improving traffic signals, installing exclusive turn lanes, installing acceleration/deceleration lanes, resurfacing and widening of roads, and adding or improving bike lanes on new or existing roads. TSM measures can also conserve energy and decrease vehicular emissions leading to cleaner air. Finally, TSM is intended to emphasize improved transportation system efficiencies rather than road expansion or construction.

As water supplies made available to EID and GDPUD under the No Action Alternative, the Proposed Action, and alternatives would be identical, there would be no discernable difference in future traffic load accommodated by each of the alternatives evaluated herein. As such, the Proposed Action and alternatives would have no impact on traffic levels and circulation patterns relative to the No Action Alternative and, therefore, would not result in the exceedance of level of service standards. As discussed, the County, through its various General Plan policies have, and continue to provide, the necessary planning and coordination mechanisms to ensure proper levels of service on roadways within the County. The Proposed Action and alternatives would have no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

5.13-3 Result in additional hazards due to a design feature resulting in inadequate emergency access.

4.10.3.7 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Roadway hazards often result from improper design features or from the interim, although significant disruptions stemming from construction-related projects. The County recognizes the importance of operational safety. As part of the General Plan Implementation Program, the County is committed to preparing and adopting a priority list of road and highway improvements for the CIP on a horizon of five years. The Board of Supervisors shall update the CIP every two years, or more frequently as recommended by the responsible departments. The CIP shall prioritize capital maintenance and rehabilitation, reconstruction, capacity, and operational and safety improvements.

The Proposed Action and alternatives would have no impact on traffic and circulation levels, patterns, and would not result in an increase in hazards or affect, in any way, existing emergency access. As discussed, the County, through its various General Plan policies have, and continue to provide, the necessary planning and coordination mechanisms to ensure proper levels of safety and emergency access on roadways within the County. Therefore, the Proposed Action and alternatives would have no impact.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

5.13-4 Result in conflicts with adopted policies supporting alternative transportation.

4.10.3.8 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Alternative transportation is recognized and promoted in El Dorado County. General Plan Goal TC-2, for example, is stated as follows:

> "To promote a safe and efficient transit system that provides service to all residents, including senior citizens, youths, the disabled, and those without access to automobiles that also helps to reduce congestion, and improves the environment.

In fact, the County is committed to promoting transit services where population and employment densities are sufficient to support those services, particularly within the western portion of the County and along existing transit corridors in the rural areas. Additionally, the County is in the process of implementing a system of recreational, commuter, and inter-community bicycle routes in accordance with the County's *Bikeway Master Plan* (El Dorado County 2005) and *Bicycle Transportation Plan* (El Dorado County 2010). These plans are intended to designate bikeways connecting residential areas to retail, entertainment, and employment centers and near major traffic generators such as recreational areas, parks of regional significance, schools, and other major public facilities, and along recreational routes.

Finally, the County is committed, through General Plan Goal TC-5, to provide safe, continuous, and accessible sidewalks and pedestrian facilities as a viable alternative transportation mode. The policies under this Goal address the requirement for pedestrian sidewalks and curbs.

Growth and development served by the Proposed Action and Alternatives would, necessarily be consistent with approved plans and policies related to alternative transportation. Additionally, the level and location of development under the Proposed Action and Alternatives would be indiscernible from that of the No Action Alternative. As such, the Proposed Action or Alternatives would have no impact on traffic and circulation levels, patterns, relative to the No Action Alternative and would not result in any impairment to alternative transportation modes.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.4 Air Quality (Indirect Effects Service Area)

Subsection 4.10.4 of this Final EIS addresses the potential indirect, service-area-related impacts on air quality that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes and supplements information and analysis presented in sections 4.12 (Affected Environment: Air Quality) and 5.14 (Environmental Consequences: Air Quality) of the Draft EIS/EIR.

4.10.4.1 Affected Environment

Section 4.12 of the Draft EIS/EIR presents an overview the affected environment related to air quality in areas within the EID and GDPUD Subcontractor service areas. The following summarizes the affected environment related to air quality in areas within the EID and GDPUD Subcontractor service areas potentially affected by the Proposed Action and Alternatives.

4.10.4.1.1 Sensitive Receptors

As described in the Draft EIS/EIR, sensitive receptors are present throughout the County and Subcontractor service areas. Sensitive receptors with respect to air quality are identified by land uses where people would likely be present for extended periods of time. Such land uses include residential areas, schools, playgrounds, parks and recreational areas, hospitals and convalescent homes.

4.10.4.1.2 Regional Overview

4.10.4.1.2.1 Climate and Meteorology

Western El Dorado County is located in a transition zone between the climate of the Central Valley and that of the Sierra Nevada, ranging from freezing temperatures in the winter and experiencing summer temperatures greater than 100˚F. Wind currents in this area are primarily from the west and southwest; however, in the winter, winds are typically from the east and southeast. The area experiences inversions that contribute to degraded air quality during the summer.[168]

4.10.4.1.2.2 Air Quality

Western El Dorado County is located at the western edge of the Mountain Counties Air Basin (MCAB), and is under the jurisdiction of the El Dorado County Air Pollution Control District (APCD). As described in the Draft EIR/EIS, the County is currently designated as a non-attainment area with respect to the State 1-hour ozone and PM_{10} standards, and is either in attainment or unclassified for the remaining State standards. With respect to the national standards, the County is designated as a severe non-attainment area for the 1-hour ozone standard and non-attainment for the 8-hour ozone standard. The County is either in attainment, unclassified, or unclassified/attainment for the remaining national standards. Based on current attainment status, ozone, PM10, CO, and NO_2 is the primary concern in El Dorado County. The California Air Resources Board (CARB) does not yet have a measuring method with enough

168 El Dorado County Planning Department, El Dorado County General Plan Environmental Impact Report, May 2003, p. 5.11-1.

accuracy or precision to designate areas in the State as either “attainment” or “non-attainment.” The entire State is considered “unclassified” for visibility-reducing particulate matter.

4.10.4.1.2.3 Asbestos-Containing Rocks and Soils

As described in the Draft EIS/EIR, asbestos is a term used for several types of naturally occurring fibrous minerals. Dust from unpaved roads and construction activities that result in crushing or grading of serpentine rock or soils represent a typical source that may pose a health risk to humans as airborne fibers may become lodged in the respiratory or digestive tract and cause health problems. All types of asbestos are considered hazardous by State and federal health professionals. There is not sufficient scientific information to support the identification of an exposure level that would be considered “safe”; however, the most important way to reduce asbestos risk is to reduce exposure to airborne fibers. El Dorado County has adopted an ordinance that regulates construction activities where asbestos-containing rock may be present.

4.10.4.1.2.4 Service Area-Related Air Quality Impact Sources

Service area-related air quality impacts sources are accessed based on three categories: fixed, non-stationary, and temporary sources. There are numerous stationary operations within the service area that can be sources of regulated emissions and particulates that may affect air quality (e.g., quarry operations, lumber mills, industrial facilities, rail yards, wood-burning stoves) dispersed throughout the County. Primary non-stationary source of impacts on air quality in El Dorado County is vehicular traffic. Common commuter vehicles are emitters of carbon monoxide, NO_x (and thus ground-level ozone), and potentially particulate emissions. Additionally, emissions of concern from industrial vehicles that use diesel include sulfur dioxide and particulates. Construction-related activities are the most notable temporary source of air quality impacts. Heavy machinery, pile driving, blasting, excavation activities, material transport, traffic related to additional worker trips, and constant delivery traffic all make construction a common producer of dust and diesel particulate-emissions in many locales. In rapidly growing areas, such as the western slopes of El Dorado County, it can be a prolonged source of emissions and particulates, as construction continually moves from one area to the next. Commercial/industrial, public utility, retail, roadway, or residential construction can be temporary sources of air quality problems.

4.10.4.2 Environmental Consequences

This section addresses potential indirect, service area-related impacts on the existing air quality conditions that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes the information and analysis presented Section 5.14 of the Draft EIS/EIR. Any substantive revisions to the Draft EIS/EIR presented below are cited as such. The analysis presented here was conducted at a general, programmatic level, consistent with the framework and rationale described in the Overview of Impacts Analysis (see page 5-147 of the Draft EIS/EIR).

The Proposed Action, as defined, does not include construction of any new facilities, and thus there are no direct air quality impacts resulting from the action. Any facilities such as specific diversion intakes, pipelines, storage facilities, pumping plants, and water treatment plants, to the extent they are needed in the future will exist as separate and independent projects from this action. Air quality impacts from the construction and operation of any future facilities will be examined at a project-specific level in later, more detailed environmental documentation.

4.10.4-1 Conflict with or obstruct implementation of the applicable air quality plan.

4.10.4.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Under all of the Alternatives considered in this Final EIS, future water deliveries would be restricted to deliveries within the proposed Subcontractor service areas. As described in the Draft EIS/EIR, nothing associated with the Proposed Action and alternatives would conflict with or otherwise be inconsistent with the existing guidance, directives, and air quality planning documents relied upon by the County. A new water supply contract, providing the capability to meet and support existing General Plan growth objectives would be necessarily consistent with these planning documents. The County General Plan (and specific Goals, Objectives, and Policies of its Public Health, Safety and Noise Element), the TGPA/ZOU, and environmental documentation for those plans have been approved and are in effect. Those documents, as appropriate, address the protection of ambient air quality and consistency with applicable air quality plans. Therefore, water supplies made available under the No Action Alternative, Proposed Action and other alternatives to serve approved future development would likely result in a minimal impact on the implementation of applicable air quality plans.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.4-2 Result in a cumulatively-considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).

4.10.4.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The County Air Quality Management District ensures that criteria pollutants and State ambient air quality standards are monitored and continuously addressed. For any new project-specific applications, County policies governing hazardous materials assessment, construction activities, and land uses that may affect air quality provide the necessary guidance and assurances that air quality standards are met. El Dorado County, through its General Plan (and specific Goals, Objectives, and Policies of its Public Health, Safety and Noise Element) provide ample consideration and protection of ambient air quality. Future growth and development served by water supplies made available under the Proposed Action and alternatives would be necessarily consistent with those approved plans. As such, the Proposed Action and alternatives (including the No Action Alternative) would result in no net increase of any criteria pollutant beyond that anticipated and addressed in County plans currently in effect. The contribution of the Proposed Action and alternatives to criteria pollutants is not considered cumulatively considerable and therefore, would likely result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.4.5 Violate any air quality standard or contribute substantially to an existing or projected air quality violation.

4.10.4.6 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The County's Clean Air Plan, implemented in cooperation with the County Air Quality Management District, requires that criteria pollutants and State ambient air quality standards are monitored and continuously addressed. For any new project-specific applications, County policies governing hazardous materials assessment, construction activities, and land uses that may affect air quality provide the necessary guidance and assurances that air quality standards are met. El Dorado County, through its General Plan (and specific Goals, Objectives, and Policies of its Public Health, Safety and Noise Element) provide ample consideration and protection of ambient air quality.

New water supplies made available under the Proposed Action or Alternatives would not violate any air quality standard or contribute to an existing or projected air quality violation. Construction of potential new facilities to divert, convey, treat, and distribute the P.L.101-514 contract water for the EID service area would follow applicable local, state, and federal air quality standards. Therefore, the impact of the Proposed Action or alternatives would likely to result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.4-4 Substantially increase exposure of sensitive receptors to toxic air pollutants, or expose people to substantial levels of hazardous substance air emissions or create objectionable odors affecting a substantial number of people.

4.10.4.7 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Sensitive receptors are located throughout the Subcontractor service areas of both EID and GDPUD. At this time, the specific locations and details of any potential new facilities that would be required to divert, convey, treat, and distribute the P.L.101-514 contract water are not generally known for GDPUD. Much depends on pending infrastructure sharing agreements between GDPUD and PCWA. EID on the other hand, with its more developed infrastructure, has fewer uncertainties. It is possible that new facilities could be located near sensitive receptors. The construction of these facilities would generate construction-related dust and vehicle emissions, which could be experienced by sensitive receptors. However, any impacts related to on-site construction-related air emissions, including emissions from additional construction vehicular traffic would be temporary and would not continue once construction was completed. Moreover, any construction activities would be bound by existing County policies and ordinances governing air quality concerns and would be addressed in project specific environmental documentation.

Nothing associated with the Proposed Action and alternatives would conflict with or otherwise be inconsistent with the existing guidance, directives, and air quality planning documents currently in place. A new water supply contract, providing the capability to meet and support existing General Plan growth objectives, is necessarily consistent with these planning documents. El Dorado County, through its General Plan (and specific Goals, Objectives, and Policies of its Public Health, Safety and Noise Element) and TGPA and ZOU provide ample consideration and protection of ambient air quality.

Providing water supply would not substantially increase exposure of sensitive receptors to toxic air pollutants, or expose people to substantial levels of hazardous substance air emissions or create objectionable odors. Construction of potential new facilities to divert, convey, treat, and distribute the P.L.101-514 contract water for the EID service area would follow applicable local, state, and federal air quality standards. Therefore, the impact of implementing the Proposed Action or alternatives would likely result in minimal effects.

<u>**Mitigation Measures**</u>

No mitigation would be required for the Proposed Action or Alternatives

4.10.5 NOISE (INDIRECT EFFECTS SERVICE AREA)

Section 4.10.4 of this Final EIS addresses the potential indirect, service-area-related impacts on existing noise environment that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes and supplements information and analysis presented in sections 4.13 (Affected Environment: Noise) and 5.33 (Noise Environmental Consequences) of the Draft EIS/EIR.

4.10.5.1 Affected Environment

Section 4.13 of the Draft EIS/EIR presents an overview of the noise environment of El Dorado County. Noise is generally a local issue, except for roadways that carry significant traffic between counties, and is primarily influenced by local rather than regional conditions (e.g., traffic on a roadway, local topographic conditions, and adjacent stationary noise sources). As overall development within the County occurs, ambient noise levels will increase.

The following describes the affected environment relative to noise conditions and sensitive receptors in areas within the EID and GDPUD Subcontractor service areas where this new water allocation will be used.

4.10.5.1.1 Noise-Sensitive Receptors

Land-use types for which low ambient noise levels are integral to the use or value of the land are considered noise-sensitive receptors. These receptors typically include residences, hospitals, convalescent homes, schools, guest lodgings, libraries, and parks. The largest majority of noise sensitive land uses located within the County is residential dwellings. Sensitive receptors, as identified, exist throughout the EID and GDPUD service areas.

4.10.5.1.2 Noise Sources

As described in the Draft EIS/EIR, several sources of noise that could affect local communities occur within El Dorado County. These sources include noise generated from stationary activities (e.g., commercial and industrial uses), aircraft operations, as well as traffic on major roadways and highways. In general, areas within EID and GDPUD that contain noise-sensitive land uses are relatively quiet except in the vicinity of traffic on major roadways and highways, near aircraft operations, or where stationary activities that generate noise (e.g., commercial and industrial uses) are present. A significant temporary noise source is construction-related activities. The use of heavy machinery, pile driving, blasting, excavation activities, material transport, the intensity of on-site workers' activities, and constant delivery traffic make construction the most widespread noise source in many locales. In rapidly growing areas such as the western slopes of El Dorado County, it can be a prolonged noise source, as construction continually moves from one area to the next.

4.10.5.2 Environmental Consequences

This section addresses potential indirect, service-area-related impacts on the existing noise environment that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes the information and analysis presented Section 5.15 of the Draft EIS/EIR. Any substantive revisions to the Draft EIS/EIR presented below are cited as such.

4.10.5-1 Substantially increase exposure of sensitive receptors to noise levels above established federal, State or local standards.

4.10.5.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

As described in the Draft EIS/EIR, growth resulting indirectly from the implementation of the new CVP water service contract would add sensitive receptors to the EID and GDPUD service areas, primarily in the form of new residences. This growth would be necessarily consistent with General Plan zoning and growth expectations. Potential impacts from construction-related noise and increases in noise from construction-related vehicular traffic associated with new development would be temporary. With anticipated future increases in population, all of the typical day-to-day activities (e.g., school travel, work commute, home maintenance, errands, etc.) associated with urban/rural life would increase the overall magnitude of ambient noise levels within these areas.

To address future noise conditions experienced by existing and future sensitive receptors, the County General Plan contains a comprehensive suite of policies and provisions governing noise control and abatement in keeping with these expected increases in population. These policies were unaffected by the recent implementation of the TGPA/ZOU.

As stated, future growth and development served by the Proposed Action and alternatives would be necessarily consistent with the goals, objectives, policies and implementation measures provided for the El Dorado County General Plan, Public Health, Safety and Noise Element. As such, no significant noise impacts beyond those addressed in applicable County planning documents would result from the Proposed Action or Alternatives. In keeping with applicable County plans, subsequent project-level analyses for any future projects would include a more detailed analysis based on project-specific details and design features. Appropriate mitigation measures would be identified and implemented, as necessary, at that time. Because the Proposed Action and Alternatives would be consistent with County plans currently in place, future growth and development served by the Proposed Action and Alternatives would result in no impact on noise levels above established federal, State or local standards.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.6 Geologic, Seismic, Soils, Mineral, and Paleontological Resources (Indirect Effects Service Area)

Section 4.10.6 of this Final EIS addresses the potential indirect, service-area-related impacts on existing geologic, seismic, mineral, soils, and paleontological resources that could result from the new CVP water service contract authorized under P.L. 101-514. This subsection summarizes and supplements information and analysis presented in sections 4.14 (Affected Environment: Geology, Soils, Mineral resources, and Paleontological Resources) and 5.16 (Geology, Soils, Mineral Resources, and Paleontological Resources Environmental Consequences) of the Draft EIS/EIR.

4.10.6.1 Affected Environment.

Section 4.14 of the Draft EIS/EIR presents an overview of the environment relative to the existing geology, soils, mineral resources, and paleontological resources of El Dorado County. The following summarizes the affected environment description presented in the Draft EIS/EIR related to existing geology, seismic conditions, soils, minerals, and paleontological resources in those Subcontractor service areas where this new water allocation would be used.

4.10.6.1.1 Regional Geologic Setting

El Dorado County is located in the Sierra Nevada geomorphic province. Certain distinctive rock assemblages in the western Sierra Nevada can be interpreted as remnants of ancient volcanic areas, subduction zone complexes, and sequences of oceanic crust and upper mantle. The stratigraphic and structural data of the area suggest that the rock assemblages record the deposition of marine sediments and submarine volcanic rocks from the Paleozoic Era. The western part of the EID service area is comprised of Copper Hill volcanics, the Pine Hill intrusive complex, and other metavolcanic and metasedimentary rocks associated with foothills development.[169]

4.10.6.1.2 Faults and Seismicity

The distribution of known faults is concentrated in the western portion of the county, with several isolated faults in the central county area and the Lake Tahoe Basin. Fault systems mapped in western El Dorado County include the West Bear Mountains Fault; the East Bear Mountains Fault; the Maidu Fault Zone; the El Dorado Fault; the Melones Fault Zone of the Clark, Gillis Hill Fault; and the Calaveras–Shoo Fly Thrust. There are no active fault-rupture hazard zones within the proposed GDPUD and EID Subcontractor service areas. According to the most recent estimates

169 California Department of Conservation, Division of Mines and Geology, Geologic Map of the Sacramento Quadrangle, California, 1:250,000, DMG Regional Geologic Map Series, 1981, Sheet 1.

published by the California Geological Survey, El Dorado County has a low to moderate potential for strong seismic ground shaking and is not located in a Seismic Hazard Zone.[170]

4.10.6.1.3 Mineral Resources

Metallic mineral deposits – and gold deposits in particular – are considered the most significant extractive mineral resource in El Dorado County. Other metallic minerals found include silver, copper, nickel, chromite, zinc, tungsten, mercury, titanium, platinum, and iron. Non-metallic mineral resources include building stone, limestone, slate, clay, marble, soapstone, sand, and gravel.[171] Gold and other metallic resources are not considered to be exhausted in El Dorado County. Some mining operations are still active or may be active near Sly Park, Georgetown, Pilot Hill, Fairplay, and other locations in southwestern El Dorado County.

4.10.6.1.4 Subsidence, Volcanic, Landslide, and Avalanche Hazards

Surface subsidence is generally caused by groundwater withdrawal, gas withdrawal, hydrocompaction, or peat oxidation. None of these types of subsidence are evident within El Dorado County,[172] and therefore subsidence would not be expected to affect locations in the proposed Subcontractor service areas that would be served by the water deliveries resulting from the Proposed Action.

Volcanic hazard potential exists in the Tahoe-Truckee area, but none has been identified in the western portions of El Dorado County. Regarding landslide hazard, there are no current maps identifying landslide hazards in El Dorado County, as these mapping programs were discontinued in the mid-1990s.[173] Previous mapping efforts, however, have shown the areas with potential for landslides to be along the Foothills Fault Zone, and on the eastern slope of the Sierra Nevada.[174]

Snow avalanches are not expected to occur in the proposed Subcontractor service areas because elevations in these parts of the EID and GDPUD service areas are under 2,500 feet – considerably

170 El Dorado County Planning Department, El Dorado County General Plan Draft Environmental Impact Report (2004) (SCH #2001082030), May 2003, p. 5.9-6.

171 El Dorado County Planning Department, El Dorado County General Plan Draft Environmental Impact Report (SCH #2001082030), May 2003, p. 5.9-23.

172 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, pp.4-110 to 4-111, included as Appendix D in PCWA American River Pump Station Project Draft EIS/EIR (SCH #1999062089), August 2001.

173 El Dorado County Planning Department, El Dorado County General Plan Draft Environmental Impact Report (SCH #2001082030), May 2003, p. 5.9-10.

174 California Department of Conservation, Division of Mines and Geology (CDMG). 1973. Generalized Map Showing Relative Amounts of Landslides in California. Sacramento, CA.

lower than potential avalanche areas that normally receive significant snowfall (5,000 feet and above).

4.10.6.1.5 Soils and Erosion

As described previously in the Draft EIS/EIR, Soils in the EID and GDPUD service areas (private land below 5,000 feet) consist of well-drained silt and sandy and gravelly loams divided into two physiographic regions; the Lower and Middle Foothills and the Mountainous Uplands. El Dorado County soils are subject to erosion near road cuts and stream banks. The NRCS rates the erosion potential in the western county as low to moderate on most of the land with slopes less than 15 percent. Slopes in the El Dorado Hills, Shingle Springs/Cameron Park, and Diamond Springs/El Dorado areas range from 0 to 25 percent. Steeper slopes in excess of 25 percent are located along the river and stream canyons in the Coloma/Gold Hill, Cool/Pilot Hill, and Georgetown/Garden Valley, Pollock Pines, Camino, Pleasant Valley, Latrobe, and Somerset/Fairplay areas. The following areas in the EID and GDPUD service areas are characterized by predominantly steep slopes: Pollock Pines, Pleasant Valley, Georgetown/Garden Valley, American River, and Mosquito.[175] Of these steeper areas, only a small portion of the Georgetown/Garden Valley area lies within the Subcontractor service areas of this Proposed Action.

4.10.6.1.6 Paleontological Resources

El Dorado County geology is fairly complex, with documented formations ranging from the Paleozoic era, dating to as early as 350 million years ago (Ma), to stream and gravel deposits still being deposited in recent times. Paleontological finds within most of these formations have been limited, with the exception of certain limestone cave deposits. Other geological contexts from which a few vertebrate fossils have been discovered in the County include the Mehrten formation and Pleistocene channel deposits.[176]

4.10.6.2 Environmental Consequences

This section addresses potential indirect, service area-related impacts on the existing geology, soils, mineral resources, and paleontological resources of El Dorado County that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes the information and analysis presented Section 5.16 of the Draft EIS/EIR. Any substantive revisions to the Draft EIS/EIR presented below are cited as such.

175 El Dorado County Planning Department, (SCH #2001082030), May 2003, p. 5.9-19.

176 El Dorado County Planning Department, El Dorado County General Plan Final Environmental Impact Report (SCH #2001082030), January 2004, p. 2-69.

The Proposed Action and alternatives would have the following indirect effects on geology, soils, mineral resources, and paleontological resources within the Subcontractor service areas:

4.10.6-1 Expose people or structures to major geologic hazards, such as rupture of a known earthquake fault, as defined on the most recent Alquist-Priolo Earthquake Fault Zoning Act Map, seismic ground shaking, liquefaction, slope failure, or landslides.

4.10.6.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

While the distribution of known faults is concentrated in the western portion of the county, there are no active fault-rupture hazard zones within the proposed GDPUD and EID Subcontractor service areas. Moreover, it is acknowledged that El Dorado County has a low to moderate potential for strong seismic ground shaking and no portion of El Dorado County is located in a Seismic Hazard Zone (regulatory zones that encompass areas prone to liquefaction and earthquake-induced landslides) based on the Seismic Hazards Mapping Program administered by CGS.

Under its current General Plan, the County has committed to keeping up-to-date on geologic, seismic, and other hazards (Policy 6.3.2.1 of the Public Health, Safety and Noise Element). Furthermore, General Plan Implementation Measure HS-C requires the County to develop a program to collect, maintain, and update geological, seismic, avalanche, and other geological hazard information. [Policy 6.3.2.1]. Measure HS-D requires development and adoption of standards to protect against seismic and geologic hazards. [Objective 6.3.1]. These measures provide operational commitments to enact processes to maintain the most up-to-date informational database to support all planning efforts within the County having regard to geological, seismic, and other geological hazards. No new policies regarding major geologic, seismic, and other hazards within El Dorado County were proposed as part of the TGPA/ZOU EIR.

Water made available under the Proposed Action and alternatives would serve future development only in areas that are designated for municipal and industrial use in the El Dorado County General Plan and TGPA/ZOU. El Dorado County has numerous safeguards already in place to help identify, plan and protect persons from these hazards. As such, the Proposed Action and alternatives would have no direct or indirect impact on increasing the risks associated with geologic and seismic hazards or catastrophic mass wasting events. This impact, therefore, is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.6-2 Place structures on soils that are likely to collapse or subside, or be located on expansive soils (defined in Table 18-01-B of the Uniform Building Code) that could damage foundations or structures.

4.10.6.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Water made available under the Proposed Action and alternatives would serve future development only in areas that are designated for municipal and industrial use in the El Dorado County General Plan and TGPA/ZOU. El Dorado County, through its General Plan, has numerous safeguards already in place to help identify, plan and protect persons from the risks associated with new structure development on unstable soils and subsurface geology. The Proposed Action and alternatives, therefore would have no direct or indirect impact on increasing the risk from these hazards. This impact is likely to result in minimal effects.

Mitigation Measures

No mitigation is required for the Proposed Action or Alternatives.

4.10.6-3 Substantially increase erosion or loss of topsoil due to site disturbance.

4.10.6.5 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The Agriculture and Forestry Element of the County General Plan acknowledges that agricultural land conservation is a top priority in the County. Goal 8.1 is for the: Long-term conservation and use of existing and potential agricultural lands within the County and limiting the intrusion of incompatible uses into agricultural lands. The Conservation and Open Space Element includes Objective 7.1.2 (Erosion and Sedimentation) which identifies the mandate to: minimize soil erosion and sedimentation. Various policies exist to meet that objective.

As previously described in Section 4.10.2.1 Affected Environment, the TGPA/ZOU EIR identified an update to the Chapter 17.21 (Agricultural, Rural Lands and Resource Zones) of the Zoning Ordinance, expanding the allowable uses in these zones (relative to allowable uses in the current agricultural and timberland zones) to include activities intended to support agriculture by allowing compatible uses (e.g. agricultural homestays (Section 17.040.170), Health Resort and Retreat Centers). The addition of this new policy does not change the analysis previously described in the Draft EIS/EIR relative to the Proposed Action and Alternatives.

As noted, water made available under the Proposed Action and alternatives would serve future development only in areas that are designated for municipal and industrial use in the El Dorado County General Plan and TGPA/ZOU. El Dorado County, through its General Plan, has numerous safeguards already in place to help identify, avoid, or otherwise mitigate for soil erosion and sedimentation risks. The Proposed Action and alternatives, therefore would have no direct or indirect impact on increasing the risks of soil erosion and sedimentation. This impact is likely to result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.6-4 Result in the loss of availability of a known mineral resource that would be of value to the region and residents of the State, or result in the loss of availability of a locally important mineral resource recovery site delineated in the El Dorado General Plan.

4.10.6.6 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Water from the proposed CVP M&I water service contract would be delivered to the proposed Subcontractor service areas in a manner that is consistent the El Dorado County General Plan goals and policies implemented to conserve the County's significant mineral resources. The Proposed Action and Alternatives would have no direct or indirect impact on the mineral resources of the County. El Dorado County, through its General Plan, utilizes numerous safeguards to help identify, avoid, or otherwise mitigate any potential adverse effects on mineral resources. This impact, therefore, is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.6-5 Directly or indirectly destroy a unique paleontological resources or site or unique geologic feature.

4.10.6.7 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

El Dorado County, through its various policies and implementation measures identified in its Conservation and Open Space Element relevant to paleontological resources, there is guidance to help identify, avoid, or otherwise mitigate any potential future planned activities on these resources. The Cultural Resources Ordinance is intended to integrate each of these protective provisions into one overall guidance document. With the adherence to these policies within the context of the El Dorado County General Plan, the impact of future development served by the Proposed Action and Alternatives on significant unique paleontological resources or unique geologic features within the County would avoided. Because the level and location of development served by the Proposed Action and Alternatives would be indistinguishable from that of the No Action Alternative, the impact is considered likely to result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.7 Recreation (Indirect Effects Study Area)

Subsection 4.10.7 of this Final EIS addresses the potential indirect effects of the Proposed Action and Alternatives on recreation resources in and near the Subcontractor service areas. This subsection summarizes and supplements information and analysis presented in sections 4.15 (Affected Environment: Recreation) and 5.17 (Recreation Environmental Consequences) of the 2009 Draft EIS/EIR.

In March 2012, the County adopted a *Final El Dorado County Parks and Trails Master Plan* (Master Plan)[177]. The Master Plan presents a comprehensive overview of west-slope recreational facilities and assesses current and future demand for recreation and trail amenities within the planning area. Where appropriate, information contained in the Master Plan is used here to update and supplement information presented in the Draft EIS/EIR.

4.10.7.1 Affected Environment

The following describes the affected environment related to recreation and recreational resources in areas within the EID and GDPUD Subcontractor service areas, which could be potentially affected by the Proposed Action and Alternatives. As described in the Draft EIS/EIR, the diverse natural characteristics of El Dorado County provide a wide range of recreational opportunities. Many of the recreational resources located in the County have been developed by State and federal public agencies on public lands that are not directly subject to the County's General Plan. El Dorado County also owns and operates a number of regional recreation areas and is also involved in trail designation and construction as well as planning and administering the use of rivers flowing through the County for recreation activities.

4.10.7.1.1 In-County Recreational Areas

El Dorado County has a combined total of 106 existing and proposed parks and recreation areas encompassing more than 65,800 acres. The largest recreation areas include the approximately 17,718-acre Folsom Lake State Recreation Area (SRA), along the shores of Folsom Reservoir, and the 42,000-acre Auburn SRA in the North and Middle Fork American River Canyon. There are four County service area recreation zones of benefit on the western slope: Ponderosa, Gold Trail, Mother Lode, and Camino/Pollock Pines Recreation Districts. A comprehensive list of County parks, City and District parks, and El Dorado County public recreation trails in western El Dorado County is contained in Appendix A through C, respectively, of the 2012 Master Plan.

177 El Dorado County. *Final El Dorado County Parks and Trails Master Plan*. March 27, 2012.

Recreational use of open space lands within the County is managed under plans developed by the U.S. Forest Service (El Dorado National Forest), Bureau of Land Management (along the American River), or the California Department of Parks and Recreation (CDPR, Auburn SRA, Folsom Lake SRA).[178]

Sly Park, located at Jenkinson Lake, is the only recreational area in the County operated by EID, but lies outside the proposed Subcontractor service area. Another parcel of undeveloped land owned by EID that may be developed in the future is adjacent to Bass Lake in the El Dorado Hills area, and is within the Subcontractor service area.[179]

4.10.7.1.2 American River

Recreational use on the North Fork American River is concentrated upstream of the confluence of the North Fork and South Fork American River, outside of the Folsom Lake SRA. The North Fork supports commercial whitewater rafting upstream of Lake Clementine. On the Middle Fork, commercial rafting occurs upstream of the North Fork/Middle Fork confluence. Boating is prohibited downstream of the Middle/Fork North Fork confluence to the Folsom Reservoir high water line. Other recreation opportunities along the North Fork American River include hiking, mountain bicycling, and horseback riding on the Auburn-to-Cool Trail and Western States Trail.

4.10.7.2 Environmental Consequences

This section addresses potential indirect, service area-related impacts on non-diversion-related recreation resources that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes the information and analysis presented Section 5.17 of the Draft EIS/EIR.

The Proposed Action and alternatives would have the following indirect effects on recreation within, and in the vicinity of, the Subcontractor service areas:

4.10.7-1 Result in permanent closure of recreation trails through the project area or result in a substantial increase in exposure to hazards for recreationists, for land-based activities due to project construction or operation.

178 SWRI, Draft American River Basin Cumulative Impact Report, August 2001, pp.4-85 to 4-86, included as Appendix D in PCWA American River Pump Station Project Draft EIR/EIS (SCH #1999062089), August 2001.

179 El Dorado County Planning Department, (SCH# 2001082030), May 2003, p. 5.7-68/69.

4.10.7.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

Policy TC-4a of the County General Plan Parks and Recreation Element provide that the County shall implement a system of recreational, commuter, and inter-community bicycle routes in accordance with the County's "*Bikeway Master Plan*." In 2005, the County adopted the *El Dorado County Bicycle Master Plan* to provide a blueprint for the development of a bicycle transportation system on the western slope of El Dorado County. This plan was updated by the County's adoption of the *El Dorado County Bicycle Transportation Plan* in 2010. The plan was developed with the overall goal of providing a safe, efficient, and convenient network of bicycle facilities that establish alternative transportation as a viable option in El Dorado County and neighboring regions. The plan designates bikeways connecting residential areas to retail, entertainment, and employment centers and near major traffic generators such as recreational areas, parks of regional significance, schools, and other major public facilities, and along recreational routes. Additionally, Policy TC-4i provides that, within Community Regions and Rural Centers, all development shall include pedestrian/bike paths connecting to adjacent development and to schools, parks, commercial areas and other facilities where feasible. In Rural Regions, pedestrian/bike paths shall be considered as appropriate.

In consideration of public safety, Policy TC-4h states that, where hiking and equestrian trails abut public roads, they should be separated from the travel lanes whenever possible by curbs and barriers (such as fences or rails), landscape buffering, and spatial distance. Existing public corridors such as power transmission line easements, railroad rights-of-way, irrigation district easements, and roads should be put to multiple-use for trails, where possible.

California State Parks is collaborating with the Reclamation to prepare a joint General Plan/Resource Management Plan for the Auburn State Recreation Area (SRA). California State Parks manages Auburn SRA through a contract with Reclamation. The General Plan/Resource Management Plan is a programmatic document that will define a long term vision for the park unit, will provide guidelines for the protection and management of natural and cultural resources, will determine the use and management of the many recreation activities which occur in the SRA, and will identify any additional facility improvements. An Environmental Impact Report/Environmental Impact Statement (EIR/EIS) will be prepared as part of this project. Currently, a scoping meeting for the project is anticipated for fall 2016.

The Proposed Action and alternatives would have no direct impact on recreational trails, their use, or impart any increased risk to recreationists within the County. As noted, El Dorado County, through its Parks and Recreation Element of the General Plan, provide guidance to help identify, avoid, or otherwise mitigate the potential impacts of planned activities on these resources and activities.

The future development within the Subcontractor service areas that will be served under the Proposed Action and Alternatives will necessarily be consistent approved plans to develop and manage county-wide recreation resources. For this reason, and because the level and location of future development under the Proposed Action and Alternatives will be indistinguishable from that under the No Action Alternative, the potential indirect impact on trails and recreation safety would be likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.7-2 Result in an increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

4.10.7.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The County, through its Parks and Recreation Element of its 2004 General Plan and its 2014 *Final El Dorado County Parks and Trails Master Plan*, documents its commitment to providing an adequate level of recreational parklands. Proper oversight and planning will ensure that park usage is not exceeded concomitant with anticipated and approved growth. This principal has been firmly established in the El Dorado County General Plan, Parks and Recreation Element and the 2014 Master Plan.

The Proposed Action and Alternatives would have no direct impact on recreational parks. The El Dorado County General Plan, through its Parks and Recreation Element, provide guidance to help identify, avoid, or otherwise mitigate the potential impacts of increased pressures placed on existing park/recreational facilities. Future development served by the Proposed Action and Alternatives would be consistent with Parks and Recreation Element. For this reason, and because the level and location of future development under the Proposed Action and Alternatives will be indistinguishable from that under the No Action Alternative, the indirect impact of the Proposed Action or Alternatives on future use of parks and recreational facilities is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.8 4.10.8Visual Resources (Indirect Effects Study Area)

Section 4.10.8 of this Final EIS addresses the potential indirect, service-area-related impacts on existing visual resources that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes and supplements information and analysis presented in sections 4.16 (Affected Environment: Visual Resources) and 5.18 (Visual Resources Environmental Consequences) of the Draft EIS/EIR.

4.10.8.1 Affected Environment

Section 4.16 of the Draft EIS/EIR presents an overview of the environment related to the existing visual resources of El Dorado County. The following summarizes the affected environment description presented in the Draft EIS/EIR related to the existing visual resources in those Subcontractor service areas where this new water allocation will be used.

4.10.8.1.1 Regional Visual Setting

Undeveloped lands characterize much of El Dorado County included within the EID and GDPUD service areas. The native environment varies throughout El Dorado County. Gently rolling grassy foothills containing oak woodlands, orchards, and vineyards dominate views in the County's western and southern areas. Views of the gently rolling foothills progressively change into landscapes consisting of steep, scenic river and stream corridors with dense woodlands, rugged valleys, and mid-range views of peaks along the crest of the Sierra Nevada. Historic buildings, trails, and remnants of the early mining history of the County contribute significantly to the visual environment. Agricultural activities including ranching, orchards, vineyards and wineries, and grazing lands provide visual elements as well.

The existing urban environment is as varied as the native environment. The largest portion of the proposed place of use for the P.L. 101-514 water lies within the more heavily-developed western portion of the county along Highway 50, including El Dorado Hills, Bass Lake, and Cameron Park. Areas along State Route 49 are characterized by rural communities with commercial cores with architectural styles reflecting Old West, Victorian, and contemporary design. This character, however, is more common in the GDPUD proposed Subcontractor service area than in the EID area.

In addition, several highways in El Dorado County have been designated by Caltrans as scenic highways or are eligible for such designation. None of these highway segments, however, are within or adjacent to the Subcontractor service areas to be served under the Proposed Action or Alternatives.

4.10.8.1.2 American River and Folsom Reservoir

Folsom Reservoir is located within a landscape of rolling wooded foothills and provides a generally pleasing visual setting for numerous recreational uses, as viewed above the dam. Folsom Reservoir levels are generally drawn down as summer progresses, creating exposed soil along the reservoir's shores, and affecting the overall visual quality; this effect is accentuated in dry years.

Upstream from Folsom Reservoir, many of the tributary streams flow into the forks of the American River in very steep terrain, creating cascades and waterfalls. These features provide notable scenic value to the area. Vegetation in the area is composed of oak woodland, chaparral, and ponderosa pine forest.

4.10.8.2 Environmental Consequences

This section addresses potential indirect, service area-related impacts on the existing visual resources of El Dorado County that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes the information and analysis presented Section 5.18 of the Draft EIS/EIR. Any substantive revisions to the Draft EIS/EIR presented below are cited as such.

The Proposed Action and alternatives would have the following indirect effects on visual resources within, and in the vicinity of, the Subcontractor service areas:

4.10.8-1 Result in a substantial adverse effect on a scenic vista or substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a State scenic highway.

4.10.8.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The Land Use Element of the El Dorado County General Plan contain provisions addressing the protection of visual resources including scenic vistas and other aesthetic values along scenic, historic roadway corridors. The County is responsible for reviewing all projects within designated State Scenic Highway corridors for compliance with State criteria. There are no State Scenic Highway corridors with the proposed EID or GDPUD services areas.[180] The delivery of water from the proposed CVP M&I water service contract would not substantially change the existing scenic resources of El Dorado County.

Water made available under the Proposed Action and alternatives would serve future development only in areas that are designated for municipal and industrial use in the El Dorado County General Plan and TGPA/ZOU. El Dorado County, through its Land Use Element of the General Plan, has policies and implementation measures in place to help identify, avoid, or otherwise mitigate planned activities that may impart adverse effects on visual resources. Future development to be served under the Proposed Action or Alternatives would necessarily be consistent with these policies and measures. In addition, the nature and location of development served by the Proposed Action or Alternatives would be indistinguishable from that of the No

180 California Scenic Highway Mapping System, El Dorado County. http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm. Accessed April 2016.

Action Alternative. As such, the impact of Proposed Action and Alternatives on visual acuity, aesthetics, or any scenic vista within the County would likely result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.8-2 Result in a substantial degradation to the existing visual character or quality of the site and its surroundings or create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

4.10.8.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

As noted previously for 4.10.8-1 and in the Draft EIS/EIR, the Land Use Element of the El Dorado County General Plan contain provisions addressing the protection of visual resources including scenic vistas and other aesthetic values along scenic, historic roadway corridors. The County is committed to maintaining the characteristic natural landscape features unique to each area within the County. The delivery of water from the proposed CVP M&I water service contract would substantially degrade the existing visual character or quality within the service areas.

Water made available under the Proposed Action and alternatives would serve future development only in areas that are designated for municipal and industrial use in the El Dorado County General Plan and TGPA/ZOU. El Dorado County, through its Land Use Element of the General Plan, has policies and implementation measures in place to help identify, avoid, or otherwise mitigate planned activities that may impart adverse effects on visual resources including any increase in nighttime glare. Future development to be served under the Proposed Action or Alternatives would necessarily be consistent with these policies and measures. In addition, the nature and location of development served by the Proposed Action or Alternatives would be indistinguishable from that of the No Action Alternative. As such, the impact of Proposed Action and Alternatives on visual character and glare within the Subcontractor service areas would be likely result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.9 CULTURAL RESOURCES

Section 4.10.9 of this Final EIS addresses the potential indirect, service-area-related impacts on existing cultural resources that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes and supplements information and analysis presented in sections 4.17 (Affected Environment: Cultural Resources) and 4.19 (Cultural Resources Environmental Consequences) of the Draft EIS/EIR.

4.10.9.1 Affected Environment

Section 4.17 of the Draft EIS/EIR presents an overview of the cultural resources of El Dorado County. The following summarizes the affected environment description presented in the Draft EIS/EIR related to existing cultural resources in those Subcontractor service areas where this new water allocation will be used.

4.10.9.1.1 Service Area-Related Cultural Resources

The Water Agency's planning area covers approximately 18,270 acres. According to the files at the North Central Information Center of the California Historical Resources Information System, housed at CSU Sacramento, roughly 4,252 acres, or about 23 percent of the area, had been subject to previous cultural resources studies as of 2006. These are of various ages and levels of completeness, and many of them may not be up to current standards. They are listed in the Class I Overview prepared for Reclamation (Waechter 2008). A review of the Information Center's files, published references, and historic-period maps has identified 325 recorded or potential cultural resources, of which 146 appear to lie within the planning area boundaries.

4.10.9.1.2 Prehistoric/Native American Resources

The most common element of prehistoric/Native American resources, which include ethnographic period sites, are milling features: mortars and grinding slicks made on boulders or bedrock outcrops. These occur as isolated features and also in association with artifacts, midden, and lithic scatters of flaked stone tools and debitage. According to the records search results, none of the known prehistoric sites or components within the Plan Area has been formally evaluated for eligibility to the National Register of Historic Places or the California Register of Historical Resources.

4.10.9.1.3 Historic-Era (Non-Native) Resources

Historic-period resources make up two-thirds of the total, and these are dominated by mining remains, ditches/canals (which may also be related to mining), refuse deposits, and roads/trails. Adits, shafts, tailings, and prospect pits (also called "glory holes" or "coyotes") cover much of El Dorado County, as well as adjacent Placer, Nevada, and Amador counties. Roads and trails were constructed to access mining sites and connect settlements, and these travel corridors join to form webs across the landscape, along which people built houses, farms, and commercial businesses. Refuse deposits, like prehistoric lithic scatters, are common elements of many sites. Few, if any, of these resources have been formally evaluated for eligibility to the National Register of Historic Places or the California Register of Historical Resources.

4.10.9.2 Environmental Consequences

This section addresses potential indirect, service area-related impacts on the existing cultural resources of El Dorado County that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This section summarizes the information and analysis presented Section 5.19 of the Draft EIS/EIR. Any substantive revisions to the Draft EIS/EIR presented below are cited as such.

The Proposed Action and Alternatives would have the following indirect effects on cultural resources within the Subcontractor service areas:

4.10.9-1 Result in a substantial adverse change in the significance of an historical or archaeological resource.

4.10.9.3 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

El Dorado County, through its various policies and implementation measures identified in its Conservation and Open Space Element relevant to cultural and historic resources, provides guidance to help identify, avoid, or otherwise mitigate any potential future planned activities on these resources. The Cultural Resources Ordinance is integrates all of these protective provisions into one overall guidance document. Future development to be served under the Proposed Action or Alternatives would necessarily be consistent with County policies and measures intended to protect significant resources. In addition, the nature and location of development served by the Proposed Action or Alternatives would be indistinguishable from that of the No Action Alternative. As such, the impact of Proposed Action and Alternatives on historical or archaeological resources within the Subcontractor service areas would likely result in minimal effects*.*

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.9-2 Result in the disturbance of any human remains, including those interred outside formal cemeteries.

4.10.9.4 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

As noted, Water made available under the Proposed Action and alternatives would serve future development only in areas that are designated for municipal and industrial use in the El Dorado County General Plan and TGPA/ZOU. The County possesses and adheres to numerous policies related to the protection of cultural resources. El Dorado County, through its various policies and implementation measures identified in its Conservation and Open Space Element and, consistent with the provisions of the Cultural Resources Ordinance, provides guidance to help identify, avoid, or otherwise mitigate any potential future planned activities on the possible discovery of past human remains. As such, the potential for indirect impact from the Proposed Action or Alternatives is likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives.

4.10.10 Terrestrial Biological Resources (Service Area Impacts)

This section of the Final EIS describes terrestrial biological resources that occur within the Subcontractor service areas likely to receive new water supplies under the Proposed Action and Alternatives evaluated in this Final EIS. This section addresses the potential indirect impacts on these resources that could occur as a result of planned development facilitated by water made available by the Proposed Action or alternatives to that action. Information and analysis presented in sections 4.18 (Affected Environment: Terrestrial and Wildlife Resources) and 5.20 (Environmental Consequences: Terrestrial and Wildlife Resources) of the Draft EIS/EIR are summarized and supplemented, as appropriate, herein.

This section also incorporates by reference information and analysis contained in the Draft Biological Assessment for the Central Valley Project Water Service Contract Between the U. S. Bureau of Reclamation and El Dorado County Water Agency Authorized Under P.L. 101-514 Section 206 (Draft BA) (Reclamation 2009). This Draft BA was prepared as part of the federal Endangered Species Act Section 7 consultation between Reclamation and the USFWS and addresses potential project impact on federally listed terrestrial species. The Draft BA was included as Appendix G of the Draft EIS/EIR.

4.10.10.1 Affected Environment

Section 4.18 of the Draft EIS/EIR presents an overview of affected environment to terrestrial biological resources within the EID and GDPUD Subcontractor service areas. As noted in the Draft EIS/EIR, El Dorado County possesses a diverse mix of native flora and fauna. This diversity can be attributed to a combination of unique physical characteristics that have resulted in a wide assortment of habitats. These unique physical features include a wide range of elevations and varied terrain, diverse substrate material, large tracts of contiguous natural habitat, and a broad range of climatic conditions.

The following summarizes the affected environment description presented in the Draft EIS/EIR related to existing terrestrial biological resources in those Subcontractor service areas where this new water allocation will be used.

4.10.10.1.1 Coniferous Forest Habitats

Coniferous forest habitats are the dominant vegetation type above 2,500 feet elevation. Coniferous forest habitats cover 613,200 acres, or more than half of the 1,145,400 acres in the county. The eight major coniferous forest habitats in El Dorado County are Douglas-fir, Jeffrey pine, lodgepole pine, ponderosa pine, red fir, Sierran mixed conifer, subalpine conifer, and white fir. Within the Subcontractor service areas, Sierran mixed confer is the dominant type of the coniferous forest habitats.

4.10.10.1.2 Woodland Habitats

Woodland habitats are located primarily at middle and lower elevations in the western half of El Dorado County. The four major woodland habitats are montane hardwood-conifer, montane hardwood, blue oak-foothill pine, and blue oak woodland. These habitats combined cover 252,400 acres in El Dorado County. Woodland habitats range in structure from open savannah to dense forest. Sensitive woodland habitats in the county include montane riparian, valley-foothill riparian, aspen, and valley oak woodland.

<u>Montane hardwood-conifer</u>, which covers 49,100 acres, includes vegetation associated with both coniferous and hardwood habitats and is a transitional habitat between the montane hardwood, mixed chaparral, and woodlands of low elevations and the coniferous forests of high elevations.

<u>Montane hardwood</u> covers 155,900 acres. This habitat usually occurs at lower elevations than montane hardwood-conifer and is often associated with major river canyons. Montane hardwood is composed of a mixture of trees that occur on rocky, poorly developed and well drained soils. At low elevations, common species include canyon live oak, foothill pine, madrone, and California bay. Black oak and Douglas-fir may occur at higher elevations. Common shrubs in montane hardwood habitat include wood rose, snowberry, manzanita, and poison-oak.

<u>Blue oak-foothill pine</u> covers 4,200 acres and is characterized by a mixture of hardwoods, conifers, and shrubs. This habitat is found generally in the foothills where it intergrades with blue oak woodland and annual grassland at lower elevations, extending up to about 3,000 feet elevation, where it frequently intergrades with mixed chaparral. The understory is commonly characterized by clusters of mixed shrubs with interspersed openings dominated by annual grasses. Blue oaks are dominant at lower elevations but are usually outnumbered by foothill pines at higher elevations. Associated tree species include interior live oak, canyon live oak, and California buckeye. Interior live oaks are present on alluvial soils associated with river floodplains, low foothills, and upland slopes. Canyon live oaks are present on low foothills, mountain canyons, upland slopes, and exposed ridges.

<u>Blue oak woodland</u> covers 43,200 acres and is found mostly below 3,000 feet elevation on shallow, rocky, and infertile soils. Blue oak woodland includes an understory of annual grasses

or a poorly developed shrubby understory featuring species such as poison-oak, California coffeeberry, and buckbrush. Interior live oaks and canyon live oaks are often found in blue oak woodland. These species can also be the dominant tree species where they may be considered as distinct habitats. Interior live oaks are often associated with river floodplains, low foothills, and upland slopes. In low elevation foothill woodlands, interior live oaks occur as widely spaced trees or clumps that may be concentrated around rock outcrops. Interior live oak becomes a more significant part of the blue oak woodland canopy with increasing elevation, particularly on north-facing slopes. Canyon live oaks are found on low foothills, mountain canyons, upland slopes, and exposed ridges.

4.10.10.1.3 Shrub-Dominated Habitats

Shrub-dominated habitats exist at scattered locations throughout the county and include sagebrush, alpine dwarf-shrub, montane chaparral, chamise chaparral, and mixed chaparral. These five habitats cover a total of 84,100 acres. Although none of these habitats are considered sensitive, they are known to provide habitat for a number of special-status plant and wildlife species.

Alpine dwarf-shrub covers 1,200 acres above 8,500 feet elevation. The prostrate plants within this habitat are adapted to the thin, rocky soil, heavy snowpack, and short growing season. Common plants include pussy paws, Sierra primrose, Davidson’s penstemon, and Indian paintbrush. This habitat is not found in the Subcontractor service areas.

Chamise chaparral covers 3,700 acres and is usually found below 4,000 feet elevation often consists of nearly pure stands of chamise. The purest stands of chamise occur on xeric (dry), south facing slopes. Toyon, sugar sumac, poison-oak, and California buckthorn are commonly found with chamise in drainages and on other relatively moist sites.

4.10.10.1.4 Herbaceous-Dominated Habitats

Annual grassland, which covers 81,100 acres, is the only major herbaceous-dominated habitat in El Dorado County. Annual grassland is fairly common at low elevations (i.e., below 2,500 feet elevation) in the western region of the county. This habitat comprises mostly non-native annuals, primarily of Mediterranean origin, but can also include a variety of native herbaceous species. Nonnative grasslands have replaced most native perennial grasslands in El Dorado County and throughout most of California.

4.10.10.2 Wildlife

The complex array of habitats in El Dorado County supports abundant and diverse fauna because large tracts of land are covered by habitats known to have outstanding value for wildlife, such as mixed coniferous and hardwood forests. Sierran mixed conifer habitat alone, the most common habitat in the county, supports 355 species of animals (Verner and Boss 1980). Oak woodlands provide habitat for more than 100 species of birds, 60 species of mammals, 80 species of amphibians and reptiles, and 5,000 species of insects (Verner and Boss 1980, Pavlik et al. 1991). Blue oak-foothill pine, another major habitat type in El Dorado County, provides suitable breeding habitat for 29 species of amphibians and reptiles, 79 species of birds, and 22 species of mammals (Verner and Boss 1980).

Important wildlife habitat is found throughout the county. Large contiguous blocks containing multiple habitat types have the potential to support the highest wildlife diversity and abundance. Special-status wildlife species occur in both large and small blocks of habitat, while some large mammals and other species that have large home ranges are generally found only on large undisturbed parcels. Generally, the lowest diversity of native wildlife species can be expected in densely urbanized areas as in much of the EID Subcontractor service area.

Wildlife diversity is generally high in the lower montane coniferous forest types. Amphibians and reptiles found in lower montane forest and woodlands include Pacific treefrog and rubber boa. Common resident birds in these forests include Stellar's jay and hairy woodpecker. Migratory species that use these forests for breeding during summer months include western tanager, Nashville warbler, and black-headed grosbeak. Common mammals in lower montane coniferous forests include mule deer and Douglas' squirrel.

Oak and other hardwood habitats at mid-elevations are important for a large percentage of the wildlife species found in El Dorado County. Reptiles and amphibians found in oak woodlands include California slender salamander, western fence lizard, and California kingsnake. Common birds in oak woodland include acorn woodpecker, western scrub-jay, and oak titmouse. Mammals that characterize oak woodland habitat include mule deer, western gray squirrel, gray fox, and bobcat.

Chaparral generally has lower wildlife diversity than most forest and woodland habitats. However, chaparral does provide habitat for many wildlife species, including some that are considered rare elsewhere. Reptiles found in chaparral include western rattlesnake, western fence lizard, and western whiptail. Common birds in chaparral at low elevations include wrentit, Bewick's wren, California towhee, and California quail. At higher elevations chaparral can provide habitat for mountain quail, fox sparrow, and green-tailed towhee. Mammals commonly associated with chaparral include and gray fox and mule deer.

Annual grasslands generally support lower wildlife diversity than woodland and shrub-dominated habitats but are invaluable to the grassland-dependent species found in El Dorado County. A great diversity and abundance of insects rely on grasslands. Reptiles found in annual grasslands include western fence lizard and gopher snake. Birds that are common in this habitat include western meadowlark, Say's phoebe, and savanna sparrow. Mammals known to use this habitat include California ground squirrel, black-tailed jackrabbit, pocket gopher, and coyote.

Agricultural land and lands dominated by urban development support many wildlife species, most of which are highly adapted to these disturbed environments. Agricultural land is not generally considered important wildlife habitat but is used by many species, particularly as foraging habitat. Wildlife found in agricultural areas varies by crop type and time of year. Common wildlife expected in most agricultural regions of El Dorado County include Brewers blackbird, American crow, red-tailed hawk, house finch, raccoon, striped skunk, and opossum.

Wildlife found in urban areas is often dependent upon surrounding land uses and the presence or absence of nearby natural vegetation. In densely urbanized areas such as El Dorado Hills, Cameron Park, and Shingle Springs, a large percentage of the wildlife can be made up of exotic species such as rock dove, European starling, house sparrow, house mouse, and brown rat. Urban areas provide habitat for species also found in agricultural areas, such as mourning dove, American robin, and western gray squirrel.

4.10.10.3 Sensitive Habitats

Sensitive habitats for El Dorado County and, specifically, in those areas delineated by the proposed Subcontractor service areas have been identified and described in detail in other documents. Most notably, the Draft BA for listed terrestrial species associated with the Section 7 consultation between Reclamation and USFWS for this action provides a thorough discussion of these habitats and potentially affected listed species (see Appendix G of the Draft EIS/EIR). A brief summary of some of the sensitive habitats includes those for montane and valley-foothill riparian habitat, valley oak woodland, and vernal pools.

<u>Montane riparian</u> habitat, which covers 700 acres, is associated with montane lakes, ponds, seeps, bogs, and meadows, as well as rivers and streams. This habitat is usually present below 8,000 feet elevation. Montane riparian vegetation is quite variable and often structurally diverse. Usually, the montane riparian zone occurs as narrow, often dense grove of broadleaved, deciduous trees. In the Sierra Nevada, characteristic species include thinleaf alder, aspen, black cottonwood, dogwood, wild azalea, willow, and white alder. Like all riparian habitats, montane riparian habitat supports rich fauna that include a high diversity of amphibians, reptiles, birds and mammals. Montane and other riparian habitats also provide important migration and dispersal corridors for wildlife (Mayer and Laudenslayer 1988). A few of the many common wildlife species associated with montane riparian habitat in El Dorado County include western aquatic garter snake, Pacific treefrog, Wilson's warbler, and mink. Several special-status wildlife species depend on montane riparian including willow flycatcher and yellow-legged frog.

<u>Valley-foothill riparian</u> habitat is typically found at lower elevations (i.e., below 3,000 feet elevation) in western El Dorado County. It is found along many of the rivers and streams that flow through the valleys and rolling foothills in this region. Plant diversity within valley-foothill riparian varies considerably depending upon hydrological factors, soils, and other environmental conditions. Dominant tree species may include Fremont cottonwood, willow, and valley oak. The

understory typically consists of a shrub and herbaceous layer. Common shrubs and vines include wild rose, blackberry, blue elderberry, poison-oak, wild grape, California coffeeberry, and willows. Common wildlife associated with valley-foothill riparian habitat include black-headed grosbeak, bushtit, striped skunk, raccoon, and gray fox. Special status wildlife species that depend on valley-foothill riparian habitat include the northwestern pond turtle, Cooper's hawk, and foothill yellow-legged frog.

Valley oak woodland covers 3,300 acres at lower elevations in El Dorado County. This habitat, which is dominated by valley oaks, varies from savanna-like to forest-like stands with partially closed canopies. Valley oak woodland is composed mostly of winter-deciduous, broad-leaved species. Denser stands typically grow in valley soils along natural drainages. In the foothills, valley oak woodland often intergrades with blue oak woodland or blue oak-foothill pine habitats. Trees frequently associated with this habitat include western sycamore, box elder, Northern California black walnut, blue oak, and interior live oak. Valley oak woodland, like most oak woodland habitats, supports numerous wildlife species. It is particularly important for species that feed on acorns, are cavity-nesters, or otherwise dependent on valley oaks for food and/or breeding habitat. Wildlife found commonly in valley oak woodland includes gopher snake, acorn woodpecker, oak titmouse, white-breasted nuthatch, California quail, and western gray squirrel. Valley oak woodland is classified by both the CNDDB and CWHR, and is listed as a high-priority community for inventory by the CNDDB.

Vernal pools are associated with annual grassland habitat in the westernmost region of the county. These ephemeral pools support many endemic species, including special-status plants, invertebrates, and amphibians. Suitable topographic and soil conditions are prerequisites for the occurrence of vernal pools. The topography requirement is a series of microdepressions that collect water from precipitation and runoff from the surrounding higher landforms during the rainy season. The important soil requirement is a subsoil hardpan or claypan, which prevents the draining of water from these pools by downward percolation, resulting in a perched water table. Vernal pools are typically characterized by a high percentage of native annuals such as goldfields, downingia, and meadowfoam.

4.10.10.4 Federally Listed Plant and Wildlife Species

In keeping with Section 7 of the Federal Endangered Species Act (ESA) (16 U.S.C. 1536c), Reclamation completed a Draft Biological Assessment (BA) for the Proposed Action and submitted the BA to the U. S. Fish and Wildlife Service (USFWS) for review in April 2008. The BA was included in the Draft EIS/EIR as Appendix G. The BA evaluates the direct and indirect effects of the Proposed Action on terrestrial federally listed threatened, endangered, candidate, and proposed species within the EID and GDPUD service areas. The primary analysis included in the BA addresses eight federally listed terrestrial species, listed below, that are known to occur in the "Action Area" which, includes the portions of the EID and GDPUD service areas: areas that could receive water made available under the Proposed Action and Alternatives. The list of species also includes species that could potentially occur in the Action Area, based on geographic range, elevation range and habitat present.

The eight federally listed terrestrial species that are known to occur in the Action Area, or that could potentially occur in the Action Area, based on geographic and elevation range and habitat present, are listed here:

4.10.10.4.1 Federally Listed Plants

- Stebbins' morning glory (*Calystegia stebbinsii*; Federal Endangered (FE), California Endangered (CE), California Native Plant Society (CNPS) 1B.11,2)
- Pine Hill ceanothus (*Ceanothus roderickii*; FE, California Rare (CR), CNPS 1B.23)
- Pine Hill flannel bush (*Fremontodendron californicum* ssp. *decumbens*; FE, CR, CNPS 1B.2)
- El Dorado bedstraw (*Galium californicum* ssp. *sierrae*; FE, CR, CNPS 1B.2)
- Layne's ragwort (*Packera layneae*; Federal Threatened (FT), CR, CNPS 1B.2)

4.10.10.4.2 Federally Listed Wildlife

- Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*; FT, Federal Proposed for Delisting (FPD)
- California red-legged frog (*Rana aurora draytonii*; FT, California Species of Concern (CSC))
- Bald eagle (*Haliaeetus leucocephalus*; Former FT (Delisted 2007), CE, California Fully Protected Species (CFP))

Provided below is a summary of the status of federally listed plant and wildlife species known to occur or potentially occurring in the Action Area. Each summary includes an analysis of the location and extent of potential habitat for these species. Detailed information on critical habitat and the life history for each of these species is provided as Appendix G of the Draft EIS/EIR.

4.10.10.5 Federally Listed Plants

Four of the five gabbro soils plants—Stebbins' morning glory, Pine Hill ceanothus, and Layne's ragwort, and El Dorado bedstraw—are known to occur in the Action Area, and one could potentially occur in appropriate habitat (Pine Hill flannel bush). Refer to Figure 4 for a map of known occurrences of these species in the Action Area. Three of the species—Pine Hill ceanothus, Pine Hill flannel bush and El Dorado bedstraw—are endemic (restricted) to gabbro-derived soils (also called Rescue soils) of the Pine Hill formation in western El Dorado County. The two remaining species—Stebbins' morning glory and Layne's ragwort—occur primarily in Rescue soils of the Pine Hill formation, but are also known to occur in several other locations on serpentine- and gabbro-derived soils (USFWS 2002a).

A summary of the location of known occurrences of each gabbro plant in the southern portion of the Action Area is provided below. Refer to Appendix G of the Draft EIS/EIR for an overview of the life history and ecology of each plant.

4.10.10.5.1 Stebbins' morning glory (Calystegia stebbinsii; FE, CE, CNPS 1B.1)

Stebbins' morning glory is found on serpentine and gabbro-derived soils, and occurs primarily in western El Dorado County. One known occurrence was identified in initial analyses conducted for the southern portion of the Action Area east of Bass Lake—two colonies about 0.35 mile west of the Cameron Park Drive exit, north of Highway 50 and the frontage road. There are several additional occurrences immediately east of the Action Area, east of Cameron Park Drive overpass, and northeast of the junction of Meder Road and Cameron Park Drive.

The southern portion of the Action Area located west of Bass Lake supports several large populations totaling 300 or more individuals located from Salmon Falls Road to Kanaka Valley, south of the South Fork American River. These populations are located within the Salmon Falls Unit of the Pine Hill Preserve and extend outside of the Action Area, eastward along the South Fork American River.

4.10.10.5.2 Pine Hill ceanothus (Ceanothus roderickii; FE, CR, CNPS 1B.2)

Pine Hill ceanothus is endemic to the Rescue soils of the Pine Hill formation in western El Dorado County. A population of Pine Hill ceanothus was known to occur in the southern portion of the Action Area in Cameron Park, ½ mile west of Cameron Park Drive exit on the north side of Highway 50. However, CNDDB (2007) notes that this population has most likely been extirpated. There are additional occurrences east of the southern portion of the Action Area, along Highway 50 between Cameron Park and Shingle Springs. CNDDB includes records for the southern portion of the Action Area located west of Bass Lake, including several populations of Pine Hill ceanothus located south of the South Fork American River, east of Salmon Falls Road and Folsom Lake. While the total number of individuals in these populations is not known, estimates are as high as 12,000 individuals. These populations are located within the Salmon Falls Unit of the Pine Hill Preserve. These populations extend outside of the Action Area, eastward along the South Fork American River.

4.10.10.5.3 Pine Hill flannel bush (Fremontodendron californicum ssp. decumbens; FE, CR, CNPS 1B.2)

Pine Hill flannel bush is endemic to the Rescue soils of the Pine Hill formation in western El Dorado County. There are no known occurrences of Pine Hill flannel bush in the Action Area. However, there is a known occurrence just outside the southern portion of the Action Area.

4.10.10.5.4 El Dorado bedstraw (Galium californicum ssp. sierrae; FE, CR, CNPS 1B.2)

El Dorado bedstraw is endemic to Rescue soils of the Pine Hill formation in western El Dorado County. There are several populations of El Dorado bedstraw located in the southern portion of the Action Area west of Bass Lake. These include two populations, one located at 0.5 miles east of the Salmon Falls bridge, and one at 2 miles east of the Salmon Falls bridge in a ravine opening into the South Fork American River; a population located near the confluence of Sweetwater Creek and the South Fork American River; and five colonies totaling approximately 150 individuals located east of Folsom Lake between Sweetwater and Cracker creeks. These populations are location within or partly within the Salmon Falls Unit of the Pine Hill Preserve. In addition, there is a known occurrence immediately east of the Action Area, between Cameron Park Drive and Sabana Drive.

4.10.10.5.5 Layne's ragwort (Packera layneae; FT, CR, CNPS 1B.2)

Layne's ragwort is found on serpentine- and gabbro-derived soils, and occurs primarily in western El Dorado County. There are several known occurrences of Layne's ragwort in the southern portion of the Action Area east of Bass Lake—on the east side of Bass Lake Road, about 0.25 mile south of intersection with Green Valley Road; on the east side of Bass Lake Drive, near intersection with Woodleigh Lane; west of Wilkinson Road, about 1 mile ENE of Bass Lake; east of Bass Lake, on Woodleigh Court; about 1 air mile due east of Bass Lake, west of Woodleigh Lane; and near a small reservoir at the corner of Woodleigh Lane and Surrey Lane. There are additional occurrences immediately east of the Action Area, south of the intersection of Cameron Park Drive and Meder Road. In addition, there are several records for populations located near Salmon Falls Road and the South Fork American River and along Crocker Creek within the Sweetwater Creek Drainage. These populations are located within the Salmon Falls Unit of the Pine Hill Preserve. These populations extend outside of the Action Area, eastward along the South Fork American River.

4.10.10.6 Federally Listed Wildlife

A summary of the location of known occurrences of federally listed wildlife species is provided below. Refer to Appendix G of the Draft EIS/EIR for an overview of the life history and ecology of each species and to Figure 4 of the Draft EIS/EIR for a map of known occurrences of these species in the Action Area.

4.10.10.6.1 Valley elderberry longhorn beetle (Desmocerus californicus dimorphus; FT)

There is no critical habitat for valley elderberry longhorn beetle in the Action Area. The closest critical habitat is located in Sacramento County along the American River Parkway (USFWS 1984). No survey data are available on elderberry shrubs in riparian areas within the Action Area, and there are no known occurrences of valley elderberry longhorn beetle within the Action Area (CNDDB 2007). At the time of its listing, the loss of riparian habitat was identified as one of the major threats to valley elderberry longhorn beetle, and recovery efforts for valley elderberry longhorn beetle have focused on the preservation and restoration of riparian habitat (USFWS 2006b). In its 5-year review for valley elderberry longhorn beetle issued on October 2, 2006, USFWS recommended valley elderberry longhorn beetle for delisting, noting that since 1980 approximately 50,000 acres of existing riparian habitat have been protected in the Sacramento and San Joaquin valleys, and an additional 5,000 acres of habitat have been restored for the benefit of the beetle (USFWS 2006b).

4.10.10.6.2 California red-legged frog (Rana aurora draytonii; FT, CSC)

The Action Area does not contain designated critical habitat for California red-legged frog. The nearest critical habitat units, ELD-1 and PLA-1are located approximately 15 miles to the east and 15 miles to the northeast of the Action Area, respectively (USFWS 2008). There are no known occurrences of California red-legged frog in the northern or southern portions of the Action Area. The closest known records for California red-legged frog in El Dorado County include a 2005 record for a single adult California red-legged frog found just outside the Action Area in a drainage leading to Folsom Lake, located at Fitch Way (CNDDB 2009). It is not confirmed if this individual was from a larger population in the vicinity. The closest confirmed California red-legged frog population is located approximately 20 miles east of the southern portion of the Action Area at Spivey Pond, on the north fork of Weber Creek; and approximately 5 miles to the northwest from the southern portion of the Action Area, on the east side of Folsom Lake. The closest known records for California red-legged frog in Placer County are approximately 15–20 miles northeast of the northern portion of the Action Area at Michigan Bluff and at Ralston Ridge.

One California red-legged frog expert who has conducted surveys in the vicinity of the GDPUD service area states California red-legged frog were not present in the northern portion of the Action Area historically, and that there is a very limited potential for California red-legged frog within the area (Barry, pers. comm., 2006). However, breeding habitat may be present in riparian or wetland areas, especially in small ponds and potholes in flat or gently sloping terrain close to the headwaters of short foothill streams (Barry, pers. comm., 2006).

4.10.10.6.3 Bald eagle (Haliaeetus leucocephalus; Former FT, CE, CFP)

USFWS removed the bald eagle in the lower 48 states from the list of threatened and endangered wildlife in 2007 (USFWS 2007). The Action Area is located in what was previously Bald Eagle Management Zone 28, Sierra Nevada Mountains (CA-NV) (USFWS 1986). The Action Area does not contain a “key occupied area or potential nesting area” as formerly designated by USFWS for recovery of the species (USFWS 1986). There are no known occurrences of bald eagle in the Action Area. However, Bass Lake, just west of the southern portion of the Action Area, represents wintering habitat for bald eagle, which have been observed wintering at this location since the 1950s (CNDDB 2007). Bald eagles are known to nest at Sly Park and Stumpy Meadows reservoirs, approximately 25 miles to the east and northeast, respectively (Ebert, pers. comm., 2006).

4.10.10.7 Environmental Consequences

This section addresses potential indirect, service area-related impacts on the existing terrestrial and wildlife resources of El Dorado County that could result from the implementation of the new CVP water service contracts authorized under P.L. 101-514. This subchapter summarizes the information and analysis presented Section 5.20 of the Draft EIS/EIR. Any substantive revisions to the Draft EIS/EIR presented below are cited as such. The analysis presented here was conducted at a general, programmatic level, consistent with the framework and rationale described in Section 4.1 of this Final EIS.

4.10.10-1 Have a significant adverse effect, either directly through habitat modifications, fragmentation, on any species in local or regional plan, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

4.10.10.8 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The El Dorado County General Plan EIR noted that potentially significant secondary impacts on wildlife habitat associated with urbanization may include such effects as the reduction in water quality caused by urban runoff, erosion and siltation; increased noise and lighting that reduce habitat value for nocturnal wildlife; intrusion of humans and domestic animals and the resulting predation and disturbance of wildlife; increased uses of natural areas for recreational activities; impacts on tree canopy and understory from fire safety methods (defensible space); and introduction of non-native invasive species that would degrade existing habitats for native plant and wildlife species.

Impacts on these major habitat types would be considered significant because conversion for high- and medium-intensity land uses would remove and fragment a substantial amount of the existing wildlife habitat on the west slope. While low-density development reduces habitat quality much more than it reduces the amount of habitat, even low-density development, such as rural ranchettes, can have a substantial impact on habitat quality. One of the most significant impacts of low-density development and non-urban sprawl on wildlife is fragmentation of habitat patches by roads, structures, and fences. The negative consequences of habitat fragmentation are well known theoretically and have been documented in numerous studies. When habitat is fragmented from a few large patches to numerous small patches, wildlife diversity is expected to decrease even if the remaining parcels support similar vegetation and the decrease in the total amount of habitat is small.

The General Plan includes two policies that provide some degree of protection for wildlife habitat: (1) discourage development on slopes over 40 percent (Policy 7.1.2.1); and (2) oak canopy retention guidelines based on land use designation (Policy 7.4.4.4). Although these policies would provide some protection, they would be ineffective at reducing this impact to a minimal effect, because they do not include mandatory standards and apply only to discretionary projects.

Policy CO-12a addresses retention of native vegetation. Under this policy, development outside an approved building envelope on previously undisturbed sites shall retain existing, native vegetation to the greatest extent feasible. However, since this policy only requires preserving native vegetation if feasible, it is not expected to provide much guaranteed protection for wildlife habitat but it could reduce the overall amount of habitat loss and fragmentation. The effectiveness of the policy would be largely dependent upon the level of enforcement by the County.

Policy CO-11a requires that the County provide for Open Space lands through various mechanisms, including the designation of land as Open Space, Rural Lands, and Natural Resources. Policy CO11b requires that Open Space, Natural Resources, and Rural land use designations on the General Plan Land Use Map be maintained in support of identification of natural-resource areas required for the conservation of important habitat resources, including habitat for special-status species; protection of streams, lakes, ponds, springs, wetlands, and adjacent riparian habitat; and protection of large and contiguous native habitats (including river canyons). Impacts on wildlife habitat can be reduced by applying less intensive land use designations to habitats that are important for plant and animal life, but this policy lacks sufficient specificity to ensure that impacts would be lessened, because the designations do not restrict timber harvesting, mining, or agricultural conversion.

Measure CO-I directs the County to develop an integrated natural resources management plan which it has initiated. The management plan would address a number of issues related to protection of wildlife habitat. Specific elements of the management plan would include:

- coordination among, local, state, and federal agencies having jurisdiction over natural resources within the county;
- public involvement in natural resource management planning and implementation;
- conservation and restoration of large and contiguous native habitats;
- thresholds of significance for the loss of various habitats and/or resources;
- connectivity of large and contiguous native plant communities, native habitats, and other
- important habitat features;
- permanent protection of important habitat features through means such as use of Open Space and Natural Resource land use designations or zoning, clustering, large lot design, setbacks, or other appropriate techniques;
- incentive programs;
- monitoring of the plan’s goals and objectives; and
- adaptive management.

The integrated natural resources management plan would be developed within 5 years of General Plan adoption.

As an indirect impact of the Proposed Action and Alternatives, El Dorado County, through its various policies and implementation measures identified in its General Plan's Conservation and Open Space Element relevant to terrestrial and wildlife resources, offers guidance to help identify, avoid, or otherwise mitigate the effects of any potential future planned activities on these resources. By buildout, however, much of the existing habitat at lower elevations could be fragmented or removed by urban and agricultural development. More habitat in the central part of the county could be removed or fragmented than at 2025, because development is expected to continue to spread eastward up the west slope of the Sierra Nevada as western El Dorado County becomes increasingly urbanized. This impact was considered a significant impact in the El Dorado County General Plan EIR. For the Proposed Action, however, the increment of indirect impact is considered likely to result in minimal effects. because the level and location of development served by the Proposed Action and Alternatives would be indistinguishable from that of the No Action Alternative. The impact is considered likely to result in minimal effects.

Mitigation Measures

No mitigation would be required for the Proposed Action Alternatives

4.10.10-2 Substantially affect a rare, threatened or endangered species of animal or plant or the habitat of those listed species.

4.10.10.9 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

The Proposed Action and Alternatives would have no direct impact on any rare, threatened or endangered species within the service areas of either EID or GDPUD. However, the El Dorado County General Plan EIR concluded that development of and projected increases in urban, agricultural, and mined areas under the General Plan would lead to loss of habitat and loss of individuals of both special-status plants and animals. This impact was considered significant for all of the four equal-weight alternatives assessed under the General Plan Update CEQA review process.

As noted above, Reclamation completed a Draft BA for the Proposed Action in April 2008 and submitted the BA to USFWS in accordance with legal requirements set forth under Section 7 of ESA. The purpose of the BA was to evaluate the direct and indirect effects of the Proposed Action on terrestrial federally listed threatened, endangered, candidate, and proposed species within the EID and GDPUD service areas. The BA was included as Appendix G of the Draft EIS/EIR and describes the Section 7 consultation process between Reclamation and the USFWS for the

Proposed Action. Considerable focus was directed towards special-status plants within the EID and GDPUD service areas.

After publication of the Draft EIS/EIR, the USFWS submitted a memorandum to Reclamation in June 2010 stating USFWS's concurrence with the Draft BA's finding that, "…the proposed action, the execution of a new long-term CVP water service contract between EDCWA and the Bureau of Reclamation (Reclamation), is not likely to adversely affect any federally listed species

As described in the Draft BA, the USFWS, EDCWA, EID, Reclamation, and other parties have been involved in ongoing efforts to preserve gabbro plants and their habitat. These efforts have been focused on regional planning for the protection of gabbro plants. Efforts to preserve these plants began in 1979 when, under recommendation from the California Native Plant Society (CNPS), the California Department of Forestry and Fire Protection (now referred to as CAL FIRE) transferred 320 acres of habitat at Pine Hill to CDFW for ecosystem management. In 1992, the El Dorado Board of Supervisors formed a Rare Plant Technical Advisory Committee (RPTAC) with business, non-profit, and state and federal agency participation to advise the County on a rare plant policy. Also in 1992, Reclamation, CDFW, and the Bureau of Land Management signed a Memorandum of Understanding that acknowledged the importance of preservation of habitat for gabbro species. In 1995, USFWS conducted a critical needs analysis as part of its Biological Opinion for the interim CVP water service contracts (as part of the proposed action to renew these CVP contracts) and identified the need to establish a preserve for gabbro species.

Five gabbro plants were listed by the USFWS on October 18, 1996. In 2001, eight local, state, and federal agencies signed a Cooperative Management Agreement that formalized each participant's role in the management and protection of the gabbro plants.

The USFWS issued its Recovery Plan for Gabbro Soil Plants for the Central Sierra Nevada Foothills in 2002. The Recovery Plan provides a recommendation for a 5,000-acre preserve that would provide the best achievable protection for gabbro species in western El Dorado County. The location and prioritization for areas in the preserve was developed in conjunction with the RPTAC. The USFWS considered the following criteria in developing the preserve:

- Priority was given to areas occupied by several of the target species;
- Principles of preserve design (linkages, size of preserve) were considered;
- Developed lands were eliminated to the extent possible; and
- Proportion of private to public lands was considered

El Dorado County, state, and federal agencies have provided funding since the 1990s for the acquisition of properties for a gabbro plants preserve, called the Pine Hill Preserve. A draft Pine Hill Preserve Management Plan (PHPMP) was issued in December 2006 and has undergone public review and comment. The Preserve currently includes 4,042 acres in western El Dorado

County, of which 3,114 acres lie within the 5,000 acres designated for the recovery of the gabbro species in the Recovery Plan. Ownership of the land is divided among the Bureau of Land Management, Reclamation, USFWS, CDFW, CAL FIRE, EDCWA, EID, El Dorado County, and the private non-profit, American River Conservancy (ARC). The PHPMP is formally reviewed and updated every 5 years.

The purpose of the PHPMP is to coordinate management activities at the Preserve with actions undertaken by federal, state and local agencies, conservation organizations, and private landowners to fulfill the objectives of the Preserve. The PHPMP outlines strategies for achieving the following objectives:

- Protect and manage gabbro soil rare plant habitat areas in western El Dorado County to ensure their conservation and recovery;
- Promote and conduct research to find the best management techniques to aid in the conservation and recovery of the gabbro soil rate plants;
- Treat vegetation to reduce fuel loads, maintain functional habitat for the rare gabbro soil plant species, and reduce the risks of wildfire damage to human life and property in areas adjacent to the Preserve;
- Provide the community with recreational, educational, and outreach opportunities concerning rare plants and their habitats; and
- Establish a solid mechanism for funding management activities at the Preserve.

To preserve and provide additional protection for special-status gabbro soil plants, the County, USFWS, and other state and federal agencies are currently attempting to conserve much of the remaining habitat for gabbro soil plants. Expansion of the Pine Hill Ecological Preserve is one of the goals of the USFWS recovery plan for gabbro soil plants. Implementation of the recovery plan is expected to reduce the possibility that gabbro soil plants would become extinct or extirpated from El Dorado County, but because USFWS has no specific legislative mandate to require federal and state agencies or private entities to comply with the goals of the recovery plan, some of the goals may not be reached.

Impacts on special-status plants and their habitat are expected to be most severe in the gabbro soil region outside of the protected Pine Hill Ecological Preserve, but direct and secondary impacts are also expected within designated preserve areas. There is already substantial development in the preserve area, and more development is anticipated. By 2025 the preserve would likely be substantially more isolated because it is almost entirely surrounded by high- and medium-intensity land designations.

As noted previously, El Dorado County and EDCWA have worked with federal and State agencies in the continued development towards a long-term protection and preservation strategy for gabbro soil special status species. These have included the following:

- Contribution to development of the Pine Hill Preserve
  - Funding
    - $2.1M toward purchase of 525 acres
    - $2.9M toward purchase of land
    - $5.7M toward purchase of 236 acres and a preserve manager salary
  - Long-Term Management
    - Cooperative Management Agreement
    - Fulfilling roles as part of the agreement
  - Cooperation with USFWS
    - Development of MOA between USFWS, EDCWA, and El Dorado County regarding long-term protection of gabbro soils plants

As an indirect impact, El Dorado County, through its various policies and implementation measures identified in its General Plan's Conservation and Open Space Element and, consistent with the provisions of the Cultural Resources Ordinance, guidance is provided to help identify, avoid, or otherwise mitigate any potential future planned activities on existing rare, threatened or endangered species within the service areas of either EID or GDPUD. Several General Policies address protection of special-status species; each with varying degrees of anticipated effectiveness.

Policy 7.4.1.1 states that the gabbro soil plants will be protected in perpetuity through the establishment of five preserve sites and that these preserve site shall be integrated into the overall open-space plan.

Policy 7.4.1.3 limits land uses within established preserve areas to activities that are compatible with rare plant protection and requires the County to develop an educational and interpretive program on rare plants. This policy would also reduce impacts on gabbro soil plant populations, particularly secondary impacts, such as degradation of existing habitat caused by inappropriate recreational uses.

Policy 7.4.1.4 requires that approved preserves be designated as Ecological Preserve on the General Plan land use map. The effectiveness of this policy would be dependent upon the degree to which land use restrictions associated with the Ecological Preserve land use designation would protect special-status species.

Policy 7.4.1.5 addresses preparation of natural community preservation/conservation strategies. In most cases, however, Policy 7.4.1.5 would do little to reduce the potential for significant impacts on special-status species since under this policy, mitigation would be required only for special-status species restricted to areas where *discretionary development is proposed; mitigation would not be required as long as the species was found and protected elsewhere on public land or private Natural Resources land.*

Policy 7.4.1.6 directs the County to, under certain circumstances, require comprehensive habitat restoration and/or offsite mitigation plans. This policy also does not require impacts to be reduced to less-than-significant levels and applies only to discretionary projects; therefore, the policy would not be applicable to projects on nearly a third of the land open to ministerial development approvals in the county.

Policy 7.4.2.1 requires the County to protect, to the extent feasible, special-status species by developing biological conservation plans. This would also be mostly ineffective in mitigating impacts on special-status species. This policy is applicable only when federal or state plans do not provide adequate protection on lands outside County control. This policy could be effective in avoiding or delaying extirpation of a particular special-status species, but because few species have approved conservation plans, many special-status species would receive no consideration.

These policies, however, combined with the current and anticipated future level of participation by EDCWA and El Dorado County in funding various preservation actions, would render impacts on federal and California listed rare, threatened or endangered species of animals and plants and the habitat of those listed species as less than significant. Additionally, because the level and location of development served by the Proposed Action and Alternatives would be indistinguishable from that of the No Action Alternative, the impact is considered likely to result in minimal effects***.***

Mitigation Measures

No mitigation would be required for the Proposed Action or Alternatives

5 5.0 CUMULATIVE IMPACT

5.1 CUMULATIVE IMPACT FRAMEWORK AND ASSUMPTIONS

Cumulative impacts are defined in CEQ Regulations (40 CFR 1508.7 and 1508.25) as follows:

> "Cumulative impact" is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

By assessing the cumulative effect of a proposed action, the lead agency can evaluate the extent to which the action could exacerbate impacts on environmental, human, and community resources that have occurred or will result from other past, present, and reasonably foreseeable future actions regardless of what agencies (Federal or non-Federal) or persons undertake such actions. As noted above, cumulative effects can result from individually minor but collectively significant actions taking place over time (40 CFR 1508.7, 1508.25).

The evaluation of future cumulative impacts of a proposed action should be based upon known or reasonably foreseeable long-range plans, regulations, operating agreements, or other information that establishes them as reasonably foreseeable in order to avoid undue speculation. The cumulative effect of a proposed action is considered significant only if the "incremental" impact of the action is found to be considerable when added to the overall cumulative impact resulting from other past, present and future actions.

Section 5.22 (Cumulative Impact Framework and Assumptions) of the 2009 Draft EIS/EIR describes the methodology used in that document to determine the contribution of the Proposed Action and alternatives to the cumulative impact of other past, present and future projects on various resources that could be directly affected by proposed increased diversions from Folsom Reservoir and the American River above Folsom. Since the Draft EIS/EIR was completed and circulated for public review in December of 2009, events have occurred that directly affect the context in which the Proposed Action's contribution to the cumulative impact of past, ongoing, and future actions was presented in that document. Key events include the reaffirmation of the 2008 USFWS BiOp and 2009 NMFS BiOp and the adoption of the January 2016 Record of Decision for the Coordinated Long Term Operation of the CVP and SWP Final EIS. In keeping with these events, the evaluation of cumulative impact of the Proposed Action has been updated and revised to accurately reflect current knowledge and understanding of CVP/SWP long-term operations. These revisions are explained in detail in the following sections.

It is important to note that despite the inclusion of updated information and additional analysis in this Final EIS, the determinations of cumulative impact associated with the Proposed Action are identical to those presented in 2009 Draft EIS/EIR. This is important because, under 40 CFR Section 1502.9(c)(1), a supplemental EIS must be prepared if there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. Despite the incorporation of new information and cumulative impact analysis in this Final EIS, Reclamation has determined that in the absence of any new project impacts or impacts that are more severe than previously identified, the preparation of a Supplemental EIS is unwarranted under NEPA.

5.2 APPROACH TO ASSESSING DIVERSION-RELATED CUMULATIVE IMPACTS

For CVP/SWP system-wide hydrological effects, Reclamation, NMFS, USFWS, and other relevant public trust resource agencies have ratified the hydrological modeling framework with which to simulate system-wide potential impacts under a future cumulative condition. Future demand assumptions, along with anticipated CVP/SWP operations and projected regulatory controls, have been agreed to and incorporated into the modeling construct used to analyze potential effects of the long-term CVP and SWP operating criteria and procedures (OCAP). As described previously, that modeling construct is the CALSIM II model.

Reclamation has completed several environmental documents that definitively illustrate, through CALSIM II modeling, the anticipated future cumulative impacts associated with operation of the integrated CVP/SWP. The *Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement* (LTO EIS) dated January 2016 is the best and most recent example currently available. The LTO EIS evaluates the potential cumulative effect of long-term operation of the CVP and SWP on each of the water-related resources addressed in this EA, i.e., Water Supply, Hydropower, Fisheries and Aquatic Resources, Terrestrial Resources, and Recreational Resources.

As discussed below, the LTO EIS presents a comprehensive listing of past, present, and reasonably foreseeable future actions relevant to assessing the cumulative impact of diversion-related actions within the CVP/SWP system. In keeping with CEQ regulations and requirements, this Final EIS uses and relies upon the hydrologic modeling output and future cumulative impacts analysis contained in the LTO EIS. The LTO EIS in its entirety is herein incorporated by reference into this Final EIS.

5.2.1 2016 CALSIM II Model Verification Process

To more fully understand the proposed action's contribution to cumulative impact conditions presented in the LTO EIS, additional modeling was conducted by ECORP Consulting, Inc. (ECORP 2016). This modeling effort is described in detail in Section 4.1.5 of this Final EIS.

As previously discussed and in keeping with NEPA requirements, this Final EIS addresses the potential impact of the Proposed Action by comparing the effects of the Proposed Action to the effects of the No Action Alternative. In relation to the evaluation of "diversion-related" direct impacts, however, that comparison is moot in most instances because annual diversion of up to 15,000 acre-feet from the American River and/or Folsom Reservoir would occur under both the No Action Alternative and the Proposed Action. Therefore, no distinction can be made between these alternatives relative to potential impacts on various diversion-related resources.

While not required under by NEPA, CALSIM II modeling runs were conducted for the Proposed Action and Alternatives using an "Alternate Basis of Comparison." This evaluation is provided for informational purposes only and compares the potential direct effects of the Proposed Action and Alternatives (including the No Action Alternative) with conditions likely to occur through the 40-year term of the contract without the additional diversion of up to 15,000 AF/yr that would occur under the Proposed Action and No Action Alternative.

The CALSIM II Model Verification Process concluded that modeling performed and presented in the Draft EIS/EIR adequately addresses potential flow-related impact. The results of this modeling effort verified the conclusions presented in the Draft EIS/EIR pertaining to resources that could be directly affected by future diversions included in the Proposed Action, No Action Alternative, and Alternatives 2, 3 and 4 (all scenarios). The CALSIM II Model Verification Process approach, methodology and results are incorporated into this Final EIS, as Appendix B.

5.3 CUMULATIVE CONTEXT: PAST, PRESENT, AND FUTURE ACTIONS

On January 16, 2016, Reclamation signed the *Coordinated Long-Term Operation of the Central Valley Project and State Water Project Record of Decision* (LTO ROD) (Reclamation 2016). The LTO ROD presents Reclamation's decision to implement the no action alternative as defined in that document. As discussed in Section 1.1 (Background) of this Final EIS, the no action alternative for the LTO contains all of the reasonable and prudent alternative (RPA) actions in the 2008 USFWS BiOp and 2009 NMFS BiOp, as amended, including the RPA actions to evaluate fish passage to upstream habitats that exhibit lower water temperatures. The 2009 NMFS BiOp includes RPA actions to facilitate fish passage to upstream habitat because often during periods with warm air and low flows, water temperatures below Shasta, Folsom, and New Melones dams become lethal to incubating eggs.

Reclamation continues to implement the LTO ROD, 2008 USFWS BiOp, and 2009 NMFS BiOp. While Reclamation has reinitiated consultation on long-term operations (ROC on LTO), and has prepared a biological assessment for ROC on LTO, those consultations are still on-going. Furthermore, Reclamation has not yet proposed any long-term operation resulting from ROC on LTO under NEPA. Thus, it remains uncertain what long-term future operations may be following ROC on LTO. The LTO EIS remains the most recent analysis of long-term operations under NEPA.

The following is a summary of the central conclusions of the diversion-related cumulative impact analysis for the no action alternative included within the LTO EIS. Detailed discussions of the modeling results for each of the resources potentially affected by the proposed diversions are provided in the LTO EIS and are not reiterated in herein.

The LTO EIS evaluated the potential for future impacts on water-related resources associated with operation of the CVP/SWP in the Sacramento and American river basins and the Delta. The cumulative impact analysis included both quantitative and qualitative considerations. The technical approach for conducting the quantitative cumulative impact assessment involved comparing CALSIM II hydrologic model output for the 2030 level of development with that of the "Second Basis of Comparison" which served as the baseline for comparison of impact for implementation of the RPAs proposed for the 2008 and 2009 BiOps that would be implemented under the LTO EIS's No Action Alternative.

The reasonably foreseeable future actions included in the LTO EIS's cumulative effects analysis are summarized below:

- Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have been implemented under other projects/programs, regardless of their inclusion in the BiOps, as described in of Chapter 3 of the LTO FEIS, Descriptions of Alternatives (Section 3.3.1.2), and inclusive of the effects of climate change and sea level rise.
- Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would be implemented under other projects/programs, as described in Chapter 3 of the LTO FEIS, Descriptions of Alternatives (Section 3.3.1.3), including:
  - Implementation of Federal and State policies and programs, including Clean Water Act (e.g., Total Maximum Daily Loads); Safe Drinking Water Act; Clean Air Act; and flood management programs
  - General Plans 2030[181]
  - Trinity River Restoration Program

[181] Anticipated development that would occur through 2030 under approved County and City General Plans within the CVP and SWP service areas.

- Central Valley Project Improvement Act programs
- Iron Mountain Mine Superfund Site
- Nimbus Fish Hatchery Fish Passage Project
- Folsom Dam Water Control Manual Update
- FERC Relicensing for the Middle Fork of the American River Project
- Lower Mokelumne River Spawning Habitat Improvement Project
- Dutch Slough Tidal Marsh Restoration
- Suisun Marsh Habitat Management, Preservation, and Restoration Plan Implementation
- Tidal Wetland Restoration: Yolo Ranch, Northern Liberty Island Fish Restoration Project, Prospect Island Restoration Project, and Calhoun Cut/Lindsey Slough Tidal Habitat Restoration Project
- San Joaquin River Restoration Program
- Stockton Deep Water Ship Channel Dissolved Oxygen Project
- Grasslands Bypass Project
- Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS)
- Future water supply projects, including water recycling, desalination, groundwater banks and wellfields, and conveyance facilities

* Future Actions considered as cumulative effects actions in the Year 2030 as described in Section 3.5 of the LTO FEIS, including:
  - Bay-Delta Water Quality Control Plan Update
  - FERC Relicensing Projects
  - Bay Delta Conservation Plan (including the California WaterFix alternative)
  - Shasta Lake Water Resources, North-of-the-Delta Offstream Storage, Los Vaqueros Reservoir Expansion Phase 2, and Upper San Joaquin River Basin Storage Investigations
  - El Dorado Water and Power Authority Supplemental Water Rights Project
  - Sacramento River Water Reliability Project
  - Semitropic Water Storage District Delta Wetlands
  - North Bay Aqueduct Alternative Intake
  - Irrigated Lands Regulatory Program
  - San Luis Reservoir Low Point Improvement Project
  - Westlands Water District v. United States Settlement
  - Future water supply projects, including water recycling, desalination, conveyance facilities (projects that did not have completed environmental documents during preparation of the EIS)

* Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp.

5.4 Cumulative Impacts and Mitigation Measures:Diversion-Related Resources (Study Area)

Section 5.4 of the Final EIS presents a summary of the Draft EIS/EIR cumulative impact assessment, a summary of the central conclusions of the diversion-related cumulative impact analysis included within the LTO EIS (Reclamation 2016), and the cumulative impact conclusions of this Final EIS. Diversion-related resources addressed herein include: Water Supply and Hydrology; Energy; Fisheries and Aquatic Resources; Terrestrial and Riparian Resources; and Recreation. As noted above, detailed discussions of the modeling results for each of the potentially affected water-related resources are provided in the LTO EIS and are not reiterated in this Final EIS.

The summary of the Draft EIS/EIR cumulative impact assessment follows a more CEQA-focused analysis of the effects of the Proposed Action relative to Base Conditions, however, the No Action Alternative was also assessed in the Draft EIS/EIR. While the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the Base Condition was critical for the Draft EIS/EIR's compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action's effects relative to the No Action Alternative; this section includes that method for the analysis of cumulative impacts.

The assessment of the Proposed Action's contribution to cumulative impact conditions derived from the LTO EIS addresses the LTO EIS's no action alternative relative to the Proposed Action. This Final EIS assessment includes and is based on new CALSIM model runs (ECORP 2016) that were used to determine whether the incremental impact of the Proposed Action is considerable and significant relative to past, present, and foreseeable future actions evaluated in the LTO EIS.

The evaluation of potential cumulative impacts for this Final EIS is organized in accordance with the four categories of past, present, and future projects discussed in Section 5.3, namely:

- Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp, including the effects of climate change and sea level rise;
- Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp, but included in alternatives;
- Future actions considered as cumulative effects actions in the Year 2030; and
- Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp.

The cumulative impact determination of this Final EIS is presented for the Proposed Project and Alternatives for each of the diversion related resources categories.

5.4.1 Water Supply (Study Area) – Cumulative Impacts

5.4.1.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

Section 5.22 of the Draft EIS/EIR assesses three potential cumulative impacts related to surface water resources and water supply that could occur as a result of the Proposed Action or Alternatives. These are: Impact 5.22-1 (Effects on CVP Allocations); Impact 5.22-2 (Effects on SWP Allocations); and Impact 5.22-3 (Effects of delivery allocations to purveyors of the Sacramento Water Forum Agreement as provided under their Purveyor-Specific Agreements.

Impact 5.22-1 (Effects on CVP Allocations) was evaluated in the Draft EIS/EIR using CALSIM II modeling to illustrate the 72-year mean differences in simulated annual deliveries to CVP contractors between the Base Condition and the Future Cumulative Condition for CVP M&I (North of Delta), Ag (North of Delta), M&I (South of Delta), and Ag (South of Delta) contractors. Based on the CALSIM II modeling results, of these CVP contractor categories, CVP M&I (North of Delta) would increase their expected long-term allocations, relative to the Base Condition, while CVP Ag contractors (South of Delta) would experience a long-term average decrease in annual allocations. This would be a potentially significant future cumulative impact on south of Delta CVP Ag contractors. The Alternatives defined by the various scenarios under the Proposed Action would not, by virtue of their immeasurable effects illustrated by CALSIM II modeling output, incrementally contribute to this potentially significant future cumulative impact relative to the Base Condition.

Impact 5.22-2 (Effects on SWP Allocations CALSIM II modeling results) from the Draft EIS/EIR present simulated delivery allocations to SWP contractors under the Future Cumulative Condition and the differences, relative to the Base Condition. Over the 72-year period of record, the mean expected future delivery allocations to SWP customers would be approximately 145,000 AF higher than that under the Base Condition. An overall percent increase of 4.3 percent, relative to the Base Condition, would be expected in delivery allocations in the future. This would be a benefit as opposed to an adverse future cumulative impact.

Impact 5.22-3 (Effects on Future Deliveries to Water Forum Purveyors) was evaluated using CALSIM II. CALSIM II results presented in the Draft EIS/EIR show the modeled future anticipated delivery allocations applicable to the various water purveyors under the Water Forum Agreement, relative to the Base Condition. Anticipated future delivery allocations presented in the Draft EIS/EIR were greater than current conditions. As such, the Draft EIS/EIR found the Proposed Action and Alternatives would have no adverse future cumulative impact on expected allocations to Water Forum purveyors.

In summary, for Impact 5.22-1 (Effects on CVP Allocations), the Draft EIS/EIR identifies a potentially significant cumulative impact when compared to the Base Condition, i.e., conditions that existed at the start of preparation of the Draft EIS/EIR. For Impact 5.22-2 (Effects on SWP

Allocations) the Draft EIS/EIR found the Proposed Action and Alternatives to have a “beneficial” cumulative impact. For Impact 5.22-3 (Effects of delivery allocations to purveyors of the Sacramento Water Forum Agreement as provided under their Purveyor-Specific Agreements), the Proposed Action and Alternatives would have no significant cumulative impact relative to the baseline condition.

It important to note that while the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the Base Condition was important for the Draft EIS/EIR’s compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action’s effects relative to the No Action Alternative. The rationale for this approach and methodology is described in greater detail in Section 4.1.6 of this Final EIS.

Section 5.22 of the Draft EIS/EIR found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action. The Draft EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect relative to water supply.

5.4.1.2 Summary of Cumulative Impact from the LTO EIS

5.4.1.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp, including climate change and sea level rise

Climate change and sea level rise, development under the general plans, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to reduce carryover storage in reservoirs, stream flows and Delta outflow, and the availability of CVP and SWP water supplies as compared to past conditions.

5.4.1.2.2 Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

Some future water quality and habitat projects could modify surface water conditions; however, water supplies are not anticipated to be affected. Future water supply projects are anticipated to both improve water supply reliability due to reduced surface water supplies and to accommodate planned growth in the general plans. Most of these programs were initiated prior to implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp which reduced CVP and SWP water supply reliability.

5.4.1.2.3 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Most of the future reasonably foreseeable actions are anticipated to reduce water supply impacts due to climate change, sea level rise, increased water allocated to improve habitat conditions, and future growth. Some of the reasonably foreseeable actions related to improved water quality and habitat conditions (e.g., Water Quality Control Plan Update and FERC Relicensing Projects), could result in further reductions in CVP and SWP water deliveries.

5.4.1.2.4 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp as projected under the LTO FEIS no action alternative, would result in changes to stream flows, increased Delta outflow, and reduced CVP and SWP water supplies as compared to conditions prior to the BiOps.

The availability of future water supply projects (discussed above) could ameliorate the effects of reduced CVP and SWP water supplies. However, these actions also could result in less water for future growth as compared to future conditions without implementing the LTO FEIS no action alternative.

5.4.1.3 Final EIS Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing, and foreseeable future projects on surface water resources and water supply likely to be affected by the Proposed Action was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing, and future projects on surface water resources and water supply would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact on these resources would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, the cumulative impact of the Proposed Action and Alternatives on surface water resources and water supply is likely to result in minimal effects.

It is important to note that this determination applies to the cumulative context through the year 2030 as described and evaluated in the LTO EIS and related BiOps, and this determination is equally applicable to conditions anticipated through the year 2056 representing the anticipated end-date for the proposed 40-year long-term water services contract. This determination applies to the future contribution of the Proposed Action and Alternatives to the cumulative impact on water supply described above, and it is also applicable to the issues of Hydropower, Flood Control, Water Quality, Fisheries and Aquatic Resources, Riparian Resources, Recreational Resources and Cultural Resources addressed in sections 5.4.2 through 5.4.8 below, respectively. These determinations are based on the relative impact of the Proposed Action and Alternatives as compared to that anticipated under the No Action Alternative.

5.4.2 <u>Hydropower (Study Area) – Cumulative Impacts</u>

5.4.2.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

Impact

5.23-1 (Effects on CVP hydropower generation and capacity) from the Draft EIS/EIR states that under the Future Cumulative Condition, CVP system hydropower generation at load center would on average, over the 72-year period of record, be reduced by approximately 52 GWH (or

1.2 percent), relative to the Base Condition. Long-Term Gen modeling results showed that in 25 out of the 72 years (35 percent of the time), a reduction in CVP hydropower generation would occur, relative to the Base Condition. These reductions, in most years, are less than 2 percent.

Section 5.23 of the Draft EIS/EIR found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action on hydropower production. The Draft EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect relative to hydropower production.

5.4.2.2 Summary of Cumulative Impact from the LTO EIS

5.4.2.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp including climate change and sea level rise

Climate change and sea level rise in combination with future development under approved general plans, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to reduce carryover storage in reservoirs and changes in stream flow patterns in a manner that could reduce hydroelectric generation in the summer and fall months. Reduced CVP and SWP water deliveries south of the Delta would also reduce CVP and SWP electricity use.

5.4.2.2.2 Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

Future water supply projects are anticipated to both improve water supply reliability due to reduced surface water supplies and to accommodate planned growth in the general plans. It is anticipated that some of these projects could increase energy use, such as implementation of desalination projects. However, other projects, such as water recycling, would not substantially increase energy use because most of the energy use was previously required for wastewater treatment. It is anticipated that energy required for water treatment of alternative water supplies would be similar as treatment for CVP and SWP water supplies. Any increase in the use of groundwater pumps would increase energy use; however, this energy use would be similar or less than the energy used for CVP and SWP water conveyance. Most of these programs were initiated prior to implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp which reduced CVP and SWP water supply reliability.

5.4.2.2.3 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Most of the future reasonably foreseeable actions are anticipated to improve water supplies in California to reduce impacts due to climate change, sea level rise, increased water allocated to improve habitat conditions, and future growth. If CVP and SWP water supply reliability increases, energy use for conveyance of CVP and SWP water supplies also would increase. Some of the future reasonably foreseeable actions are anticipated to potentially reduce CVP and SWP water supply reliability (e.g., Water Quality Control Plan Update and FERC Relicensing Projects).

Future water supply projects are anticipated to both improve water supply reliability due to reduced surface water supplies and to accommodate planned growth in the general plans. It is anticipated that some of these projects could increase energy use, such as implementation of desalination projects. However, other projects, such as water recycling, would not substantially increase energy use because most of the energy use was previously required for wastewater treatment. It is anticipated that energy required for water treatment of alternative water supplies would be similar as treatment for CVP and SWP water supplies. Increased use of groundwater pumps would increase energy use; however, this energy use would be similar or less than the energy used for CVP and SWP water conveyance.

5.4.2.2.4 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp future reasonably foreseeable actions would result in changes to stream flows and related changes in the hydroelectric generation patterns and reduced CVP and SWP water supplies as compared to conditions prior to the BiOps. If CVP and SWP water supply reliability decreases, energy use for the conveyance of CVP and SWP water supplies also would decrease and energy use for alternative water supplies could increase.

5.4.2.3 Final EIS Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing and foreseeable future projects on energy use and production within the CVP and SWP was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing, and future projects on energy use and production would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact on energy use and production would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, the cumulative impact of the Proposed Action and Alternatives on energy use and production is likely to result in minimal effects*.*

5.4.3 <u>Flood Control (Study Area) – Cumulative Impacts</u>

5.4.3.1 Summary of Draft EIS/DEIR Cumulative Impact Assessment

Impact 5.24-1 (Substantial change in the ability to adhere to the flood control diagrams for Folsom Reservoir under current operation or to its long-term re-operation) from the Draft EIS/EIR states that on a monthly mean basis during the flood control period, the storage in Folsom Reservoir would be expected to be lower in the future with the implementation of foreseeable future projects identified in the Draft EIS/EIR and all other considerations being equal. Any additional diversions occurring under the Proposed Action and Alternatives would provide a flood control benefit to the region by assisting in the ability to maintain existing flood control reservation space. Accordingly, no significant adverse future cumulative impact on Folsom Reservoir's ability to meet or adhere to its flood encroachment curve is expected.

Impact 5.24-2 (Substantial change in floodplain characteristics that would increase the exposure of persons or property to flood hazards including a substantial change in the hydraulic stress imparted to lower American River levees or lower Sacramento River levees) states that modeled results of the Future Cumulative Condition show that, relative to the Base Condition, mean monthly flows in the lower American River below Nimbus Dam during the flood control season (November through April) would be significantly less in most months during this period. Reduced flows during this period over the long-term would not increase hydraulic conditions within the river, relative to current conditions. Thus, no future cumulative impacts on floodplain characteristics or levee stress are anticipated, again, relative to the Base Condition.

The Draft EIS/EIR identifies no significant distinction between the effects of the Proposed Action and Alternatives and the effects of the No Action Alternative.

5.4.3.2 Summary of Cumulative Effect Description from the LTO EIS

The cumulative effect of past, present, and foreseeable future projects on surface water resources as presented in the 2016 LTO FEIS is described in Section 5.4.1, above. As noted above, past and anticipated actions combined with climate change and future sea level rise are anticipated to reduce carryover storage in reservoirs, stream flows and Delta outflow, and the availability of CVP and SWP water supplies as compared to past conditions. Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp as projected under the LTO EIS No Action Alternative, would result in changed stream flows, increased Delta outflow, and reduced CVP and SWP water supplies as compared to conditions prior to the BiOps.

5.4.3.3 Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing and foreseeable future projects on surface water resources was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing, and future projects on flood conditions would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact on these resources would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, the cumulative impact of the Proposed Action and Alternatives on flooding is likely to result in minimal effects***.***

5.4.4 <u>Water Quality (Study Area) – Cumulative Impacts</u>

5.4.4.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

Section 5.25 of the Draft EIS/EIR assesses two potential cumulative impacts related to surface water quality that could occur as a result of the Proposed Action or Alternatives. These are:

Impact 5.25-1 (Effects of increased diversions and changes in CVP operations on water quality in reservoirs and rivers); and Impact 5.25-2 (Effects on Delta water quality).

Impact 5.25-1 (Effects of increased diversions and changes in CVP operations on water quality in reservoirs and rivers) from the Draft EIS/EIR includes the evaluation of the potential cumulative effect of the Proposed Action and Alternatives on water quality conditions in Folsom and Shasta reservoirs and Sacramento and lower American rivers. The principal water quality parameters of concern for the lower American River (e.g., pathogens, nutrients, total dissolved solids (TDS), total organic carbon (TOC), priority pollutants, and turbidity) are primarily affected by urban land use practices and associated runoff and stormwater discharges. The stormwater discharges to the river temporarily elevate levels of turbidity and pathogens during and immediately after storm events.

Although urban land use practices, urban runoff and stormwater discharges all contribute priority pollutants to the river, monitoring has not identified any priority pollutant at concentrations consistently above State water quality objectives. Water quality objectives for dissolved oxygen, temperature, and pH, however, were not being consistently met at the time of Draft EIS/EIR preparation in the lower American River.

The lower American River is included on the federal Clean Water Act Section 303(d) list of waters that do not meet the Clean Water Act national goal of "fishable, swimmable." For listed water bodies, such as the lower American River, total maximum daily loads (TMDLs) must be developed by the State Water Resources Control Board to achieve water quality standards. Group A pesticides (e.g., aldrin, chlordane, lindane, and others), mercury, and pollutants/stressors of unknown toxicity are listed as the pollutants of concern in the lower American River.

As areas contributing stormwater flows to the American River continue to be developed, the increase in the rate and amount of stormwater runoff from new impervious surfaces is assumed to carry increased concentrations of urban pollutants that could affect water quality. Runoff from construction sites can also affect water quality by increasing sediment loads. These two types of non-point source discharges are regulated under the federal NPDES program, administered at the State level by the RWQCB and SWRCB.

Based on modeling of the future cumulative condition presented in the Draft EIS/EIR, greater reductions in flows, acting indirectly to lower dilution of the concentrations or levels of water quality parameters, could have a noticeable effect on long-term water quality. In the future, since flows in the Sacramento and American rivers could, on average, be reduced substantially in certain months of certain years, concentrations of the water quality parameters of interest such as nutrients, pathogens, TDS, TOC, turbidity, and priority pollutants (e.g., metals, organics) could be expected to be altered substantially, relative to the Base Condition. This would be a significant future cumulative impact. However, the Draft EIS/EIR found that the Proposed Action and

Alternatives would not contribute significantly to this overall cumulative effect on future water quality.

Impact 5.25-2 (Effects on Delta water quality) from the Draft EIS/EIR states that CALSIM II modeling results showed that the long-term mean monthly position of X2 in the future would generally migrate further upstream (i.e., worsen), relative to the Base Condition. Of particular concern are the monthly and yearly maximums, which are significantly larger than those simulated for the various Alternatives. Based on the modeling assumptions used, the Future Cumulative Condition would impart larger extreme events where X2 upstream migration would be more noticeable and significant on an individual month basis. It is acknowledged that current state-wide efforts at addressing long-term Delta water quality sustainability and improvement will continue to be aggressively pursued; the Governor's Delta Vision Blue Ribbon Task Force Recommendations, the ongoing California Water Fix and Eco Restore (formerly parts of the Bay Delta Conservation Plan), the Coordinated Long-Term Operation of the Central Valley Project and State Water Project[182], full implementation of RPAs contained in the 2008 USFWS BiOp and 2009 NMFS BiOp[183], and the current SWRCB Water Quality Objectives are a few examples of ongoing initiative to address this important issue. Such shifts in modeled X2 position would be of significant magnitude to result in potentially significant future cumulative impacts on Delta water quality. The Draft EIS/EIR determined that the No Action Alternative, Proposed Action and Alternatives 3 and 4 would contribute incrementally to this future cumulative impact, compared to the Base Condition; however, not significantly.

It important to note that while the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the "Base Condition" was critical for the Draft EIS/EIR's compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action's effects relative to the No Action Alternative. The rationale for this approach and methodology is described in greater detail in Section 4.1.5 of this Final EIS.

Section 5.25 of the Draft EIS/EIR found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action. The DRAFT EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect relative to surface water quality.

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[182] After publication of the 2009 Draft EIS/EIR, a Record of Decision for the Coordinated Long-Term Operation of the Central Valley Project and State Water Project in January 2016. References to the "pending CVP/SWP OCAP" contained in the Draft EIS/EIR have been revised to reflect adoption of the 2016 ROD.

[183] The 2009 Draft EIS/EIR references pending challenges to the 2008 USFWS Biological Opinion and 2009 NMFS Biological Opinion on the CVP/SWP OCAP. Resolution of those challenges subsequently occurred and references to the pending challenges contained in text from the 2009 Draft EIS/EIR has been revised accordingly.

5.4.4.2 Summary of Cumulative Impact from the LTO EIS

5.4.4.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp including climate change and sea level rise

Climate change and sea level rise area anticipated to result in substantial shifts in X2 to upstream locations, increase salinity in the Delta, and expand the region of the Delta influenced by tidal fluctuations.

5.4.4.2.2 Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

Water quality programs to reduce nutrient loadings from wastewater treatment plant effluent and other point source discharges under the TMDLs would be fully implemented by 2020; and it is anticipated that nutrient concentrations would be reduced by 2030. Programs to meet TMDLs related to dissolved oxygen, pesticides, mercury, selenium, and other constituents of concern are anticipated to be fully defined and implemented in the early 2020s to reduce, but not necessarily meet TMDL objectives, by 2030. These programs include projects to reduce effects of agricultural drainage. Tidal restoration programs would change salinity gradients in the Delta, including increased salinity in the western and central Delta, depending upon the location of the tidal restoration lands. Estuarine tidal restoration could reduce constituents from runoff of adjacent upland areas, depending upon the location of the restored lands.

5.4.4.2.3 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Some of the future reasonably foreseeable actions are anticipated to reduce water quality issues, including Bay-Delta Water Quality Control Plan Update, FERC Relicensing Projects, agricultural drainage programs, and San Luis Reservoir Low Point Improvement Project. Future reasonably foreseeable actions related to tidal restoration projects could increase salinity and mercury water quality issues.

5.4.4.2.4 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp would result in increased salinity in the western and central Delta due to climate change and sea level rise. Numerous projects would be implemented by 2030 to reduce water quality issues related to nutrients, agricultural drainage, and other discharges of constituents of concern by 2030. Depending upon the location of tidal restoration lands, salinity could increase in the western and interior Delta with implementation of the 2008 and 2009 BiOps.

5.4.4.3 Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing and foreseeable future projects on surface water quality was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 DRAFT EIS/EIR, the Proposed Action’s contribution to the cumulative impact of past, ongoing and future projects on water quality would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, the cumulative impact of the Proposed Action and Alternatives on water quality is likely to result in minimal effects.

5.4.5 Fisheries and Aquatic Resources (Study Area) – Cumulative Impacts

5.4.5.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

Section 5.26 of the Draft EIS/EIR assesses eight potential cumulative impacts on fisheries and aquatic resources that could occur as a result of the Proposed Action or Alternatives. These are: Impact 5.26-1 (Effects on CVP reservoir warmwater fisheries); Impact 5.26-2 (Impacts on Folsom Reservoir's coldwater fisheries); Impact 5.26-3 (Flow- and Temperature-related effects on upper Sacramento River fisheries); 5.26-4 (Flow- and temperature-related effects on lower Sacramento River fisheries); 5.26-5 (Effects on Delta fisheries); 5.26-6 (Effects on lower American River fall-run Chinook salmon and steelhead); 5.26-7 (Effects on lower American River splittail); and 5.26-8 (Effects on striped bass).

Impact 5.26-1 (Effects on CVP reservoir warmwater fisheries) from the Draft EIS/EIR addresses cumulative effect of the Proposed Action and Alternatives on warmwater fish in CVP reservoirs. Under the modeling simulations performed, mean end-of-month water surface area and water surface elevations are reduced in each of Shasta, Trinity, and Folsom reservoirs, relative to the Base Condition. Shasta Reservoir would lose, on average, a minimum of 160 acres for every month of the year, relative to its Base Condition, approximating a 2 percent reduction. The maximum reduction would occur in late summer or early fall. Shasta Reservoir's large water surface area; however, would still provide ample nearshore littoral habitat for warmwater fish species and their prey base. Similarly, for Trinity Reservoir, anticipated future reductions in water surface elevation are small, relative to the Base Condition (e.g., no more than a two-tenths of one percent change) for any month over the long-term. For both Shasta and Trinity reservoirs, no significant future cumulative impacts on warmwater fisheries are anticipated based on hydrology.

For Folsom Reservoir, mean monthly reductions in water surface area would occur in every month under the Future Cumulative Condition. Late summer and early fall reductions in water surface area are particularly significant with over 735 acres lost in September, representing a 9 percent reduction, relative to the Base Condition. The frequency with which potential nest-dewatering events could occur in Folsom Reservoir would also increase in the remaining months of the March through July warmwater fish-spawning period, and consequently, impacts on warmwater fish nesting success may be cumulatively significant. Such reductions in habitat availability could, in turn, lead to increased predation on young-of the year warmwater fish, thereby reducing the long-term initial year-class strength of the population. Unless willows and other near-shore vegetation, in response to long-term seasonal reductions in water levels, become established at lower reservoir elevations in the future, future year-class production of warmwater fisheries could be reduced. Consequently, seasonal reductions in littoral habitat availability represent a potentially significant cumulative impact on Folsom Reservoir warmwater fisheries. Such losses represent a significant future cumulative impact relative to the Base Condition.

Impact 5.26-2 (Impacts on Folsom Reservoir's coldwater fisheries) was addressed in the Draft EIS/EIR using simulated future mean end-of-month storage in Folsom Reservoir, relative to the Base Condition. Modeling results showed declines in end-of-month storage in all months with the largest decreases observed in late summer and early fall. Coldwater pool resources are particularly important during the latter part of each summer. By this time, development of the reservoir coldwater pool has already been established with thermal stratification between the epilimnion and hypolimnion occurring well before; during the spring. Total reservoir storage decreases of these magnitudes (i.e., 7, 15, and 11 percent, respectively, for August, September, and October) represent considerable depletions in reservoir storage. However, as noted, the reservoir coldwater pool is already established by this time and coldwater habitat would remain available within the reservoir during most months of most years. Future reductions in seasonal storage would not be expected to adversely affect the primary prey species utilized by coldwater fish. Finally, future operation of the Folsom TCD, ongoing shutter manipulation and optimal temperature target release procedures, planned improvements to the Folsom outlet works, continued reliance on the Folsom Coldwater Pool Management Model (CPMM) for predictive planning, Reclamation and Water Forum’s Lower American River Flow Management Standard, and EID’s pending TCD would all contribute to preserving the reservoir’s coldwater pool into the future. The Draft EIS/EIR found that future cumulative impacts on Folsom Reservoir’s coldwater fisheries were less than significant relative to the Base Condition.

Impact 5.26-3 (Flow- and Temperature-related effects on upper Sacramento River fisheries) was addressed using the modeled future mean monthly Sacramento River flow releases below Keswick Dam, relative to the Base Condition. Flow reductions are observed for fall and winter months, although these reductions are approximately 1 to 2 percent. Mean monthly flow increases, however, resulted for the remaining months of the year. The reductions observed are considered small, relative to the Base Condition flows and are not expected to significantly affect habitat conditions for fisheries. Accordingly, no significant future cumulative impacts on the fisheries in the upper Sacramento as a result of instream flow (e.g. habitat conditions) changes are anticipated.

Modeled mean monthly Sacramento River water temperatures at Keswick Dam, relative to the Base Condition showed small changes (i.e., increases) for the summer and late-summer months, but these increases in long-term mean monthly water temperatures did not exceed two-tenths of one degree Fahrenheit. As described in the Draft EIS/EIR, both Chinook salmon and steelhead, possess low thermal tolerance and elevated water temperatures could reduce spawning and rearing success of these anadromous salmonids. The slight changes in temperatures, coupled with the lower baseline temperatures suggest that water temperature alone would not necessarily constitute a significant cumulative impact in this reach of the Sacramento River.

The Draft EIS/EIR modeled the long-term future annual early life stage survival of all four runs of Chinook salmon, relative to the Base Condition. Modeling results from Reclamation's Sacramento River Chinook Salmon Mortality Model showed that for both winter-run and spring-run, early life stage survival under the Future Cumulative Condition decrease by approximately one percent, relative to the Base Condition. Such decreases in estimated long-term survival of these listed species were considered a significant future cumulative impact: however, neither the Alternatives nor the various scenarios under the Proposed Action would significantly contribute to these anticipated long-term impacts relative to the Base Condition. Therefore, the cumulative impact was likely to result in minimal effects.

Impact 5.26-4 (Flow- and Temperature-related effects on lower Sacramento River fisheries) was assessed in the Draft EIS/EIR using simulated long-term future mean monthly flows in the Sacramento River at Freeport, relative to the Base Condition. Mean monthly flow both decreased and increased over the course of 12 months, however, in October, flows would decrease by approximately 855 cfs on average, as applied over the 72-year period of modeled hydrology. This would be a 6 percent reduction, relative to Base Condition flows and, occur during the month when flows in the Sacramento River are typically at their lowest. Such flow reductions could, however, would be offset to some degree by the long-term increases in mean monthly flows in September, relative to the Base Condition. Long-term future water temperatures in the lower Sacramento River show little change, relative to the Base Condition. Table 5.26-4B (see page 5-217 of the Draft EIS/EIR) shows the mean monthly water temperatures at Freeport under the Future Cumulative Condition. Slight increases occur in April and May. Such increases, over the long-term are unlikely to significantly affect fish species (e.g., Sacramento splittail and striped bass) that make little to no use of the upper river (i.e., upstream of RM 163). Native and introduced warmwater fish species primarily use the lower river for spawning and rearing, with juvenile anadromous fish species also using the lower river, to some degree, for rearing.

The Draft EIS/EIR noted that many of the fish species utilizing the upper Sacramento River also use the lower river to some degree, even if only as a migratory corridor to and from upstream spawning and rearing grounds. Adult Chinook salmon and steelhead, for example, primarily use the lower river as an immigration route to upstream spawning habitats and an emigration route to the Delta. While the long-term average mean monthly water temperatures may not significantly change, the extent to which inter-annual increases may affect various life-stages of listed species is important to consider. Accordingly, the modeling results also revealed that the number of years that temperatures at this location would exceed 56°F, 60°F, and 70°F would be greater (i.e., one more occurrence for the 56°F index, 3 more occurrences for the 60°F index, and 8 occurrences more often for the 70°F index), relative to the Base Condition. Based on these overall findings, fish species within the lower Sacramento River would experience a potentially significant future cumulative impact relative to the Base Condition. Neither the Alternatives nor the various scenarios under the Proposed Action, however, would substantially contribute to these anticipated long-term impacts. The cumulative impact, therefore, is likely to result in minimal effects.

Impact 5.26-5 (Effects on Delta fisheries) was evaluated using water quality parameters presented in Section 5.25 of the Draft EIS/EIR. Table 5.25-4 (see page 5-207 of the Draft EIS/EIR) showed the modeled position of X2 under the Future Cumulative Condition, relative to the Base Condition. Late fall X2 migration upstream, as an average mean monthly variation from current conditions was notable, as were the individual month and year extremes. Table 5.26-5 (see page 5-218 of the Draft EIS/EIR) shows the simulated future mean monthly Delta outflow, relative to the Base Condition. Percent decreases, relative to current conditions are small, except for October. The maximum outflow decreases for each month are large, but upon closer inspection of the modeling results show that they occur in years when base Delta outflows are well above the long-term means. Large reductions in those years would have little effect on Delta fisheries.

The modeling results under the Future Cumulative Condition reveal that while October would incur potentially significant decreases in Delta outflow, the X2 position would experience significant upstream migrations in November and December.

Under the Future Cumulative Condition, the long-term average position of X2 would move upstream less than one km, relative to the Base Condition, for any given month of the year. However, during the February through June period considered important for providing appropriate spawning and rearing conditions and downstream transport flows for various fish species, the upstream shift in the position of X2 under the cumulative condition would meet or exceed one-half km 13 percent of the time (46 months out of the 360 months included in the analysis).

The model simulations conducted for the cumulative condition included conformance with X2 requirements set forth in the SWRCB Interim Water Quality Control Plan. Furthermore, Delta export-to-inflow ratios under the cumulative condition would not exceed the maximum export ratio as set by the SWRCB Interim Water Quality Control Plan. Although the cumulative condition would not cause X2 or Delta outflow standards to be violated, there would be a decrease in long-term average outflow and an upstream shift in the position of X2, relative to the Base Condition.

Overall, with these results combined, the potential future cumulative impacts on Delta fisheries are considered to be significant. As presented in the Draft EIS/EIR, the Alternatives, including the various scenarios under the Proposed Action, would contribute incrementally to the potential significant future cumulative impact but the incremental contribution slight and unsubstantial. The cumulative impact, therefore, is likely to result in minimal effects.

Impact 5.26-6 (Effects on lower American River fall-run Chinook salmon and steelhead) was evaluated through hydrologic, water temperature, and early life-stage mortality modeling under a Future Cumulative Condition, compared to an existing or Base Condition. The Future Cumulative Condition was developed on the best set of known actions and reasonably foreseeable projects that are incorporated into the CALSIM II model. As either operational rules or depletions, these collective actions dictate the mass balance hydrology that is produced from the modeling. Flows and water temperatures were the primary indicators used to determine potential impact.

A broad assessment of the future flows and water temperatures at select points within the lower American River were simulated and are presented. These data were then applied to known life stage requirements for fall-run Chinook salmon and steelhead to serve as the basis for the impact assessments. It should be noted that CALSIM II and its related water temperature and early life stage salmon survival models generate output data under a coarse-scale, future level scenario. Future level scenarios, by definition, are rough approximations of what could occur in the future. They are premised on not only anticipated institutional, regulatory, and environmental controls, but also CVP/SWP operational rules, and changing depletion/accretion assumptions. All of this is made more uncertain given the extent to which the 72-year hydrologic period of record (e.g., that used to provide the inter-annual variability in natural precipitation and water availability) remains representative of future hydrologic conditions.

Given known future depletions contemplated from the American River basin, it was expected that lower American River flows and water temperatures would be affected under the Future Cumulative Condition, relative to the Base Condition. The extent to which these reductions could adversely affect fall-run Chinook salmon and steelhead immigration, spawning and incubation, or juvenile rearing and emigration was addressed in the Draft EIS/EIR.

Table 5.26-6A through 5.26-6C (see pages 5-220 through 5-221) show the modeled future mean monthly flows in the lower American River, relative to the Base Condition, for the reach below Nimbus Dam, Watt Avenue, and the mouth. The modeling results show significant long-term mean monthly decreases in flows during the fall (October and November) and spring (April and May) months. Mid-winter mean monthly flows are not affected, nor are the late summer flows. An approximate 30 percent decrease in anticipated future, long-term mean monthly flows in October would have significant effects on fall-run Chinook salmon and steelhead adult immigration and could also affect early spawning and egg incubation. Such reductions in flows would reduce the amount of available Chinook salmon spawning habitat, which could result in increased redd superimposition during years when adult returns are high enough for spawning habitat to be limiting.

Simulated mean monthly flows at Watt Avenue and at the mouth under the Future Cumulative Condition show similar, if not accentuated conditions, with flow decreases more pronounced during these months. At both locations, these mean monthly flow reductions extend well into the summer months. Both fall-run Chinook salmon and steelhead may be adversely affected in terms of their long-term juvenile rearing habitat availability under such flow reductions. Equally significant is the juvenile emigration period (February through June) where long-term flows at Watt Avenue would be significantly reduced, relative to the Base Condition.

The flow reductions that would occur under the cumulative condition are of sufficient magnitude and frequency to reduce juvenile steelhead summer (July through September) rearing habitat, relative to the amount available under the existing condition. These could affect the long-term rearing success of juvenile steelhead. Modeled future water temperatures in the lower American River, relative to the Base Condition are provided in Table 5.26-6D through Table 5.26-6F. They cover the reach of the lower American River below Nimbus Dam, Watt Avenue, and the mouth. For all three locations, the late-spring (April through June) represent the period where long-term mean monthly water temperatures are expected to increase the greatest, relative to current conditions. At the mouth, mean monthly water temperatures for April and May were simulated to increase by approximately 0.5°F. At Watt Avenue, long-term mean monthly water temperatures would be 0.3°F or greater for each of April, May and June. Such temperature increases would impart significant effects on fall-run and steelhead juvenile rearing in the upper portions of the river. It would also likely significantly affect juvenile emigration during this period.

Table 5.26-6G (see page 5-223 of the Draft EIS/EIR) shows the long-term anticipated early life-stage fall-run Chinook salmon survival, relative to the Base Condition. The modeling results reveal that, over the long-term, survival of the early life-stage fry and smolts from egg mass would increase, relative to the Base Condition by 2 percent. When comparing these data with the instream water temperature modeling results, these results can be explained by the fact that modeled water temperatures during the fall-run Chinook salmon spawning and egg incubation period (October through February) and the steelhead spawning and egg incubation period (December through March) remain outside of the period when river water temperatures would show long-term increases. The Salmon Mortality Models produce a single estimate of early life stage Chinook salmon mortality in each river for each year of the simulation. The overall salmon mortality estimate consolidates estimates of mortality for three separate Chinook salmon early life stages: (1) pre-spawned (in utero) eggs; (2) fertilized eggs; and (3) pre-emergent fry. The mortality estimates are computed using output water temperatures from Reclamation's water temperature models as inputs to the Salmon Mortality Models. Thermal units (TUs), defined as the difference between river water temperatures and 32°F, are used by the Salmon Mortality Models to track life stage development, and are accounted for on a daily basis. For example, incubating eggs exposed to 42°F water for one day would experience 10 TUs. Fertilized eggs are assumed to hatch after exposure to 750 TUs. Fry are assumed to emerge from the gravel after being exposed to an additional 750 TUs following hatching.

Since the models were limited to calculating mortality during early life stages, they did not evaluate potential impacts on later life stages, such as recently emerged fry, juvenile out-migrants, smolts, or adults. Additionally, the models did not consider other factors that may affect early life stage mortality, such as adult pre-spawn mortality, instream flow fluctuations, redd superimposition, and predation. Simulation output from the Salmon Mortality Models provided estimates of annual (rather than monthly mean) losses of emergent fry from egg potential (i.e., all eggs brought to the river by spawning adults).

Overall, based on the hydrologic, water temperature and salmon survival modeling output and, in consideration of the listed status of fall-run and steelhead, modeled flow reductions and increased water temperatures during any one of the several life-stages of these fish species are sufficient to impart a potentially significant future cumulative impact on this resource. The future cumulative impact on fall-run Chinook salmon and steelhead was found to be potentially significant. The potential effects of the various Alternatives on fall-run Chinook salmon and steelhead in the lower American River varies. The Alternatives that contemplate the full 15,000 AFA diversion (e.g., the No Action Alternative; the Proposed Action; and Alternative 3) were shown to have slight, but notable potential effects relative to the Base Condition. The Alternatives that proposed reduced diversions (e.g., Alternatives 4A, 4B and 4C) did not. Mitigation measures for the No Action Alternative, the Proposed Action and Alternative 3 were included in the Draft EIS/EIR to mitigate the potential cumulative effect of the Alternatives relative to the Base Condition. These included a shift in diversion patterns from those modeled. Implementation of these measures would reduce the potential incremental contribution to levels considered less than significant relative to the Base Condition.

Impact 5.26-7 (Effects on lower American River splittail) was addressed in the Draft EIS/EIR using modeled mean monthly flows in the lower American River at Watt Avenue, under the Future Cumulative Condition. As shown in the Draft EIS/EIR, flows would be significantly reduced during the February through July period, relative to the Base Condition. April and May showed the largest mean monthly reductions; approximating 15 percent. These modeling data suggested that the splittail spawning period (February through May) would experience a long-term decline in average usable riparian habitat. Given the uncertainty regarding the magnitude and extent of splittail spawning habitat in the lower American River, and the actual amount of potential spawning habitat available at specific flow rates throughout the river, the effects of flow reductions during the February through May period would be uncertain, and therefore, represented a potentially significant future cumulative impact on this federally species. The Alternatives including the various scenarios under the Proposed Action, would contribute to this potential significant future cumulative impact, but that contribution would be slight and unsubstantial. Therefore, the cumulative impact of the Proposed Action and Alternatives is likely to result in minimal effects.

Impact 5.26-8 (Effects on striped bass) was evaluated in the Draft EIS/EIR using projected mean monthly flows at the mouth of the lower American River under the Future Cumulative

Condition. Modeled flows were shown to decrease throughout the spring and early summer months. Such flow reductions, over the long-term, could have potentially significant impacts on striped bass juvenile rearing, which occurs during the months of May and June. Using the CDFG attraction flow index of 1,500 cfs, the Future Cumulative Condition would result in several additional years where flows would be less than the 1,500 cfs target, relative to the Base Condition. There would be 12 occurrences in May, representing a 17 percent increase in the frequency with which flows would be less than the 1,500 cfs target, and 5 occurrences in June, representing a 7 percent increase in frequency. Overall, based on the modeled future flow conditions in the lower American River, there would be a significant future cumulative impact on the striped bass recreational sport fishery. As shown in the Draft EIS/EIR, the Alternatives including the various scenarios under the Proposed Action, would incrementally contribute to this potential significant future cumulative impact, but that contribution would be slight and unsubstantial. Therefore, the cumulative impact of the Proposed Action and Alternatives is likely to result in minimal effects*.*

It important to note that while the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the “Base Condition” was important for the Draft EIS/EIR’s compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action’s effects relative to the No Action Alternative. Section 5.26 of the Draft EIS/EIR found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action. The Draft EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect on fisheries and aquatic resources.

5.4.5.2 Summary of Cumulative Impact from the LTO EIS

5.4.5.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp including climate change and sea level rise

Climate change and sea level rise, development under the general plans, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to reduce carryover storage in reservoirs, stream flows and Delta outflow, and the availability of CVP and SWP water supplies as compared to past conditions.

5.4.5.2.2 Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

These future actions could modify surface water conditions (e.g., flow) and affect habitat for fish and aquatic resources. However, many of these actions are intended to improve habitat conditions for aquatic resources or water quality, and thus the alternatives would not contribute to an adverse cumulative effect on fisheries and aquatic resources. In addition, these actions were or would be subject to compliance with ESA, CESA, and other environmental laws and requirements, which serve to reduce the potential for impacts on fisheries and aquatic resources.

5.4.5.2.3 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Most of the future reasonably foreseeable actions are anticipated to reduce water supply impacts due to climate change, sea level rise, and increased water allocated to improve habitat conditions. It is unclear how these future reasonably foreseeable actions would influence aquatic resources because project details are not available. However, as described above, these actions would be subject to environmental regulations that avoid or limit the potential for cumulative effects on aquatic resources. Some of these actions (e.g., FERC relicensing projects) could cumulatively contribute to reducing adverse effects of climate change on aquatic resources if fish passage and improved water temperature control result from the FERC process.

5.4.5.2.4 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp future reasonably foreseeable actions would result in changes in stream flows, increased Delta outflow, and reduced CVP and SWP water supplies as compared to conditions prior to the BiOps. These RPA actions are intended and anticipated to put fisheries and aquatic resources on a more favorable trajectory than would occur without these actions. Reclamation has prepared and transmitted a biological assessment to USFWS and NMFS for ROC on LTO. That consultation is still on-going. Furthermore, Reclamation has yet to analyze any proposed operation resulting from ROC on LTO under NEPA. It is unclear what the outcome of those consultations will be at this time.

5.4.5.3 Final EIS Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing and foreseeable future projects on fisheries and aquatic resources was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing, and future projects on fisheries and aquatic resources would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, for purposes of this Final EIS, the cumulative impact of the Proposed Action and Alternatives on fisheries and aquatic resources is likely to result in minimal effects.

5.4.6 <u>Riparian Resources (Study Area) – Cumulative Impacts</u>

5.4.6.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

Riparian resources throughout the CVP are dependent on system-wide hydrological operations to ensure adequate flows both in volume and seasonally. Long-term future changes in reservoir and instream operations have the potential to affect riparian diversity, sustenance, and expansion in reservoirs and river reaches throughout the CVP, including the Delta. CALSIM II modeling was used as the primary simulation tool to predict hydrological changes and relate those changes to riparian resource communities throughout the CVP.

Section 5.27 of the Draft EIS/EIR assesses four potential cumulative impacts on riparian resources that could occur as a result of the Proposed Action or Alternatives. These are: Impact 5.27-1 (Effects of changes in water surface elevations on Folsom, Trinity, and Shasta reservoir vegetation); Impact 5.27-2 (Flow-related effects on upper and lower Sacramento River riparian vegetation); Impact 5.27-3 (Flow-related effects on Delta riparian vegetation and special-status species; and Impact 5.27-4 (Flow-related effects on lower American River riparian vegetation and special-status species dependent upon riparian and open water habitats).

Impact 5.27-1 (Effects of changes in water surface elevations on Folsom, Trinity, and Shasta reservoir vegetation) was assessed in the Draft EIS/EIR using the long-term average end-of-month storage and/or water surface elevations for Folsom and Shasta reservoirs. The Draft EIS/EIR found that these elevations would be reduced, relative to the Base Condition, with the most significant reductions occurring during the fall period (October and November). Trinity Reservoir showed slight, albeit insignificant long-term changes in water surface elevations. The most significant changes occurred outside of the growing season months of March through September. For most reservoirs, weedy vegetation, rather than vegetation that would provide higher quality wildlife habitat, typically establishes in the drawdown zone, due to the constant fluctuations in reservoir elevation that result from annual/seasonal reservoir drawdown. Consequently, reductions in reservoir elevations that would occur in the future would not affect areas of high and consistent habitat value that are available for species associated with the reservoir. Accordingly, the future cumulative impact on reservoir riparian vegetation in Shasta, Trinity, and Folsom reservoirs was found to be less than significant relative to the Base Condition.

Impact 5.27-2 (Flow-related effects on upper and lower Sacramento River riparian vegetation) was evaluated upper Sacramento River long-term average flows during the March through October growing season. Under the Future Cumulative Condition, these flows would remain unaffected relative to the Base Condition. In fact, the early months of the growing season showed long-term mean monthly flow increases, as releases from Keswick Dam, relative to the Base Condition. In the upper Sacramento River, simulated future reductions in mean monthly flow releases from Keswick Dam occurred in the months of January and February. Accordingly, anticipated long-term flow reductions that would occur under the Future Cumulative Condition would not be of sufficient magnitude and/or frequency to significantly alter upper Sacramento River riparian vegetation and related species.

Modeled reductions in long-term average flows of the lower Sacramento River at Freeport under the Future Cumulative Condition revealed only slight changes, relative to the Base Condition. No long-term changes in mean monthly flows were observed over the growing season in early spring and mid-summer months. Therefore, significant adverse effects on riparian habitats of the lower Sacramento River would not be expected under the Future Cumulative Condition.

Impact 5.27-3 (Flow-related effects on Delta riparian vegetation and special-status species) was evaluated in the Draft EIS/EIR using modeled Delta outflow conditions under the Future Cumulative Condition. Modeling results showed that while there would be slight mean monthly reductions in outflow during April and May (peak riparian growing season), by mid-summer, simulated outflows would increase, relative to the Base Condition. The month of October revealed the largest simulated reduction in long-term average mean monthly Delta outflow.

The long-term average reduction in lower Sacramento River flow would not affect the growing season months. Potential shifts in the long-term average position of X2 were slight, under the Future Cumulative Condition with the mid-winter months of November and December revealing the largest upstream migrations of X2. Water quality conditions, at least in terms of the X2 salinity surrogate for riparian vegetation would not be significantly affected under the Future Cumulative Condition. Overall, anticipated flow reductions and the general maintenance of the X2 position during the critical growing season would be considered minor perturbations and would not adversely affect Delta vegetation or special-status species dependent upon Delta habitats. The future cumulative impact on Delta riparian vegetation and special-status species relying upon those botanical communities would be less than significant relative to the Base Condition.

Impact 5.27-4 (Flow-related effects on lower American River riparian vegetation and special-status species dependent upon riparian and open water habitats) was evaluated in the Draft EIS/EIR using modeling results for long-term future changes in lower American River flows. Riparian plant communities along the lower American River are maintained through hydrologic, geomorphic, and substrate conditions that have occurred there over time. Spatially, they are varied along the longitudinal profile of the river with alder-dominated vegetation occurring as stringers along the upper reaches of the river while, further down, gravel bars and point bars occur as a result of sediment transport and storage along the channel bed. Regeneration of willows occurs on scoured gravel bar sites. Cottonwoods also form small stringers on freshly deposited sediment on point bars as well as on less steep terraces with suitable seed beds, where even-aged stands of older cottonwoods occur. As noted previously, most of the riparian forest habitat immediately adjacent to the lower American River is dominated by cottonwood intermixed with willows. Several backwater and off-river ponds occur at some of the bars along the river.

Long-term future changes in lower American River flows could result in more frequent occurrences where flow indices for cottonwood growth and terrace inundation are not met. As an example, flows could be below the radial growth maintenance index more frequently than that occurring presently.

Table 5.27-1A from the Draft EIS/EIR (see page 5-230) shows tabulations from modeled future simulations of the number of months under the Future Cumulative Condition when mean monthly lower American River flows (at four locations) would be below 1,750 cfs, the threshold flow considered necessary to support the continued radial growth of cottonwoods during the growth season (May through September). Significant increases in the number of months were observed under the Future Cumulative Condition (e.g., a 19 percent increase in the number of months from the Base Condition was tabulated for Watt Avenue). This would be a potentially significant future cumulative impact on cottonwood growth along the lower American River.

Higher flows earlier in the growing season (i.e., April through June) are often critical to the establishment of seedlings of riparian species on riverine terraces. Table 5.27-1B (see page 5-230 of the Draft EIS/EIR) tabulates the number of years, for each month under the Future Cumulative Condition, when mean monthly flows in the lower American River below Nimbus Dam would be within the flow range considered optimal (i.e., between 2,700 and 4,000 cfs) and compares the Base Condition with the Future Cumulative Condition. The early growing season (May) shows a noticeable reduction in the number of months, relative to the Base Condition, when mean monthly flows would be within the 2,700 to 4,000 cfs range considered optimal for riparian growth. This would be a potentially significant future cumulative impact on riparian growth along the lower American River. Table 5.27-1C (see page 5-231 of the Draft EIS/EIR) shows the number of years, for each month under the Future Cumulative Condition, when mean monthly flows in the lower American River at H Street would be within the threshold criteria for minimum backwater pond sustenance and continuous recharge. Tabulated years from CALSIM II hydrology output for the lower American River at this location show the variation between the Base Condition and the simulated hydrology under the Future Cumulative Condition. The largest reduction occurs in October, although May also reported 6 fewer occurrences (or an 8 percent reduction) when flows would be within the minimal/optimal range for backwater pond sustenance and continuous recharge. This would be a potentially significant future cumulative impact on backwater pond maintenance along the lower American River. Overall, the modeling results for the Future Cumulative Condition show that lower American River hydrology would be affected substantially during portions of the riparian growth seasons. Such changes in hydrology are considered sufficient to represent a potentially significant future cumulative impact on riparian communities and backwater pond and wetlands. The Alternatives, along with the various scenarios under the Proposed Action, while contributing to this potentially significant future cumulative impact would not impart a significant increment.

As noted above, while the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the “Base Condition” was important for the Draft EIS/EIR’s compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action’s effects relative to the No Action Alternative. Section 5.27 of the Draft EIS/EIR (Riparian Resources) found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action. The Draft EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect on riparian resources.

5.4.6.2 Summary of Cumulative Impact Assessment from the LTO EIS

5.4.6.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp including climate change and sea level rise

Climate change and sea level rise and development under the general plans are anticipated to reduce carryover storage in reservoirs and changes in stream flow patterns in a manner that would change shoreline, riparian, and floodplain habitat.

5.4.6.2.2 Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

Other actions, including restoration projects, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to improve shoreline, riparian, and floodplain habitat.

5.4.6.2.3 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Some of the future reasonably foreseeable actions to improve water quality and FERC Relicensing projects would improve shoreline, riparian, and floodplain habitat. Other future reasonably foreseeable actions, such as expanded or new reservoirs, would reduce some types of terrestrial habitat and increase other types of terrestrial habitat within the reservoir area.

5.4.6.2.4 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp along with future reasonably foreseeable actions would result in changes in stream flows and levee vegetation policies that would result in changes to related terrestrial resources as compared to conditions prior to the BiOps. Reduced riparian habitat along levees would occur within the federally authorized levee systems that have maintenance agreements with the USACE as compared to recent conditions.

5.4.6.3 Final EIS Cumulative Impact Determination: Proposed Action and Alternatives

The cumulative impact of past, ongoing, and foreseeable future projects on riparian resources was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing, and future projects on riparian resources would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, for purposes of this Final EIS, the cumulative impact of the Proposed Action and Alternatives on riparian resources is likely to result in minimal effects.

5.4.7 Recreational Resources (Study Area) – Cumulative Impacts

5.4.7.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

Future changes in system hydrology have the potential to affect water-related recreational facilities and activities in various reservoirs, waterways, and in the Delta through reduced water surface elevations, water surface area, and river flows. Section 5.28 of the Draft EIS/EIR assesses three (3) potential cumulative impacts on water-related recreational resources that could occur as a result of the Proposed Action or Alternatives. These are: 5.28-1 (Impacts on recreational facilities and activities at Shasta and Folsom reservoirs); Impact 5.28-2 (Impacts on recreational activities along the lower American River); and 5.28-3 (Impacts on recreational activities in and along the upper and lower Sacramento River).

5.28-1 (Impacts on recreational facilities and activities at Shasta and Folsom reservoirs) was evaluated in the Draft EIS/EIR using modeled output data for future simulated reservoir water surface areas for Shasta, Trinity, and Folsom reservoirs relative to the Base Condition. Shasta Reservoir showed slight mean, long-term, end-of-month water surface area changes, relative to the Base Condition, but these monthly reductions did not exceed 2 percent. Trinity Reservoir showed no measurable changes in water surface elevations; most mean monthly long-term changes were less than one-tenth of one percent of Base Condition elevations. Folsom Reservoir showed the most noticeable changes with September revealing a 9 percent reduction in mean end-of-month water surface area, relative to the Base Condition, with an 11.2-foot reduction in long-term water surface elevation in September.

At Shasta Reservoir, the slight long-term reductions in water surface area and corresponding elevations are unlikely to represent a significant future cumulative impact given the size of the reservoir and, therefore, the ability of recreationists to seek our alternative locations for activity (e.g., boat launching, swimming, fishing access, etc.). At Folsom Reservoir, however, to the extent that September represents an important end of season recreational month (e.g., Labor Day weekend), the magnitude and frequency of the simulated reductions in water surface elevations and surface area would likely have a significant future cumulative impact on recreational activities and facilities relative to the Base Condition. Based on these results, the Draft EIS/EIR determined that the Alternatives and various scenarios under the Proposed Action, while contributing to this future cumulative impact; would not impart a significant incremental contribution to the cumulative impact relative to the Base Condition.

Impact 5.28-2 (Impacts on recreational activities along the lower American River) was evaluated in the Draft EIS/EIR using the frequency with which mean monthly flows all along the lower American River would be below the minimum 1,750 cfs necessary for water-related recreational activities would increase, relative to the Base Condition. At Watt Avenue, for example, mean monthly river flows under the Future Cumulative Condition would be below 1,750 cfs during the May through September recreational season, approximately 20 percent more often than today. This alone, would be a significant future cumulative impact on lower American River water-dependent recreational activities relative to the Base Condition. The Draft EIS/EIR found that the Alternatives including the various Proposed Action scenarios, while contributing to this future cumulative impact, would not impart a significant increment relative to the Base Condition.

Impact 5.28-3 (Impacts on recreational activities in and along the upper and lower Sacramento River) was assessed in the Draft EIS/EIR using modeled results for long-term mean monthly flows in the upper and lower Sacramento River. Riverine recreational activities depend on adequate flows. While recreationists have the ability to choose when and where they recreate and so, would tend to avoid conditions unsuitable for water-related activities, summer time flows are an important determinant of recreational activity. In the Sacramento River, flows are rarely limiting during the May through September recreational season. Long-term mean monthly flows, on average, were simulated to increase, relative to Base Condition levels in the upper Sacramento River, with the exception of September. The mean monthly flow reduction for September, however, is not significant and long-term September flows under the Future Cumulative Condition are still well above 6,000 cfs.

In the lower Sacramento River, mean monthly flows under the Future Cumulative Condition showed similar trends with that occurring upstream. Slight changes, over the long-term, are predicted. Any reductions in mean monthly, long-term averaged flows, would likely have minimal effects. Future cumulative condition flows in the lower Sacramento would remain well above 10,000 cfs throughout the summer recreational period.

Based on these results, the Draft EIS/EIR determined that the future cumulative impacts on upper and lower Sacramento River water-dependent recreational activities would be less than significant relative to the Base Condition.

It important to note that, while the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the “Base Condition” was critical for the Draft EIS/EIR’s compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action’s effects relative to the No Action Alternative. Section 5.28 of the Draft EIS/EIR found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action. The Draft EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect relative to water-related recreational resources.

5.4.7.2 Summary of Cumulative Impact Assessment from the LTO EIS

5.4.7.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp including climate change and sea level rise

Climate change and sea level rise and development under the general plans are anticipated to reduce carryover storage in reservoirs and changes in stream flow patterns in a manner that would change recreational opportunities and could reduce the opportunities for sport ocean salmon fishing.

5.4.7.2.2 Actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

Other actions, including restoration projects, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to improve recreational opportunities.

5.4.7.2.3 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Some of the future reasonably foreseeable actions to improve water quality and FERC Relicensing projects would improve recreational opportunities. Other future reasonably foreseeable actions, such as expanded or new reservoirs would improve recreational opportunities.

5.4.7.2.4 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp would result in changes to stream flows would result in changes to related recreational opportunities as compared to conditions prior to the BiOps.

5.4.7.2.5 Final EIS Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing and foreseeable future projects on water-related recreational resources was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing and future projects on riparian resources would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, for purposes of this Final EIS, the cumulative impact of the Proposed Action and Alternatives on water-related recreational resources is likely to result in minimal effects.

5.4.8 Cultural Resources (Study Area) – Cumulative Impacts

5.4.8.1 Summary of Draft EIS/EIR Cumulative Impact Assessment

River flow fluctuations and reservoir levels are influential hydrologic factors able to potentially affect cultural resources in those waterbodies. Long-term reservoir elevation and river flow decreases could expose previously submerged resources, while reservoir and flow increases could damage or submerge existing exposed resources. Section 5.29 of the Draft EIS/EIR assessed two (2) potential cumulative impacts on water-related cultural resources that could occur as a result of the Proposed Action or Alternatives. These are: Impact 5.29-1 (Effects of changes in magnitude and/or frequency of Folsom reservoir elevations on cultural resources);

and Impact 5.29-2 (Effects of changes in magnitude and/or frequency of lower American River and Sacramento River flows on cultural resources).

Impact 5.29-1 (Effects of changes in magnitude and/or frequency of Folsom reservoir elevations on cultural resources) was evaluated in the Draft EIS/EIR using modeled results for the mean monthly average water surface elevations under both the Base Condition and under the Future Cumulative Condition. For Folsom Reservoir, each of the mean monthly average water surface elevations under both the Base Condition and Future Cumulative Condition, were well within the 395 to 466 ft msl zone of historic maximum fluctuation. A review of the entire 874 monthly record shows that, under the Future Cumulative Condition, there would be 37 additional months when Folsom Reservoir water surface elevations would be below 395 ft msl, relative to the Base Condition. This represents an approximate 4 percent increase in the frequency with which water elevations would be below 395 ft msl. Nevertheless, the maximum long-term mean monthly water surface elevation decrease for Folsom Reservoir was approximately 11 ft msl. An 11 ft vertical drop in water surface, depending on reservoir slope and bathymetry, could affect a large area of shoreline. As shown in the Draft EIS/EIR, the maximum reduction in mean end-of-month water surface area for Folsom Reservoir was 740 acres (or 9 percent of the reservoir's water surface area for that month, under the Base Condition). Such reductions could represent a significant impact; however, the extent to which Folsom Reservoir has undergone numerous wetting and drying cycles (i.e., lowering and raising water levels as a part of its historic operations) suggests that no additional effects on cultural resources would occur under the Future Cumulative Condition. Accordingly, future changes in hydrology are considered to represent a less-than-significant future cumulative impact on cultural resources related to Folsom Reservoir.

Impact 5.29-2 (Effects of changes in magnitude and/or frequency of lower American River and Sacramento River flows on cultural resources) was assessed using modeling data for the Future Cumulative Condition. Those data confirm that, overall, long-term flow reductions are anticipated through CVP watercourses. Changes in river flows, therefore, would have a much more limited effect on either inundating (through water elevation rise) or desiccating (through water level decline) cultural resource sites along the channel embankments. More importantly, the 72-year hydrologic period of record includes numerous episodes of extremely high flows within both in the lower American and Sacramento rivers. At such flows, any cultural resource sites along the river channels would have historically been inundated through substantial river stage increases. Accordingly, while future flow changes (i.e., reductions) are anticipated to occur, it is unlikely that such changes would significantly affect the remaining cultural resources along these waterways that would have already been subject to the full range of inundation and exposure. Potential future cumulative impacts on cultural resources along these waterways is considered to be less than significant, therefore, relative to the Base Condition.

As described previously, it important to note that while the comparison of potential cumulative effects of the Proposed Action and Alternatives relative to the "Base Condition" was important for the Draft EIS/EIR's compliance with CEQA, NEPA requires the analysis of impact to be based on the Proposed Action's effects relative to the No Action Alternative. Section 5.29 of the Draft EIS/EIR found no distinction between the cumulative effects of the No Action Alternative and the Proposed Action. The Draft EIS/EIR also found no distinction between the No Action Alternative and Alternatives 3 and 4 relative to potential cumulative effect relative to water-related cultural resources.

5.4.8.2 Summary of Cumulative Impact Assessment from the LTO EIS

5.4.8.2.1 Actions in the 2008 USFWS BiOp and 2009 NMFS BiOp including climate change and sea level rise and actions not included in the 2008 USFWS BiOp and 2009 NMFS BiOp that would have occurred without implementation of the BiOps

Community development would occur in accordance with general plan projections for 2030. Development within the Delta would be subject to the requirements of the Delta Protection Commission and Delta Stewardship Council. Future development projects are anticipated to potentially effect cultural resources. However, development of these programs would include preparation of environmental documentation that would identify methods to minimize adverse impacts to cultural resources. Restoration plans for the ongoing programs would be completed. Development along river corridors in the Central Valley. Future restoration projects are anticipated to potentially affect cultural resources. However, development of these future programs would include preparation of environmental documentation that would identify methods to minimize adverse impacts to cultural resources.

Climate change and sea level rise, development under the general plans, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to reduce availability of CVP and SWP water supplies as compared to past conditions. Future water supply projects are anticipated to both increase water supply reliability due to reduced surface water supplies and to accommodate planned growth in the general plans. Most of these programs were initiated prior to implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp which reduced CVP and SWP water supply reliability. Future water supply projects are anticipated to potentially affect cultural resources. However, development of these future programs would include preparation of environmental documentation that would identify methods to minimize adverse impacts to cultural resources.

5.4.8.2.2 Future Actions Considered as Cumulative Effects Actions in the Year 2030

Most of the future reasonably foreseeable actions are anticipated to reduce water supply impacts due to climate increased water allocated to improve habitat conditions, and future growth. Some of the reasonably foreseeable actions related to improved water quality and habitat conditions (e.g., Water Quality Control Plan Update and FERC Relicensing

Projects), could in further reductions in CVP and SWP water deliveries. Future development of the cumulative projects are anticipated to potentially affect cultural resources. However, development of these future programs would include preparation of environmental documentation that would identify methods to minimize adverse impacts to cultural resources.

5.4.8.2.3 Full implementation of the 2008 USFWS BiOp and 2009 NMFS BiOp

Community development and restoration projects for the ongoing programs would be completed. Climate change and sea level rise, FERC relicensing projects, and some future projects to improve water quality and/or habitat are anticipated to reduce availability of CVP and SWP water supplies as compared to past conditions. Future water supply projects are anticipated to both increase water supply reliability due to reduced surface water supplies and to accommodate planned growth in the general plans. Future development projects are anticipated to potentially affect cultural resources. However, development of these future programs would include preparation of environmental documentation that would identify measures to minimize adverse impacts to cultural resources.

5.4.8.2.4 Final EIS Cumulative Impact Determination: Proposed Action and Alternatives

As discussed above, the cumulative impact of past, ongoing, and foreseeable future projects on water-related recreational resources was evaluated in the 2016 LTO FEIS. Consistent with the findings of the 2009 Draft EIS/EIR, the Proposed Action's contribution to the cumulative impact of past, ongoing and future projects on water-related cultural resources would be indistinguishable from that of the No Action Alternative. For this reason, the Proposed Action's contribution to the cumulative impact would be unsubstantial. This conclusion also applies to Alternative 3 and Alternative 4 (all scenarios). Therefore, for purposes of this Final EIS, the cumulative impact of the Proposed Action and Alternatives on water-related cultural resources is likely to result in minimal effects.

5.5 CUMULATIVE IMPACTS AND MITIGATION MEASURES – SERVICE AREA RESOURCES

This section of this Final EIS addresses the indirect cumulative effects of the Proposed Action and Alternatives within the EID and GDPUD service areas when new water supplies are made available to those providers. These effects would be due, in large part, to future development within the service areas made possible by improved water availability. In keeping with NEPA requirements, the significance of the indirect cumulative impact of the Proposed Action and Alternatives is determined by comparing the impact with that of the No Action Alternative.

As noted previously, the Draft EIS/EIR, in its entirety, is incorporated by reference in this Final EIS. This section of the Final EIS summarizes the service area cumulative impact analysis presented in Sections 5.30 through 5.38 of the Draft EIS/EIR and includes text revisions made in response to public comments on the Draft EIS/EIR and pertinent informational updates made at the NEPA Lead Agency's discretion.

As stated above, it is important to note that the 2009 Draft EIS/EIR for P.L. 101-514 was a joint NEPA/CEQA document, and as such, presented information and analysis to fully comply with both NEPA and CEQA requirements for environmental review. A Final EIR was completed and certified by EDCWA in January of 2011 after the conclusion of the Draft EIS/EIR public review period. With certification of the Final EIR, EDCWA's obligation under CEQA was fully met. This Final EIS, therefore, is intended as a NEPA-only document. As such, the analysis of indirect cumulative service area impacts is presented differently in this Final EIS than in the 2009 Draft EIS/EIR and 2011 Final EIR. Whereas CEQA requires an EIR to evaluate project impacts relative to the environmental conditions as they exist at the start of the environmental review process, NEPA requires an EIS to evaluate the impact of the proposed action relative to future conditions likely to occur in the absence of the project. These future conditions are typically reflected in the No Action Alternative.

For purposes of this Final EIS, the potential indirect cumulative impact of the Proposed Action and alternatives are evaluated relative to the conditions anticipated to occur under the No Action Alternative. Given that the No Action Alternative assumes that an alternative water supply of up to 15,000 AFA would be acquired by EDCWA in the event that the Proposed Action is not approved, water available to serve growth and development within the EID and GDPUD service areas under the No Action Alternative would be identical to that provided under the Proposed Action.

As stated previously in this Final EIS, no new facilities, improvements to existing infrastructure, or construction activities are proposed as part of the Proposed Action or alternatives. To the extent that construction of certain facilities is required to fully implement the P.L.101-514 contract, appropriate project-level environmental documentation would be prepared by appropriate lead agencies at such time in the future when those decisions would be made. Any construction related impacts and site specific facility impacts would be the responsibility of those agencies proposing such future projects; they are not part of the impact evaluations presented in the Draft EIS/EIR or this Final EIS.

Extensive analysis of the potential impact of future growth and development within the subcontractor service areas was conducted as part of the County's General Plan and environmental review process (El Dorado County 2004). This process effectively provided a future cumulative assessment of the various plans, programs, policies, ordinances and planning process applicable to El Dorado County under anticipated future growth pressures.

In December of 2015, the County certified a Final Environmental Impact Report for the Targeted General Plan Amendment and Zoning Ordinance Update (TGPA/ZOU) and adopted the

TGPA/ZOU. The TGPA/ZOU included several modifications and additions to the County General Plan including but not limited to revised community design standards for Mixed Use Design; Landscaping and Irrigation; Outdoor Lighting; Mobile Home Park Design; Research and Development Zone Design; and Parking and Loading. These changes are considered herein, but do not substantively alter the analysis or conclusions addressing subcontractor service area impacts presented in the 2009 Draft EIS/EIR.

Implementation of the proposed CVP Water Services Contract under P.L. 1015-4 or any alternatives to the Proposed Action addressed herein, would in no way conflict with or circumvent those policies and committed obligations and mitigation measures made by the County. Because development served by the Proposed Action and Alternatives would be necessarily consistent with development evaluated and planned for under the County General Plan and EIR process, the P.L. 101-514 Draft EIS/EIR and this Final EIS rely heavily on the impact evaluations and conclusions presented in the General Plan EIR. Where appropriate, new information presented in the TGPA/ZOU EIR is included in this evaluation and is cited as such.

Section 4.10 of this Final EIS addresses the potential indirect, service area-related future impacts resulting from the Proposed Action and alternatives. Resource areas covered in this section are the same as those addressed in Section 4.10 above and include: Land Use (subsection 4.10.1); Transportation and Circulation (4.10.2); Air Quality (4.10.3); Noise (4.10.4); Geology, Soils, Minerals, and Paleontological Resources (4.10.5); Recreation (4.10.6); Visual Resources (4.10.7); Cultural Resources (4.10.8); and Terrestrial and Wildlife Resources (4.10.9).

5.5.1 Land Use – (Service Area Cumulative Impacts)

5.5.1.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

Land use is generally a County-specific issue, except where land uses may interact with surrounding jurisdictions. Continued concentration of urban development along the U.S. 50 corridor under the County's General Plan would extend a corridor of urban land uses east from Sacramento County. It is now likely that future urbanization will occur south of U.S. 50 in the City of Folsom, given the recent sphere of influence boundary expansion for that city and pending City General Plan Update process which considers substantial residential, commercial and industrial development on undeveloped land adjacent to and south of Highway 50 and immediately west of the El Dorado County western boundary.

The El Dorado County General Plan, as amended, is intended to guide the location and intensity of land uses in El Dorado County. In the County's General Plan EIR, the four equal-weight alternatives that were considered differed with respect to their land use maps; however, they all considered existing land use patterns, and specifically, areas that have already been developed with residential uses. The potential for land use incompatibility would continue into the future, primarily as a result of the range of uses allowed by right. Incompatibilities could be created by the Low-Density Residential designations; siting of government buildings in inappropriate zoning districts; lack of compatibility review for the wide variety of uses allowed by right; and conflicting uses permitted in Rural Regions (e.g., ranch marketing, timber harvesting, mining, agriculture, residential). Development intensity and density could be more widespread at buildout because all available developable land could already be in use by that time. The potential for incompatibilities that could be encountered throughout the County in 2025 could be fully realized at buildout. Moreover, the General Plan acknowledged that the discretionary review process could allow development near existing mining operations resulting in land use compatibilities. This impact was considered significant and represents a significant and unavoidable cumulative impact that could result through buildout of the County General Plan. This determination was not substantially altered by County adoption of the TGPA/ZOU in 2015.

Although the Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact due to buildout of the County General Plan and its potential for the creation of incompatible land uses in close proximity, the contribution of the Proposed Action and alternatives to this impact would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be identical to that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and alternatives, therefore, is considered likely to result in minimal effects.

5.5.2 Transportation and Circulation (Service Area Cumulative Impacts)

5.5.2.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

Traffic impacts are a regional concern for which the Sacramento Area Council of Governments (SACOG) plays a lead role. As regional growth continues, development patterns will affect traffic and circulation in El Dorado County, and planned growth in the county resulting from the equal-weight alternatives would affect the regional road network, including the U.S. 50 corridor. Growth may foster increased improvements to the County's roadway system, but would also cause greater levels of traffic and a greater level of improvement need.

Jobs created in El Dorado County would result in employees commuting from Sacramento and Placer counties. Similarly, housing opportunities in western El Dorado County resulting from General Plan implementation would increase peak-hour trips into Sacramento, Rancho Cordova, Folsom, and other areas of Sacramento County where most of the regional area jobs are concentrated.

At the time of publication of the 2009 Draft EIS/EIR, SACOG had adopted a Metropolitan Transportation Plan (MTP). As discussed in the Draft EIS/EIR, the MTP was intended to respond to the cumulative traffic effects that local plans have on the circulation system of the entire Sacramento region. These significant General Plan impacts would also cause a considerable contribution to significant regional traffic impacts. Much of the cumulative traffic impact outside of El Dorado County would occur in Sacramento County as a result of the increased commute traffic along the U.S. 50 corridor. The SACOG MTP projected a regional (SACOG-wide) increase in population of 928,048 between 2000 and 2025. The MTP allocated a share of this population growth, 69,500, to El Dorado County. To the degree that the county does not accommodate this level of growth, it is possible that this growth would occur in the adjacent counties, Sacramento, Placer, and Amador. This would place higher traffic levels in these counties.

On February 18, 2016, SACOG adopted the *2016 Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS).[184] The MTP/SCS is intended to respond to the cumulative traffic effects that local plans have on the circulation system of the entire Sacramento region. The 2016 MTP/SCS was adopted by the SACOG Board. The plan covers the period from 2012 to 2036 and is an update to the 2012 Metropolitan Transportation Plan/Sustainable Communities Strategy. The MTP/SCS provides the regional plan for transportation investments, integrated with projected land use, and funding constraints the region can reasonably expect to see through 2036.

Much of the cumulative traffic impact outside of El Dorado County would occur in Sacramento County as a result of the increased commute traffic along the U.S. 50 corridor. The SACOG MTP projected a regional (SACOG-wide) increase in population of 928,048 between 2000 and 2025. The MTP allocated a share of this population growth, 69,500, to El Dorado County. To the degree that the county does not accommodate this level of growth, it is possible that this growth would occur in the adjacent counties, Sacramento, Placer, and Amador. This would place higher traffic levels in these counties.

The various alternatives considered by El Dorado County as part of their General Plan process concluded that by 2025, a range of shortfalls relative to the MTP allocation would occur. A potential shift of traffic volume to adjacent counties traffic that would otherwise have occurred in El Dorado County could result. This is a potentially significant cumulative impact, although surrounding jurisdictions retain land use authority and authority over the approval of land uses that may result in significant traffic impacts. It is not feasible to mitigate such an impact because it is not known where; or whether it would occur, and mitigation would be the responsibility of whichever surrounding county would approve development that would cause the impact. The only other means available to mitigate this impact would be to increase the development potential

[184] 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy. http://www.sacog.org/2016-plan

of the County's growth alternatives, and this would require substantially modifying land use maps and/or altering the basic conditions that defined the alternatives contemplated in the General Plan EIR (no new subdivisions of residential land under the No Project Alternative and maximum subdivision of four parcels under the Roadway Constrained 6-Lane "Plus" Alternative). This was considered infeasible because it would entirely redefine these alternatives. Therefore, this impact was considered potentially significant and unavoidable under the General Plan alternatives considered by the County. Implementation of various mitigation measures by the County would minimize El Dorado County's contribution to cumulative traffic impacts, but would not reduce them to less-than significant levels. Consequently, cumulative regional traffic impacts are considered significant and unavoidable.

The adopted General Plan includes concurrency policies. As a result, roadway improvements are expected to generally keep pace with new development. However, even under the concurrency policies, some new traffic could occur in advance of transportation improvements.

There are numerous uncertainties involved in modeling traffic in the buildout scenario. For example, while maximum buildout of any given area of the county is always a possibility, it is much less realistic to assume that maximum buildout of available land would occur countywide. Economic, environmental, physical, political, and other constraints are likely to limit maximum development in parts of the county, either as a practical matter or through application of the policies in the General Plan reflecting those constraints. In fact, many factors are indeed uncontrollable such as the current state of the housing market, economic vitality, job growth, and the overall financial health of the County and State.

Although the Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on County-wide transportation and circulation conditions due to buildout of the County General Plan, the contribution of the Proposed Action and alternatives to this impact would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and alternatives, therefore, is considered likely to result in minimal effects.

5.5.3 Air Quality (Service Area Cumulative Impacts)

5.5.3.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

Air quality is a regional environmental issue, with the majority of air pollutant emissions being created by motor vehicle use within the county's air basins and other air basins in the region. As noted previously, the designated growth areas of the county are on the west slope, which is in the MCAB. The MCAB is designated as non-attainment for the State and national ozone standards and the State particulate (PM10) standard. Ozone pollution is the primary air quality impact of cumulative concern, because precursor emissions of ozone can occur throughout the region and combine to exacerbate attainment of air quality standards in El Dorado County. Pollutants transported from the San Francisco Bay area also contribute to regional air quality impacts. The County AQMD participated with other AQMDs in the Sacramento area to prepare the 1991 Air Quality Attainment Plan, which includes strategies for achieving the State and national air quality standards. The various alternatives of the County's General Plan include policies and mitigation measures to support reduction of air emissions and help attain the standards, in keeping with the attainment plan. While various mitigation measures designed to address potential air pollutant emissions related to stationary and mobile sources resulting from implementation of County growth were proposed, it was determined that the significant impacts on regional air quality could not be avoided, despite the inclusion of all feasible mitigation measures. The significant air quality impact in El Dorado County would contribute to a cumulative significant air quality in the region, which also could not be avoided.

Implementation of the County General Plan would result in planned development, leading to increases in motor vehicle travel, wood fire stoves/fireplaces, and other sources. These would contribute cumulatively to the significant impact on air quality in the region. Although all feasible policies and mitigation measures were included in the General Plan EIR, this cumulative impact was, and is still considered significant and unavoidable.

The construction of 21,434 new dwelling units, nonresidential development (to support 36,188 new jobs), and other supporting infrastructure would generate emissions of ROG, NO_X, and PM_{10}. As noted in previous discussions, such emissions would be caused by site grading and excavation, paving, application of architectural coatings (e.g., paint, stucco), motor vehicle exhaust associated with construction equipment and construction employee commute trips, material transport (especially on unpaved surfaces), demolition, and other construction operations. Construction of nonresidential development and other supporting infrastructure would result in some new ROG, NO_X, and PM_{10} emissions, but residential construction, which would occur at a rate of about 1,000 units per year, would account for the majority of construction and this would contribute the majority of construction-related emissions.

Increased development and related resident transportation needs would result in regional emissions of ROG, NO_X, CO, and PM_{10} due to vehicle trips, use of natural gas, burning, use of maintenance equipment and consumer products that exceed the applicable thresholds and thus would contribute to a violation of applicable NAAQS or CAAQS. Most recently, diesel exhaust particulate was added to the CARB list of TACs. Activities involving the long-term use of diesel-powered equipment and heavy duty trucks, such as gravel mining and landfilling activities are, therefore, of particular concern. In addition, the attainment plan would potentially be conflicted with due to the increase in population and employment growth, which consequently leads to an increase in VMT and mobile-source emissions. As a result, this impact is considered cumulatively significant.

Odor impacts are also affected by meteorological conditions, in which case some odor emission sources (e.g., agriculture operations, landfills, rendering plants, food-processing facilities, and wastewater treatment facilities) can affect sensitive receptors at distances of more than a mile from the source. Emission sources common within urbanized settings, such as fast-food restaurants particularly those using charbroiling equipment, and dry-cleaning establishments, are not typically considered major odor emission sources. Though such sources often do not affect large numbers of people, sensitive receptors located within close proximity can be exposed to odors on a frequent basis. Odor-generating sources can reduce impacts by modifying operations or by installation of odor-controlling equipment. However, for sensitive receptors, mitigation measures are limited. In fact, in some instances, the only measures available to sensitive receptors is to relocate upwind or further downwind from a source.

Continued development within the County would result in the location of sensitive receptors near odor-generating sources. Continued enforcement of AQMD Rule 205 and implementation of general plan policies to limit development near odor emission sources would reduce this impact, but would not eliminate exposure of sensitive receptors to nuisance odors. As a result, this impact is considered cumulatively significant and unavoidable.

The Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on regional air quality due to potential air pollutant emissions from stationary and mobile sources resulting from buildout of the County General Plan. The Draft EIS/EIR also recognizes the potentially significant and unavoidable impact due to potential odor generation resulting from buildout. Because the Proposed Action and Alternatives would provide new water supplies to serve development within the subcontractor service areas, the Proposed Action and Alternatives would contribute to this impact. The contribution of the Proposed Action and Alternatives, however, would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and alternatives, therefore, is considered likely to result in minimal effects.

5.5.4 Noise (Service Area Cumulative Impacts)

5.5.4.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

Except for roadways that carry significant traffic between counties, noise generation is generally considered a local rather than regional issue. As noted previously, for most noise-related impacts, the location of the impact is site specific and influenced by local conditions (e.g., traffic on a roadway, local topographic conditions, and adjacent stationary noise sources). As overall development within the County occurs, ambient noise levels will increase. Compliance with standards that define noise impacts, however, will continue to be invariably controlled by traffic levels and site-specific development.

Potential cumulative noise impacts that warrant consideration are traffic noise on the regional freeway, U.S. 50, and aircraft noise from Mather Field in Sacramento County. Increases in traffic noise on U.S. 50 resulting from growth would affect adjacent land uses in Sacramento and El Dorado counties. The source of traffic noise in El Dorado County on U.S. 50 is from a broader regional area (Sacramento County and other areas), not just El Dorado County. These cumulative traffic noise levels were evaluated in the County General Plan EIR. In addition to traffic noise in El Dorado County, traffic from development of any of the General Plan alternatives in combination with other regional growth would increase noise levels adjacent to U.S. 50 in Sacramento County.

The Draft Program EIR on the Final Draft MTP 2025 evaluated, among other things, increases in noise levels on several regional roads as a result of growth in the six-county SACOG region, including El Dorado County. The MTP EIR predicts a 3 dBA increase in traffic noise along U.S. 50 from Prairie City Road to the El Dorado County line. The General Plan would contribute to this cumulatively significant impact, and the contribution would slightly exceed (in 2025) what was predicted in the MTP EIR. The MTP EIR identifies mitigation measures for these cumulative impacts, including construction of sound walls as needed (to a limit) and other noise barriers, and specifies that such measures are the responsibility of the implementing agency for specific road projects. SACOG acknowledges that this impact may not be able to be fully reduced, and concludes it would be significant and unavoidable.

Air traffic noise from continued aircraft operations at Mather Field in Sacramento County would add to the noise impact on El Dorado County residents through exposure to aircraft overflights. As residential development increases south of U.S. 50 near the Sacramento County line, more residences would be under one or more of the common aircraft approach paths to this airfield. A greater number of El Dorado County residents would be exposed to aircraft noise because of the location of residential development, but this would be a direct General Plan-related effect, rather than a contribution to a regional, cumulative impact concern.

As additional development occurs throughout the county, the potential exists for new noise-sensitive land uses to encroach upon existing or proposed stationary noise sources. Development of new stationary noise sources, such as industrial and commercial operations, may also result in a noticeable increase in ambient noise levels at nearby existing noise-sensitive land uses. To the extent that new development is discretionary, noise-related impacts associated with many of these uses, such as new shopping centers, industrial uses, emergency sirens associated with fire stations, etc. would be considered by the County during project review. As previously discussed, many of the major stationary sources of noise, such as mining and lumber mill operations, are located in the more rural areas of the county.

Implementation of noise-specific General Plan goals and policies would help to protect both existing and proposed noise-sensitive land uses from non-transportation noise sources. Nonetheless, even though sources may not exceed the applicable maximum allowable noise standards, increased development would likely still result in substantial increases in ambient noise levels at some existing and future noise-sensitive land uses. Consequently, this impact is considered a cumulatively significant and unavoidable.

Finally, under General Plan buildout conditions, additional development throughout the County may lead to incompatibility between noise-sensitive land uses and stationary noise sources. Implementation of the relevant General Plan goals and policies would help to protect both existing and proposed noise-sensitive land uses from non-transportation noise sources, but would not prevent impacts related to increases in ambient noise levels caused by non-transportation noise sources. This impact is considered significant and unavoidable.

The Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on noise, with substantial increases in ambient noise levels at some existing and future noise-sensitive land uses and significant and unavoidable impacts resulting from potential incompatibility between noise-sensitive land uses and stationary noise sources that could result from buildout of the County General Plan. Because the Proposed Action and Alternatives would provide new water supplies to serve development within the subcontractor service areas, the Proposed Action and Alternatives would contribute to these impacts. The contribution of the Proposed Action and Alternatives, however, would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and alternatives, therefore, is considered likely to result in minimal effects.

5.5.5 5.5.5Geology, Soils, Mineral Resources, And Paleontological Resources (Service Area Cumulative Impacts)

5.5.5.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

As presented in the Draft EIS/EIR, higher levels of anticipated future development in El Dorado County could result in the loss in accessibility of mineral resources compared to current conditions. This impact is considered a potentially significant and unavoidable cumulative impact.

In general, the adoption of and adherence to various General Plan policies and implemented mitigation measures can offset soil erosion, mass wasting, and other soil loss events from occurring. Also, differing acreage thresholds and/or a slope thresholds could help mitigate soil loss through erosion. Agricultural activities, however, by definition would continue to allow erosion effects. This impact would remain cumulatively significant and unavoidable.

A significant issue relates to those projects outside of CEQA and permitting oversight where discretionary and ministerial development could still occur on steep slopes, the primary factor influencing the rate and extent of erosion, and because agricultural grading activities are generally exempt from the grading permit process, this impact is considered significant. Nondiscretionary development could occur in areas prone to landslides and avalanches, this impact is also considered significant as the proposed policies and the County Building Code would not fully mitigate impacts associated with potential development in areas subject to landslides and avalanches. Therefore, this impact is considered a significant and unavoidable cumulative impact.

Implementation of the General Plan can result in conversion of farmland (Important Farmland, land currently in agricultural production, grazing land, or land under Williamson Act contract) to nonagricultural uses both directly and indirectly. Direct conversion could occur by designating farmlands for nonagricultural (e.g., residential or commercial) uses. Indirect conversion can occur by allowing incompatible uses, either near or directly on land designated for agricultural uses, without adequate safeguards in place to protect the farmlands from conversion.

Through its various policies and implementation measures identified in its Conservation and Open Space Element relevant to paleontological resources, there is guidance to help identify, avoid, or otherwise mitigate any potential future planned activities on these resources.

The Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on accessibility to mineral resources and increased soil erosion and landslide hazard due to development on steep slopes at buildout of the County General Plan. Because the Proposed Action and Alternatives would provide new water supplies to serve development within the subcontractor service areas, the Proposed Action and Alternatives would contribute to these impacts. The contribution of the Proposed Action and Alternatives, however, would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and Alternatives, therefore, is considered likely to result in minimal effects.

5.5.6 Recreation (Service Area Cumulative Impacts)

5.5.6.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

Projected new development within the County would increase the demand for park and recreation facilities. Since it is not certain that adequate new park and recreation facilities would be developed concurrent with new development based on potential funding limitations, there may be a degradation in existing facilities.

The provision of adequate parkland to serve new population growth is an objective of all of the General Plan growth scenarios. The definition of “adequate” parkland is based on county-wide standards of 5 acres per 1,000 persons within the residential development context. Based on the level and distribution of anticipated residential development, the amount of parkland needed to serve new growth to meet County standards would be approximately 268 acres through 2025 and between 404 and 984 acres at buildout.

The provision of parkland under Quimby Act requirements does not ensure the development of parks to serve the population. Substantial funding would be required to develop and also to operate and maintain parks. Limited funding, however, has historically been made available to local service providers (i.e., El Dorado Hills CSD, Cameron Park CSD, and the GDRD) through property tax revenue; these funds are typically used for operation and maintenance of parks, and are not always sufficient for these purposes. The potential inability to meet established park standards could result in the potential overuse of existing park facilities, which may lead to substantial physical deterioration of existing facilities. The lack of adequate funding for maintenance of park facilities coupled with increased use could further accelerate their deterioration. This impact would be considered a significant and unavoidable cumulative impact.

The Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on the availability of recreational resources to serve future residents as a result of buildout of the County General Plan. Because the Proposed Action and Alternatives would provide new water supplies to serve development within the subcontractor service areas, the Proposed Action and

Alternatives would contribute to this impact. The contribution of the Proposed Action and Alternatives, however, would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and alternatives, therefore, is considered likely to result in minimal effects.

5.5.7 Visual Resources (Service Area Cumulative Impacts)

5.5.7.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

The continued urbanization of the U.S. 50 corridor in Sacramento County, City of Folsom, and western El Dorado County would have a significant cumulative effect on the visual resources of that region, because of a change in landscape from one with a more rural, pastoral character to one of urban and suburban development. This change is already in process, and the change in visual character is significant and unavoidable.

This corridor plays an important scenic role as the gateway to El Dorado County from the west. Conversion of the rural landscape to a suburban appearance would result in the reduction of the natural aesthetic qualities of the corridor. While the visual impacts in the U.S. 50 corridor would be reduced by policies and mitigation measures set forth in the General Plan, they cannot feasibly be avoided or reduced to a less-than-significant level. Therefore, the cumulative reduction in the natural aesthetic qualities of the U.S. 50 corridor is considered a significant and unavoidable impact.

While the County generally encourages the design of new development to emulate the best characteristics of existing nearby development and provide for design review, the visual character of some areas will inevitably change and, in some cases, change substantially. The County, as a whole, could begin to take on a different character, but lower densities and protected sensitive resource areas could allow relatively higher amounts of open space and scenic resources to be retained. Nevertheless, based on the fact that substantial residential growth could occur, the County is unlikely to retain its rural character. This impact is considered cumulatively significant.

While the availability of clustered development in and near Community Regions and Rural Centers would provide a disincentive for large amounts of dispersed residential development in Rural Regions, the anticipated absolute level of residential development would result in the visual character of some specific areas of the county to change. New subdivisions in areas that are currently relatively undeveloped can be expected to change the rural character to one that is more sub-urban in nature. While certain General Plan Policies, such as LU-3a through LU-3, would require that new subdivisions be designed to provide open space, avoid important natural resources, incorporate design elements of nearby development, encourage pedestrian circulation and transit access, and locate services near high-density residential areas, the overall trend towards urban, as opposed to rural character, would make this a visual long-term and unavoidable cumulative impact.

The Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on visual resources due to future buildout of the County General Plan. Because the Proposed Action and Alternatives would provide new water supplies to serve development within the subcontractor service areas, the Proposed Action and Alternatives would contribute to this impact. The contribution of the Proposed Action and Alternatives, however, would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would less than that of the No Action Alternative. The cumulative impact of the Proposed Action and alternatives, therefore, is considered likely to result in minimal effects.

5.5.8 Cultural Resources (Service Area Cumulative Impacts)

5.5.8.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

Cultural resources are a site-specific resource in the County, and although there is potential for the cumulative loss of such resources throughout the region, policies contained in the various growth scenarios associated with the General Plan contain mitigation measures that, in general, would adequately protect those resources in El Dorado County. No cumulative impacts on cultural resources have been identified.

As discussed in the Conservation and Open Space Element of the El Dorado County General Plan, numerous policies and goals have been identified by the county to protect and preserve cultural resources. Over the years, numerous county and private organizations and commissions have endeavored to heighten public awareness of El Dorado County's prehistoric and historic cultural heritage and to preserve and manage numerous cultural resource sites in the area. These include the County Historical Museum, County Historical Society, and County Pioneer Cemetery Commission. These organizations and commissions serve in an advisory capacity to the county and assisted in the development of some of the policies contained in the Conservation and Open Space Element.

5.5.9 Terrestrial and Wildlife Resources (Service Area Cumulative Impacts)

5.5.9.1 No Action Alternative; Alternative 2 - Proposed Action (All Scenarios); Alternative 3 – Water Transfers; and Alternative 4 - Reduced Diversions (All Scenarios)

As a result of planned development in foothill counties, including El Dorado County, a cumulative loss and fragmentation of natural habitats is a growing impact concern in this important ecologic area. Foothill woodland and chaparral habitats are two habitat types experiencing substantial cumulative loss and fragmentation as a result of growth pressures. Additionally, riparian habitats are also experiencing encroachment by urban uses, vegetation loss, and fragmentation. The populations of special-status species that occupy these habitats, such as rare plant communities and the California red-legged frog, are experiencing cumulative loss of habitat and reduction in numbers of individuals.

The County General Plan contains various policies to protect habitats and special-status species; however, development permitted in El Dorado County under any of the anticipated growth scenarios would contribute to the cumulatively significant impact of the loss and fragmentation of woodland and chaparral habitats, riparian corridors, and other important biological resources of the Sierra Nevada foothills and impacts on special-status species. At the time the General Plan policies and mitigation measures were identified, it was deemed that they would reduce the habitat and special-status species effects to the extent feasible. However, the impact of habitat loss and fragmentation was considered significant and unavoidable. As discussed earlier, the County, along with various partnering El Dorado interests including EDCWA have participated in, and continue to participate in various programs and efforts to address the long-term resource management threats related to these important species/habitats.[185]

The Draft EIS/EIR recognizes the potential for a significant and unavoidable cumulative impact on terrestrial and wildlife resources, resulting from the loss and fragmentation of woodland and chaparral habitats, riparian corridors, and other important biological resources of the Sierra Nevada foothills and impacts on special-status species. Because the Proposed Action and Alternatives would provide new water supplies to serve development within the subcontractor service areas, the Proposed Action and Alternatives would contribute to this impact. The contribution of the Proposed Action and Alternatives, however, would not be substantial relative to the No Action Alternative. This is because the level and nature of future development served by the Proposed Action (all scenarios) and Alternative 3 would be indistinguishable from that anticipated under the No Action Alternative. Because Alternative 4 would provide less water for development relative to the No Action Alternative, its contribution to the cumulative impact would

185 The Proposed Action is in informal consultation with the USFWS under Section 7 of the ESA for listed species within the Subcontractor service areas. The reader is referred to Subchapter 6.7 (Growth-Inducing Impacts).

less than that of the No Action Alternative. The cumulative impact of the Proposed Action and Alternatives, therefore, is considered likely to result in minimal effects.

6 NEPA-REQUIRED REVIEWS

6.1 SIGNIFICANT IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Under NEPA (40 CFR 1502.16), the discussion of environmental consequences shall include any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented. [43 FR 55994, Nov. 29, 1978; 44 FR 873, Jan. 3, 1979]

The proposed new CVP water service contracts under this Proposed Action represent a long-term consumptive use of CVP water. A new water allocation is being committed under the P.L.101-514 contract. Hydropower generation, pumping power, and CVP water would, in specified quantities and, during specified periods of time, no longer be available for use by Reclamation and others. Unlike other resource extraction projects, CVP water supplies along with all other non-federal water supplies are replenished annually and naturally. While physical constraints (e.g., reservoir size) of existing infrastructure may act to limit the adequacy of this inter-annual replenishment, the hydrologic water balance of the State confirms that precipitation totals are orders of magnitude greater than consumptive demands. Hydrologically, therefore, as far as precipitation inputs Statewide are concerned, water is renewable on an inter-annual basis. An altered hydrometeorologic regime such as those potentially occurring under forced climatic perturbations may, however, change this balance over the long-term.

For potential future project-specific actions associated with the diversion, conveyance, treatment and distribution of new treated water, an irretrievable and irreversible commitment of resources may occur. It is normally assumed that resources such as fossil fuels will be expended during any construction project, primarily for earth moving operations, and other vehicular transport. In addition, the operation and maintenance of new water facility infrastructure (e.g. river intake pumps, water treatment plants, booster pump stations, pipelines) would require the commitment of energy resources. Depending on the energy source, such energy expenditure could be irretrievable.

Finally, different types of materials would also be used during the construction of any new water facilities. For example, concrete, asphalt, steel, wire, wood, plastics, etc. would be used in varying amounts in the construction of both new water infrastructure and support facilities and buildings.

The longevity of these materials (designed to maximize longevity) and their recyclable qualities would determine the extent to which such resource materials would be irretrievable lost. Finally, where new facilities require land clearing (especially in currently undeveloped areas), a loss of topsoil and vegetation would occur. Topsoil loss would, in most cases, be irretrievable, however, vegetative re-plantings and off-site mitigation measures may avoid an irreversible and irretrievable loss of trees and shrubs.

6.2 GROWTH INDUCEMENT

Chapter 6 of the 2009 Draft EIS/EIR addresses the potential effect of the Proposed Action on future growth and development that could be facilitated or "induced" by the Proposed Action. Because the Draft EIS/EIR was a joint document, the evaluation of growth-induced impact was structured to meet both state and federally-mandated requirements for such an evaluation under CEQA and NEPA, respectively. Section 15126(g) of the CEQA guidelines require an EIR to discuss how a project may "*foster economic or population growth, or the construction of additional housing . . . in the surrounding environment . . . [and] the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment*." Growth inducement may be addressed under NEPA as indirect and/or cumulative effects, as appropriate, but no federal guidelines or criteria specific to growth inducement are applicable.

Chapter 6 of the Draft EIS/EIR (Growth Inducement) presents a detailed discussion of proposed action's likely effect on growth and development within the services areas likely to receive CVP water under P.L. 101-514, the nature of future growth as defined by current approved planning documents, and the potential impact of that development on significant environmental and human resources. Specifically, the Chapter 6 addresses: Growth Concepts (Section 6.2), El Dorado County General Plan (Section 6.3), El Dorado County Population (Section 6.4), Promotion of Economic Expansion (Section 6.5), Water Supply Provisions – General Plan Context (Section 6.6), and, lastly, Growth-Induced Impact (Section 6.7). As noted previously, the Draft EIS/EIR, in its entirety, is incorporated by reference in this Final EIS.

In keeping with state-mandated CEQA requirements for the evaluation of growth-induced impact and in keeping with the findings of the El Dorado County General Plan Environmental Impact Report (El Dorado County, 2004), the Draft EIS/EIR recognized the potential for the Proposed Action and alternatives (including the No Action Alternative) to result in several "significant and unavoidable" impacts on environmental resources when compared to conditions expected to occur in the "No Project Alternative." These impacts are listed in Section 6.7 of the Draft EIS/EIR.

An important distinction between the analysis of growth-induced impacts presented in the 2009 Draft EIS/EIR and the impact evaluation presented in this Final EIS is that the Draft EIS/EIR was a joint NEPA/CEQA document and this Final EIS is intended to comply with NEPA requirements only. Whereas the 2009 Draft EIS/EIR evaluated the indirect impact of the Proposed Action relative to both the "No Project Alternative" and the "No Action Alternative," in compliance with both CEQA and NEPA requirements, this Final EIS assesses potential impact of the Proposed Action (and alternatives to the Proposed Action) relative to the No Action Alternative, only. For purposes of this Final EIS and in keeping with NEPA requirements, conditions anticipated to occur under the No Action Alternative serve as the environmental baseline for determining the potential impact on resources within the EID and GDPUD service areas due to growth inducement.

The No Action Alternative and its bearing on the analysis of environmental consequences presented in this EIS is described in detail in Section 3.5.1 of this Final EIS, above. For purposes of evaluating the effect of the proposed action on future growth and development under P.L. 101-514, the salient point is that under both the Proposed Action and the No Action Alternative, up to 15,000 AFA would be made available to serve current and future M&I water users within the EID and GDPUD service areas. As such, the potential for the Proposed Action to facilitate growth within the contract service areas would be indistinguishable from that of the No Action Alternative. As such, the potential to serve future growth and development within the contract service areas under the Proposed Action would be indistinguishable from that of the No Action Alternative. Therefore, the Proposed Action's contribution to the cumulative impact of future growth and development within the EID and GDPUD service areas to be supplied with CVP water under P.L. 101-514 would be negligible relative to the No Action Alternative.

Similar to the Proposed Action, the nature and extent of growth facilitated by Alternative 3 (Water Transfer) would be indistinguishable from that facilitated by the No Action Alternative because, again, up to 15,000 AFA would be made available under both alternatives.

Under the three reduced diversion scenarios under Alternative 4 (12,500 AFA; 10,000 AFA; and 7,500 AFA) less water would be made available on an annual basis to serve growth within the contract service areas relative to the Proposed Action and No Action Alternative. The assumed reductions in water availability would, necessarily, result in reductions in development relative to the No Action Alternative. It is reasonable to assume that such reductions would reduce the intensity of impact on resources in areas where planned development would be avoided due to lack of water supply. Alternative 4's growth-induced impact would be considered "beneficial" relative to the No Action Alternative. At this point in time, however, it is impossible to quantify the level of benefit associated with Alternative 4 accurately and without undue speculation.

6.3 CLIMATE CHANGE AND GREENHOUSE GASSES

6.3.1 Introduction

Chapter 7 of the Draft EIS/EIR was prepared in 2009 and presents a detailed accounting of pertinent existing information and research available at the time of Draft EIS/EIR preparation. The chapter provides a discussion on the background of climate change science, its technical underpinnings, some of the implications to long-term California water resources management including CVP/SWP operations, and some of the recent policy and regulatory initiatives. It includes the most recent scientific literature available at the time of Draft EIS/EIR preparation and discusses some of the focused areas of research and their interim findings that will likely affect California's natural, socio-economic, and cultural environments in the future.

Since completion of the Draft EIS/EIR in 2009, the body of knowledge related to climate change and research into the phenomenon has increased substantially. Nevertheless, the discussion of climate change in the Draft EIS/EIR is included herein by reference to provide background and context for assessing how climate change could affect future impacts of the Proposed Action and Alternatives on diversion-related resources. This Final EIS does not attempt to update or supplement the Draft EIS/EIR to include all pertinent information, data and research that has become available since completion of the Draft EIS/EIR. Instead, this Final EIS relies on results of recent CALSIM II model runs to reflect the potential effects of the Proposed Action and Alternatives in light of expected future conditions likely to result from climate change. Future changes due to climate change included in the CALSIM II are based on the best available information to date as described in Appendix 5A, Section C: CalSim II and DSM2 Modeling Results in the LTO FEIS (Reclamation 2015).

6.3.2 Potential Effects of the Proposed Action on Climate Change and Greenhouse Gas Production

Section 7.2.12 of the Draft EIS/EIR evaluates the potential indirect effect of the Proposed Action and Alternatives on climate change and greenhouse gas production. The following discussion summarizes that assessment and presents its key conclusions. For this Proposed Action, a 15,000 AFA maximum diversion from Folsom Reservoir or, from points upstream, will have no direct measurable effect on local climate. Indirect effects of the action related to growth and development served by the action may, however, result in indirect effects climate. As an action that can been viewed as accommodating approved growth (i.e., development, urbanization, land clearing, etc.), the indirect effects of water diversions, in general, can be tied, at least in some manner, to a variety of land activities to which it serves. These can include:

- Removal of vegetation (land conversions)
- Soil disturbance
- New highways, roads, and parking lots
- Commercial/retail development
- Residential development
- Recreational facilities
- Industrial development
- Institutional development

These activities can, by their influence on the net radiative energy balance and the exchange mechanisms with the overlying atmosphere, have a collective effect on climate in varying degrees. In El Dorado County, each of these land uses are controlled, for the most part, by the Community and Development Department of El Dorado County as part, and through its standard land use designation and project approval processes. The EDCWA, EID, or the GDPUD, do not control, direct, propose, or otherwise influence large scale land use changes associated with development. In the case of the two purveyors, individually small infrastructure facility projects are periodically constructed, but in terms of land area conversions, these are insignificant, relative to county and city approved development initiatives.

As land uses change, the physical processes between the land and atmosphere (e.g., evaporation, sensible heat exchange, latent heat exchange) will change. This is largely due to changing net radiation at the surface (i.e., solar shortwave reflectivity), surface roughness, moisture availability, and momentum uptake. Different surfaces also emit longwave radiation in varying amounts as per the Stefan-Boltzmann law. With land use changes, the entire net radiative energy balance is altered.

Land use changes (e.g., clearing land for logging, ranching, and agriculture), lead to varying amounts of carbon dioxide emissions, depending on the intensity of the land use change. Vegetation contains carbon that is released as carbon dioxide when the vegetation decays or burns. Under natural regeneration, lost vegetation would normally be replaced by re-growth with little or no net emission of carbon dioxide, however, over the past several hundred years, deforestation and other land use changes in many countries have contributed substantially to atmospheric carbon dioxide increases. Land use changes are responsible for 15 to 20 percent of current carbon dioxide emissions.

Methane (natural gas) is the second most important of the GHGs resulting from human activities. It is produced by rice cultivation, cattle and sheep ranching, and by decaying material in landfills. Methane is also emitted during coal mining and oil drilling, and by leaky gas pipelines. Human activities have increased the concentration of methane in the atmosphere by about 145 percent above what would be present naturally.

Nitrous oxide is produced by various agricultural and industrial practices. Human activities it is estimated have increased the concentration of nitrous oxide in the atmosphere by about 15 percent above what would be present naturally. Chlorofluorocarbons (CFCs) have been used in refrigeration, air conditioning, and as solvents. However, the production of these gases is being eliminated under existing international agreements, rationalized because of their effect on the stratospheric ozone layer. Other fluorocarbons that are also GHGs are being used as substitutes for CFCs in some applications, for example in refrigeration and air conditioning. Although currently very small, their contributions to climate change are expected to rise in the future.

Ozone in the troposphere is another important GHG resulting from industrial activities. It is, however, also created naturally and also by reactions in the atmosphere involving gases resulting from human activities, including nitrogen oxides from motor vehicles and power plants. Based on current data, tropospheric ozone is an important contributor to an enhanced greenhouse effect. However, in part because ozone is also produced naturally, and because of its relatively short atmospheric lifetime, the magnitude of this contribution remains uncertain.

The most dramatic of the human activities in terms of being the largest contributor to GHGs is the burning of fossil fuels. Of that category of emissions, those generated from fossil fuel run automobiles and other vehicles represent the most significant contribution. It is estimated that in California, approximately 41 percent of the GHG emissions result from transportation. Together, the burning of fossil fuels and land use changes, have increased the abundance of small airborne particles in the atmosphere. These particles can change the amount of energy that is absorbed and reflected by the atmosphere; and hence, the net radiative energy balance. Particulates are also believed to modify the properties of clouds, changing the amount of energy that they absorb and reflect.

It is evident that changes in land use and land cover are important contributors to climate change and variability. Reconstructions of past land-cover changes and projections of possible future landcover changes are needed to better understand past climate changes and to more accurately project possible future climate changes. Additionally, changes in land use and land cover can affect ecosystems, biodiversity, and the many important goods and services they provide to society, including carbon sequestration. Land-cover characteristics, therefore, are important inputs to climate models.

While most environmental impact research use single indicators of impact, such as CO2 emissions or deforestation rates, a sound measure of impact must take account of several factors. As noted by Dietz et al., (2001), first, there can be tradeoffs among impacts. GHG emissions will be lower for nations that make substantial use of hydroelectric power and nuclear power, but each of those energy sources have their own environmental impacts. Second, environmental impacts can be “offshored” in the sense that consumption in one part of the world is linked via world trade to changes in the biophysical environmental in another part of the world. In accounting for impacts, it is difficult to know how much of such impacts should be attributed to the site where the impacts occur and how much to the site where the consumption occurs.

This latter point is an important one. A significant complicating factor when assessing the potential effects of existing or planned activities on climate change is that, given current impact metrics (e.g., GHG loadings), it is virtually impossible to ascribe the increment of impact from a single activity to potential climate change effects either at that location, regionally, or in some transboundary context. The highly complex nature of atmospheric dynamics are such that GHG emissions in one location may, depending on a multitude of variables, spatially (in three-dimensions) and temporally, contribute to or affect a climate change related parameter (e.g., temperature or precipitation) that may be observed, but more likely than not, remain unobserved.

The above analysis reflects the conclusions presented in Section 7.2.12 of the Draft EIS/EIR. It is important to note, however, that whereas the Draft EIS/EIR is a joint document and, as such, conforms to both NEPA and CEQA requirements for environmental review, this Final EIS is a NEPA-only document. This distinction is explained in Section 4.1.1 (Approach to the Environmental Analysis) of this Final EIS.

In relation to the Proposed Action and Alternatives' indirect effect on climate change and greenhouse gas production, NEPA requires the EIS to evaluate the impact of the action relative to future conditions likely to occur in the absence of that action. These future conditions are typically reflected in the No Action Alternative. The No Action Alternative, as defined in the Draft EIS/EIR and in this Final EIS, assumes that alternate water supplies in the amount of up to 15,000 AFA would be made available to serve future growth and development within the EID and GDPUD service areas in the absence of the Proposed Action. As such, indirect impacts on climate change and greenhouse gas production caused by growth and development in areas with access to water made available by the Proposed Action and Alternatives, would be indistinguishable from those that would occur under the No Action Alternative.

6.4 ENVIRONMENTAL JUSTICE

Chapter 8 of the 2009 Draft EIS/EIR assesses the effects of the Proposed Action and Alternatives in relation to "environmental justice." That assessment and the regulatory history on which it is based is presented below.

6.4.1 Regulatory Setting

Environmental Justice refers to the inequitable environmental burdens born by groups such as racial minorities, women, residents of economically disadvantages areas, or residents of developing nations. Environmental justice proponents generally view the environment as encompassing "where we live, work and play" (in some instances, "pray" and "learn" are also included). Proponents seek to redress inequitable distributions of environmental burdens (e.g., pollution, industrial facilities, crime, etc.) and equitably distribute access to environmental goods such as nutritious food, clean air and water, parks, recreation, health care, education, transportation, safe jobs, etc. Self-determination and participation in decision-making are key components of environmental justice. Root causes of environmental injustices are long-standing and include institutional racism: the commodification of land, water, energy and air; unresponsive, unaccountable government policies and regulation; and a lack of resources and power in affected communities. Critics contend that any such "unjust" effects are unintentional and area due to a variety of other factors.

In the early 1980s, environmental justice emerged as a concept in the United States. On February 11, 1994, President Clinton issued Executive Order 12898 entitled, "*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*". This Executive Order was designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. It required federal agencies to adopt strategies to address environmental justice concerns within the context of agency operations. In an accompanying Presidential Memorandum, the President emphasized existing laws, including NEPA as providing the opportunities for federal agencies to address environmental hazards in minority and low-income communities.

In April 1995, the U.S. Environmental Protection Agency released the document titled, "*Environmental Justice Strategy: Executive Order 12898*". In August 1997, the EPA Office of Environmental Justice released the "*Environmental Justice Implementation Plan*". The

Implementation Plan supplements the EPA environmental justice strategy. It provides estimated time frames for undertaking revisions, identifying the lead agents and determining the measures of success for each action item. Several EPA offices have since developed more specific plans and guidance to implement Executive Order 12898.

The National Environmental Policy Act of 1969 (42 U.S.C. §4321 et seq.) serves as the nation's basic environmental protection charter. A primary purpose of NEPA is to ensure that federal agencies consider the environmental consequences of their actions and decisions as they conduct their respective missions. For major federal actions significantly affecting the quality of the human environment, the federal agency must prepare a detailed environmental impact statement (EIS) that assesses the Proposed Action and all reasonable alternatives. These documents are required to be broad in scope, addressing the full range of potential effects of the Proposed Action on human health and the environment. Regulations established by both the Council on Environmental Quality (CEQ) and EPA require that socio-economic impacts associated with significant physical environmental effects also be addressed in the EIS. The Memorandum accompanying the Executive Order identifies four important ways to consider environmental justice under NEPA:

1. Each Federal Agency should analyze the environmental effects, including human health, economic and social effects of federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA;
2. Mitigation measures identified as part of an Environmental Assessment (EA), or a Record of Decision (ROD), should, wherever feasible, address significant and adverse environmental effects of proposed federal actions on minority populations, low-income populations, and Indian tribes;

3. Each Federal agency must provide opportunities for effective community participation in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving the accessibility of public meetings;
4. Review of NEPA compliance must ensure that the Lead Agency preparing NEPA analyses and documentation has appropriately analyzed environmental effects on minority populations, low-income populations, or Indian tribes, including health, social, and economic effects.

The Office of Secretary's Office of Environmental Policy and Compliance (OEPC) provides national leadership and direction in the coordination and development of environmental policy and program evaluation. It provides for a coordinated and unified approach and response to environmental issues that affect multiple bureaus in order to ensure that the U.S. Department of Interior speaks as one entity with respect to these important issues. It provides guidance for the Department's compliance with the full range of existing environmental statutes, executive orders, regulations and other requirements.

The principles of environmental justice considerations under NEPA recognize that environmental justice issues may arise at any step of the NEPA process and, that agencies should consider these issues at each and every step of the process, as appropriate. Environmental justice issues cover a broad range of impacts covered under NEPA, including impacts on the natural or physical environment and interrelated social, cultural and economic effects. Environmental justice concerns may arise from any of these concerns. Agencies should recognize that the question of whether an agency's action raises environmental justice issues is highly sensitive to the history or circumstances of a particular community or population, the particular type of environmental or human health impact, and the nature of the Proposed Action itself. There is no standard formula for how environmental justice issues should be identified or addressed. However, six principles provide general guidance:

- Agencies should consider the composition of the affected area, to determine whether minority populations, low-income populations, or Native American tribes are present in the area affected by the Proposed Action and, if so, whether there may be disproportionately high and adverse human health or environmental effects on these populations;
- Agencies should consider relevant public health data and industry data concerning the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards to the extent such information is reasonably available. For example, data may suggest that there are disproportionately high and adverse human health or environmental effects on a minority population, low-income population, or Native American tribe from an agency action. Agencies should consider these multiple, or cumulative effects, even if certain effects are not within the control or subject to the discretion of the agency proposing the action;
- Agencies should recognize the interrelated cultural, social, occupational, historical, or

economic factors that may amplify the natural or physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effects of any disruption on the community structure associated with the Proposed Action; and the nature and degree of impact on the physical and social structure of the community;

- Agencies should develop effective public participation strategies. Agencies should, as appropriate, acknowledge and seek to overcome linguistic, cultural, institutional, geographic, and other barriers to meaningful participation, and should incorporate active outreach to affected groups;
- Agencies should assure meaningful community representation in the process. Agencies should be aware of the diverse constituencies within any particular community when they seek community representation and should endeavor to have complete representation of the community as a whole. Agencies should also be aware that community participation must occur as early as possible if it is to be meaningful; and,
- Agencies should seek tribal representation in the process in a manner that is consistent with the government-to-government relationship between the United States and tribal governments, the federal government's trust responsibility to federally-recognized tribes, and any treaty rights.

It is important for agencies to recognize that the impacts within minority populations, low-income populations, or Native American groups may be different from impacts on the general population due to a community's distinct cultural practices. For example, data on different patterns of living, such as subsistence fish, vegetation, or wildlife consumption and the use of wellwater in rural communities may be relevant to the analysis. Where a proposed agency action would not cause any adverse environmental impacts, and therefore would not cause any disproportionately high and adverse human health or environmental impacts, specific demographic analysis of these sensitive groups may not be warranted. However, where environments or Native American tribes may be affected, agencies must consider pertinent treaty, statutory, or executive order rights and consult with tribal governments in a manner consistent with the government-to-government relationship.

6.5 BUREAU OF RECLAMATION

Within the context of the special relationships between the United States and various Indian tribes, Reclamation has Native American Affairs Offices in Washington, D.C, the Regions, and many Area offices. These offices are primarily concerned with making Reclamation services readily available to tribes and, to ensure that Native American concerns are considered by Reclamation in their various programs. Reclamation has implemented numerous procedures to ensure that its actions do not adversely affect Indian trust assets. Reclamation staff produces and review all NEPA and related documents in order to ensure their clarity and ready accessibility to all affected parties. Notices of public meetings are published in news media and through electronic media (e.g. radio and television) as well as the Federal Register. NEPA documents requiring public review are made available for display in public libraries and distributed to all upon request.

Reclamation's four goals pertaining to environmental justice issues include the following:[1]

GOAL 1

The Department will involve minority and low-income communities as we make environmental decisions and assure public access to our environmental information.

GOAL 2

The Department will provide its employees environmental justice guidance and with the help of minority and low-income communities develop training which will reduce their exposure to environmental health and safety hazards.

GOAL 3

The Department will use and expand its science, research, and data collection capabilities on innovative solutions to environmental justice-related issues (for example, assisting in the identification of different consumption patterns of populations who rely principally on fish and/or wildlife for subsistence).

GOAL 4

The Department will use our public partnership opportunities with environmental and grassroots groups, business, academic, labor organizations, and Federal, Tribal, and local governments to advance environmental justice.

While some highly specialized technical work such as hydraulic and hydrologic modeling have been referred to universities, Reclamation tends to use its own personnel in research, technical development, communication, and leadership efforts. To further augment environmental justice, Reclamation has partnered with the Bureau of Indian Affairs and Hispanic-serving institutions throughout the U.S.

6.5.1 Principles of Analysis

When a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Native American tribe has been identified, agencies should analyze how environmental and health effects are distributed within the affected community. Displaying available data spatially, through a GIS platform for example, can provide the agency and the public with an effective visualization of the distribution of health and environmental impacts among demographic populations. This type of data should be analyzed in light of any additional qualitative information gathered through the public participation process.

Where a potential environmental justice issue has been identified, the agency should state clearly in the EIS or EA whether, in light of all of the facts and circumstances, a disproportionately high and adverse human health or environmental impact on minority populations, low-income populations, or Native American tribe is likely to result from the Proposed Action and any alternatives. This statement should be supported by sufficient information for the public to understand the rationale for the conclusion. The underlying analysis should be presented as concisely as possible, using language that is understandable to the public and that minimizes the use of technical acronyms or jargon.

Agencies should encourage the members of the communities that may suffer a disproportionately high and adverse human health or environmental effect from a proposed agency action to help develop and comment on possible alternatives to the proposed agency action as early in the process as possible.

6.5.2 Impacts and Mitigation Measures

The Congressionally mandated new CVP water service contract authorized by P.L.101-514 was granted to the El Dorado County Water Agency and would be facilitated through Reclamation. This new water service contract was intended to represent a new federal long-term water supply. The legislation did not, by design, specify the manner of delivery, locations of use, intended recipients or other restrictions pertaining to its implementation. El Dorado County interests were identified and accommodated insofar as the legislation only stipulated that the new water supply be used in El Dorado County. This was consistent with the overarching intent of P.L.101-514 (Section 206[b]) which, as early as 1990, focused on the immediate new water needs of El Dorado County. No preference was placed on socio-economic standing, racial, cultural, historic, or ethnic special-status peoples.

The Agency, EDCWA, acting as the prime contractor with Reclamation will enter into subcontracts with both EID and GDPUD for each of the latter’s share of the new CVP M&I contract water. An equitable distribution of the 15,000 AFA between EID and GDPUD was originally assumed, proposed, and implemented as part of the NEPA.CEQA analysis. The Proposed Action, in fact, as defined within this EIS/EIR is designed to equally share the 15,000 AFA between EID and GDPUD. While shifted allocations (e.g., via NEPA/CEQA alternatives) of the 15,000 AFA between EID and GDPUD were identified as procedural alternatives and thoroughly reviewed as part of the environmental review, they were only analyzed and presented in this EIS/EIR in order to address the potential environmental benefits of such partitioning as required under NEPA/CEQA. No pre-judged allocation of this new CVP water was made; moreover, no specific entities, neighborhoods, commercial enterprises, special interest groups, or industries were designated as recipients of this new federal water supply.

The Agency, under the edicts of both (the State) Water Code and Reclamation Law (as a new CVP contractor) is compelled to ensure that the maximum beneficial use of this new water supply as envisioned by P.L.101-514 is maintained; this has temporal implications. As water demands grow within the County, the two intended recipient water purveyors (i.e., EID and GDPUD) will differ in their anticipated and realized growth rates. This is due to the fact that within El Dorado County, it is acknowledged that growth is not spatially uniform. Growth follows numerous stimuli; available infrastructure, transportation access and efficiency, industrial/commercial opportunities, workforce availability, and physical/geographic constraints or barriers, among others. EID's service area, in particular its El Dorado Hills, Bass Lake, Cameron Park, and Shingle Springs areas have, and continue to represent the high growth epicenters of the County. Facilitated by ready access to State Highway 50, these areas are situated along a major commercial/economic corridor that provides an effective linkage with the greater Sacramento metropolitan area, South Lake Tahoe and, more distantly, the Central Valley and Bay Area. As a ready commuter source for the employment-diverse Sacramento region, this area has experienced considerable growth over the past decade.

The GDPUD service area, by contrast, is located more remotely: centered on the Georgetown Divide between the South and Middle/North forks of the American River. More rural in character, this area is not as easily accessible as the western areas of the EID service area. Accordingly, anticipated growth opportunities within the GDPUD service area are significantly more constrained.

As noted, the new water made available under this contracting action will be put to beneficial use as required by State and Reclamation water law. Since this new CVP water cannot be sold out of County, the Agency will exercise control over how its use will best meet existing and foreseeable future needs within the County, as new demands are generated. For certain areas, this may occur over a period of time, relative to other areas which may have a more pressing immediate need. As long as a verifiable in-County demand exists, the Agency, together with Reclamation will make these supplies available to EID and GDPUD on a long-term annual basis.

As previously described, there exists no pre-condition on the use of this water other than its defined use for municipal and industrial purposes (as set forth in Reclamation contracting) and, its limitations within certain portions of the EID and GDPUD service areas (i.e., Subcontractor service areas). The new surface water supply (diverted from Folsom Reservoir and/or exchanged with upper Middle Fork water rights) will have no effect on those rural communities relying on local area groundwater wells, nor will it affect any rivers or waterbodies relied upon for subsistence fish, vegetation or wildlife. Unimpaired inflow to Folsom Reservoir (the source of this new CVP water allocation) does not affect these resources. Moreover, use of this new water supply is not restricted to or prohibited from any one particular socio-economic, ethnic, or cultural group; water supplies held by both EID and GDPUD are managed in a commingled fashion. Service extensions, connection fees, hook-up charges, etc. are administered uniformly, without bias or preference, and on a first come first served basis. Finally, the implementation of this new water service contract does not require facility or construction activities that would remove, displace, cause to disrupt or otherwise adversely affect minority, low-income, or Native American groups or communities.

Accordingly, this action poses no deliberate or inadvertent adverse effect upon minority, low-income, or Native American communities, groups, or persons. Human health or environmental impacts associated with these groups or, their practices and livelihoods are not anticipated to be affected by this action or its alternatives.

6.6 INDIAN TRUST ASSETS

6.6.1 Affected Environment

As stated in Chapter 9 of the Draft EIS/EIR, Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. 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. ITAs 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 U.S. is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the U.S. The characterization and application of the U.S. trust relationship have been defined by case law that interprets Congressional acts, executive orders, and historic treaty provisions.

Consistent with President William J. Clinton's 1994 memorandum, "Government-to-Government Relations with Native American Tribal Governments," Bureau of Reclamation (Reclamation) assesses the effect of its programs on tribal trust resources and federally-recognized tribal governments. Reclamation is tasked to actively engage federally-recognized tribal governments and consult with such tribes on government-to-government level (59 Federal Register 1994) when its actions affect ITAs. The U.S. Department of the Interior (DOI) Departmental Manual Part 512.2 ascribes the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI 1995). Reclamation will comply with procedures contained in Departmental Manual Part 512.2, guidelines, which protect ITAs.

Further, DOI is required to "protect and preserve Indian trust assets from loss, damage, unlawful alienation, waste, and depletion" (DOI 2000). It is the general policy of the DOI to perform its activities and programs in such a way as to protect ITAs and avoid adverse effects whenever possible (Bureau of Reclamation 2000.

A review of the Proposed Action was conducted to determine whether the Proposed Action has potential to affect ITAs. The Proposed Action is to execute a new long-term water service contract between the El Dorado County Water Agency (EDCWA) and Reclamation to implement those parts of Public Law 101 514, Section 206, pertaining specifically to EDCWA. Under this contract, up to 15,000 AFA of CVP water would be provided to EDCWA for diversion from Folsom Reservoir or for exchange on the American River upstream from Folsom Reservoir (Proposed Project). The contract would provide water that would serve M&I water needs in El Dorado County. EDCWA would, in turn, make water available to EID and GDPUD for M&I use within their respective service areas. Based on the information provided it is determined the Proposed Action does not have a potential to affect Indian Trust Assets. The nearest ITA's to the proposed project site is the Auburn Rancheria which is approximately 11miles NW of the project location and the Shingle Springs Rancheria which is approximately 12 miles east of the project location.

6.6.2 Environmental Consequences

6.6.2.1 No Action Alternative

Under the no action alternative, there are no impacts on Indian Trust Assets, as no new facilities would be constructed and existing operations would continue to operate as has historically occurred.

6.6.2.2 Proposed Action (All Scenarios); Alternative 3; and Alternative 4 (All Scenarios)

There are no tribes possessing legal property interests held in trust by the United States in the water involved with this action, nor is there such a property interest in the lands designated to receive the water proposed in this action. The nearest ITA to the proposed project site is the Auburn Rancheria which is approximately 11miles NW of the project location and the Shingle Springs Rancheria which is approximately 12 miles east of the project location.

6.6.2.3 Cumulative Effects

There are no impacts on Indian Trust Assets as a result of the Proposed Action and Alternatives therefore the Proposed Action and Alternatives would not contribute to cumulative impacts on Indian Trust Assets.

7 CONSULTATION/COORDINATION AND APPLICABLE LAWSOVERVIEW

This chapter describes the consultation and coordination activities undertaken as part of the preparation of the 2009 Draft EIS/EIR (DEIS/EIR), the 2011 Final Environmental Impact Report (FEIR) and this Final EIS. Starting in late 1991, after the passing of P.L.101-514 (on November 4, 1990), Reclamation and EDCWA began discussions on the scope of the effort to be implemented in developing the DEIS/EIR. Extensive public scoping followed the early noticing of the project in 1993. The project was put on hold during the late 1990s until 2005 when the El Dorado County General Plan Update was suspended. In 2006, public scoping and agency consultation were re-initiated, and new technical work (i.e., CALSIM II modeling) was incorporated the DEIS/EIR. The joint DEIS/EIR was circulated for public review and comment in 2009. An FEIR was certified by EDCWA in 2011, fulfilling EDCWA's state CEQA requirement for environmental review of the proposed water services contract.

After publication of the DEIS/EIR, Reclamation chose not to prepare a Final EIS until pending challenges to Biological Opinions (BiOps) issued by USFWS and NMFS for operating criteria and procedures for the coordinated operation of the State Water Project and Central Valley Project were resolved. Those challenges were resolved with adoption of the record of decision (ROD) for the *Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final EIS* (LTO EIS) in January 2016.

7.2 BACKGROUND

A Notice of Preparation (NOP) for a joint EIS/EIR was prepared for the Proposed Action and circulated in April 1993 (with an assigned State Clearinghouse Number; SCH#1993052016). A Notice of Intent (NOI) was also prepared for the action and published in the Federal Register (Vol. 58, No.90, May 12, 1993). Subsequently, new information regarding potential project alternatives was identified and made available, warranting issuance of another revised NOP distributed on May 22, 1998. Since 1998, a number of events transpired that prompted EDCWA to issue a Supplemental NOP in September 2006. Specifically, in 1999, the El Dorado County General Plan Update was suspended by a Writ of Mandate, and additional environmental review of the General Plan was required. El Dorado County completed the supplemental environmental review, and approved the General Plan in July 2004; in March 2005, El Dorado County voters approved the referendum on the General Plan adopted by the Board of Supervisors. In September 2005, the Sacramento County Superior Court discharged the Writ of Mandate that previously limited development approvals in El Dorado County pending completion of the new General Plan. Additionally, water needs for this region of the County were re-verified, and focused information on the potential alternatives, including the intended service areas were established.

Through the alternatives development process, key public trust resource agencies were identified as potential Responsible Agencies under CEQA; those included the State Water Resources Control Board (SWRCB) and the Placer County Water Agency (PCWA). As a result of these latter developments and, in deference to the amount of elapsed time since the previous public scoping efforts, Reclamation and EDCWA reinitiated public scoping in 2006. A new NOP/NOI was prepared and released on September 15, 2006. The DEIS/EIR underwent several public scoping and stakeholder outreach efforts in the 20 years leading up to its publication in 2009. In that time, the lead agencies were duly diligent in keeping abreast of new policy, technical, and legal changes that, at the time, may affected the environmental analysis of this joint document. The DEIS/EIR reflected all of the early concerns identified in public scoping and agency consultation, and included, adopted, and/or incorporated changes and advances that occurred between the passing of the original legislation in 1990 and publication of the DEIS/EIR in 2009.

7.3 EARLY PUBLIC OUTREACH

An initial scoping phase was developed to help refine the Proposed Action and identify the major issues of concern. In August 1994, a list of organizations, public trust resource agencies, and interested stakeholders was developed. A questionnaire was prepared covering 13 standard questions to be asked at a series of interviews with the identified parties. A series of interviews was conducted in September, 1994. The interviewees included:

- Fisheries Resource Agencies: California Department of Fish & Game (now California Department of Fish and Wildlife), U.S. Fish & Wildlife Service, and National Marine Fisheries Service;
- PG&E
- El Dorado County Business Community (A. Hazbun, Murray & Downs, K. Russell)
- Friends of the River/CA Sportfishing Alliance
- American River Land Trust
- El Dorado County Parks and Recreation Division
- Western States Endurance Run
- California Department of Boating and Waterways
- El Dorado County Assessor's Office
- El Dorado County River Management Advisory Committee
- American Whitewater Association

The questionnaire and interview responses are included in Appendix A of the DEIS/EIR.

7.4 PUBLIC SCOPING MEETINGS

Subsequent to the May 22, 1998 NOP/NOI, two public scoping meetings were held on August 6, 1998 and August 7, 1998 to formally solicit comment on the EIS/EIR. These sessions were lightly attended by the public; oral comment by only one member of the public was tendered at these meetings. Written comments were received by: the U.S. Environmental Protection Agency (Region IX), The Center for Sierra Nevada Conservation, and a joint submittal from the El Dorado County Taxpayers for Quality Growth and Sierra Club – Maidu Group, Mother Lode Chapter.

In September, 2006, subsequent to the supplemental NOP/NOI distributed on September 15, 2006, two additional public scoping meetings were held; on September 26 and 27. These meetings were also lightly attended. Comment letters were received from the Planning and Conservation League, Westlands Water District, El Dorado County, Environmental Management Department – Air Quality Management District, Regional Water Quality Control Board, and the California Native Plant Society in response to the NOP/NOI. Appendix B of the DEIS/EIR contains the comment letters.

7.4.1 2006/2007 Outreach Efforts

As part of the 2006/2007 scoping efforts (see Appendix C in the DEIS/EIR for noticing materials and responses), additional briefing meetings were held with various agencies to provide updates of the revised Proposed Action and solicit comments that would help guide preparation of the environmental review documentation. Meetings were held with: California Department of Fish & Game (now the California Department of Fish and Wildlife), California Department of Parks & Recreation, California Department of Water Resources, CALFED, Sacramento Area Water Forum, State Water Resources Control Board, U.S. Environmental Protection Agency – Region IX, Sierra Nevada Conservancy, and the Planning and Conservation League.

The Planning and Conservation League provided extensive and thorough comments and suggested actions. An extensive discussion of the potential effects of climate change was included as Chapter 7 of the DEIS/EIR, in part, to respond to those comment. That discussion included an extensive scientific literature review, discussion of current trends, and cited reference analyses on climate change; its effects on California water resources, the CVP/SWP, upper basin ecosystem function, snowpack and wildlife, Bay-Delta, and sea level changes was prepared and included in the DEIS/EIR. The discussion included an explanation of climate change modeling, the various scaling considerations (i.e., spatiality) that govern climate modeling application at the watershed scale, what the state has committed to in addressing part of the climate change challenge, and ongoing risks, issues, and challenges for the future.

7.5 CONSULTATIONS/COORDINATION AND APPLICABLE LAWS

Numerous laws and regulations at the federal, State and local levels apply to this Proposed Action. As described previously and, as defined by the Proposed Action itself, there are two elements that make up the environmental analysis for this action and, therefore, the regulatory framework upon which its approval is predicated. First, is the execution and approval of the new

CVP M&I water service contract. Second, is the future likelihood that new facilities and/or infrastructure will be required by the contractors to fully implement (i.e., divert, convey, treat and distribute treated water) the Proposed Action. In an effort to fully disclose all of the potentially likely laws and regulations that are, or may be associated with this Proposed Action and its implementation, a broad discussion was included in Sections 10.6 through 10.9 and is repeated here in Section 7.6 of this FEIS.

7.6 FEDERAL LAWS, EXECUTIVE ORDERS, STATE LAWS, AND NOTICE REQUIREMENTS

Section 7.6 of this FEIS addresses project compliance with applicable federal law, executive orders, state law and notice requirements. The following reiterates or summarizes information presented in the DEIS/EIR. Where indicated, that information has been updated or supplemented as appropriate to reflect any substantive changes since publication of the DEIS/EIR.

7.6.1 FEDERAL LAWS

7.6.1.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA, 42 USC 4321; 40 CFR 1500.1) was established in 1969 to ensure that Federal agencies consider potential environmental effects of their actions, cooperate with other agencies, and disclose potential effects in a public forum. NEPA requirements always include the preparation of the appropriate environmental document, and may also include:

- Publishing public notice of hearings, public meetings, and availability of environmental documents;
- Holding public hearings or meetings;
- Soliciting comment and input from the public; and
- Making documents and comments available to the public according to the Freedom of Information Act.

The U.S. Bureau of Reclamation serves as the federal lead agency under NEPA. Reclamation will use this joint EIS/EIR to comply with NEPA requirements.

7.6.1.1.1 Section 46.100 of Subtitle A of Title 40 of the CFR

CEQ regulations provide that federal agencies review their NEPA regulations and procedures and, in consultation with CEQ, revise them as necessary to ensure full compliance with the purposes and provisions of NEPA (40 CFR 1507.3). The CEQ reviewed the proposed conversion of the Department of Interior's (DOI) NEPA procedures from Chapters 1-6 of Part 516 of the Department Manual to regulations at a new Part 46 to Subtitle A of Title 43 of the Code of Federal Regulations. The proposed changes and conversion of the procedures as regulations was published in the Federal Register for comment on January 2, 2008 (73 FR 126). The final rule was published in the Federal Register on October 15, 2008.

In relevant part, Section 46.100 addresses the incorporation of consensus-based management as part of the Department of Interior's NEPA process. While the DOI acknowledges that neither NEPA nor the CEQ regulations require consensus, and that consensus may not always be achievable or consistent with policy decisions, it requires the *use* of consensus-based management whenever practicable. Consensus-based management is not inconsistent with the intent of NEPA and the CEQ regulations. Recognizing that consensus-based management may not be appropriate in every case, the final rule does not set consensus-based management requirements; timelines or documentation of when parties must become involved in the process. Similar to collaborative processes, consensus-based management, like public involvement and scoping, will vary depending on the circumstances surrounding a particular proposed action.

This EIS/EIR, including its primary components, the Proposed Action and alternatives underwent extensive public outreach and community input efforts (see Subchapter 10.2 and following, provided earlier) in their development. Consistent with Section 46.100, the alternatives identification and development process provided full opportunity for the evaluation of reasonable alternatives presented by persons, organizations or communities who may have had (or have) interest in the Proposed Action. Limited by the number of authorized points of diversion, legal water permit conditions (e.g., water right and CVP), and the physical constraints of moving water from one point to another based on geography, a set number of alternatives were possible. Still, the alternatives identification process identified, described, screened, and ultimately evaluated the widest range of alternatives across several broad categories (see Chapter 3.0). These included completely new alternative water supplies to those authorized under this congressional action, variations in the amounts, allocations, and diversion patterns of those supplies, and potential demand reduction or water supply offsetting actions (e.g., reclaimed water use) up to and including possible growth moratoriums.

Under Section 46.100, the Responsible Official (RO) as defined by the Department of Interior, was intimately involved in all steps of the alternatives identification, screening criteria selection, screening process, and impact evaluation framework development for the alternatives (e.g., correlating alternatives with the use of CALSIM II hydrologic modeling simulations).

7.6.1.2 Federal Endangered Species Act

7.6.1.2.1 Long-Term Coordinated Operations of the CVP and SWP

Reclamation's Long-Term Coordinated Operations of the CVP and SWP will dictate how CVP, SWP, and related actions will be managed, controlled, and implemented. CVP water service contracts are an important part of CVP operations. Any new CVP water service contract must take into account how it could affect or otherwise be integrated into Reclamation's existing contracting program, including any environmental effects. For this reason, the current deliberations and ultimate outcome of the ESA consultations having regard to the Long-Term Coordinated Operations of the CVP and SWP are relevant to the Proposed Action.

In February 2005, the USFWS issued a Biological Opinion (BiOp) that analyzed the potential effects of the coordinated, long-term operation of the CVP and SWP, as part of Reclamation's revised CVP-OCAP action on delta smelt, and referred to as the Long-Term Coordination Operations of the CVP and SWP. As part of the litigation in the matter of *Natural Resources Defense Council et al., v. Dirk Kempthorne, San Luis & Delta Mendota Water Authority et al.,* (Case No. 05-CV-01207 OWW), the court held, on May 25, 2007, that the BiOp was "arbitrary and capricious" and "contrary to law". The court maintained that an appropriate interim remedy must be implemented. The court ordered that the USFWS issue a new BiOp by September 15, 2008 (and later postponed to December 15, 2008). The USFWS issued its final BiOp on December 15, 2008. After reviewing the current status of the delta smelt, the effects of the Proposed Action and the cumulative effects, it was the USFWS's biological opinion that the long-term coordinated operations of the CVP and SWP, as proposed, are likely to jeopardize the continued existence of the delta smelt.

On October 22, 2004, NMFS issued a BiOp on the proposed long term CVP/SWP -OCAP based on Reclamation's 2004 BA. Within that document was a consultation history that dated back to 1991, which is incorporated here by reference. On April 26 and May 19, 2006, Reclamation requested reinitiation of consultation on the CVP-OCAP based on new listings and designated critical habitats. In a June 19, 2006, letter to Reclamation, NMFS stated that there was not enough information in Reclamation's request to initiate consultation. NMFS provided a list of information required to fulfill the initiation package requirements [50 CFR 402.14(c)]. From May 2007, until May 29, 2008, NMFS participated in the following interagency forums, along with representatives from Reclamation, DWR, USFWS, and CDFG, in order to provide technical assistance to Reclamation in its development of a Biological Assessment and initiation package.

- Biweekly interagency OCAP meetings;
- Biweekly five agencies management meetings;
- Weekly directors' meetings; and
- Several modeling meetings.

In addition, NMFS provided written feedback on multiple occasions:

- Multiple e-mails from the USFWS (submitted on behalf of USFWS, NMFS, and CDFG) providing specific comments on various chapters of the CVP-OCAP Biological Assessment, including the legal setting (Chapter 1.0, Introduction) and project description (Chapter 3.0, Alternatives Including the Proposed Action and Project Description);
- February 15, 2008, e-mails from NMFS to Reclamation, transmitting comments on species

accounts for the anadromous salmonid species and green sturgeon (Chapters 3.05.0, and 10.0);

- A February 21, 2008, letter providing comments with regard to the development of the CVPOCAP Biological Assessment, and in particular, the draft project description; and
- An April 22, 2008, species list.

On May 19, 2008, NMFS received Reclamation's May 16, 2008, request to initiate formal consultation on the CVP-OCAP. On May 30, 2008, Reclamation hand-delivered a revised Biological Assessment containing appendices and modeling results. On June 10, 2008, NMFS issued a letter to Reclamation indicating that an initiation package was received, and that it would conduct a 30-day sufficiency review of the Biological Assessment received on May 30, 2008. On July 2, 2008, NMFS issued a letter to Reclamation, indicating that the Biological Assessment was not sufficient to initiate formal consultation. In that letter, NMFS described the additional information necessary to initiate consultation. In addition, on July 17, 2008, NMFS offered additional comments on the CVP-OCAP Biological Assessment via e-mail.

Throughout July 2008, NMFS continued to participate in the interagency forums listed above to continue to provide technical assistance to Reclamation on its development of a final Biological Assessment and complete initiation package. In addition, meetings were held between NMFS and Reclamation staff on August 8, September 9, and September 19, 2008, to discuss and clarify outstanding concerns regarding the modeling, Essential Fish Habitat (EFH), and project description information contained in the draft Biological Assessment. On August 20 and September 3, 2008, NMFS received additional versions of the draft Biological Assessment, hand delivered to the NMFS Sacramento Area Office on DVD.

On October 1, 2008, the Sacramento Area Office received a hand-delivered letter from Reclamation, transmitting the following documents: (1) final Biological Assessment on a DVD, (2) Attachment 1: Comment Response Matrix, (3) Attachment 2: errata sheet; (4) Attachment 3: Additional modeling simulation information regarding Shasta Reservoir carryover storage and Sacramento River water temperature performance and exceedances; and (5) Attachment 4: American River Flow Management Standard 2006 Draft Technical Report. The letter and enclosures were provided in response to our July 2, 2008, letter to Reclamation, indicating that the Biological Assessment was not sufficient to initiate formal consultation.

In its October 1, 2008, letter, Reclamation also committed to providing, by mid-October 2008: responses to comments and initiating consultation related to Pacific Coast Salmon EFH within the Central Valley, and (2) a request for conferencing and an analysis of effects of the continued long-term operation of the CVP and SWP on proposed critical habitat for green sturgeon. On October 20, 2008, Reclamation provided to NMFS via e-mail the analysis of effects on the proposed critical habitat of Southern DPS of green sturgeon. In addition, on October 22, 2008, Reclamation provided to NMFS via e-mail supplemental information regarding the EFH assessment on fall-run Chinook salmon. On November 21, 2008, NMFS issued a letter to Reclamation, indicating that Reclamation had provided sufficient information to initiate formal consultation on the effects of the CVP-OCAP, with the understandings that: (1) Reclamation is committed to working with NMFS staff to provide any additional information determined necessary to analyze the effects of the proposed action; and (2) NMFS was required to issue a final Opinion on or before March 2, 2009.

On December 11, 2008, NMFS released its Draft BiOp on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). The request for formal consultation was received on October 1, 2008. The final version of the Draft BiOp will supersede the 2004 CVP-OCAP BiOp. The Draft BiOp was based on (1) the initiation package provided by Reclamation, including the CVP-OCAP Biological Assessment, received by NMFS on October 1, 2008; (2) the supplemental analysis of effects on the proposed critical habitat of Southern DPS of green sturgeon and supplemental information regarding the EFH assessment on fall-run Chinook salmon; (3) other supplemental information provided by Reclamation; (4) declarations submitted in court proceedings pursuant to Pacific Coast Federation of Fishermen Association (PCFFA) *et al*. v. Gutierrez *et al*.; and (5) scientific literature and reports.

The purpose of the Draft BiOp was to determine, based on the best scientific and commercial information available, whether the Central Valley Project and State Water Project Operations Criteria and Plan, as proposed by Reclamation, is likely to jeopardize the continued existence of the following species: Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*, hereafter referred to as winter-run); Central Valley spring-run Chinook salmon (*O. tshawytscha*, hereafter referred to as spring-run); Central Valley (CV) steelhead (*O. mykiss*); Central California Coast (CCC) steelhead (*O. mykiss*); Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*, hereafter referred to as Southern DPS of green sturgeon); and Southern Resident killer whales (*Orcinus orca*, hereafter referred to as Southern Residents) or, destroy or adversely modify the designated critical habitat of the above salmon and steelhead species, or proposed critical habitat for Southern DPS of green sturgeon.

NMFS concluded that, as proposed, the long-term continued operation of the CVP and SWP is not likely adversely affect Central California Coast steelhead and their designated critical habitat. However, the long-term CVP/SWP OCAP is likely to jeopardize the continued existence of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Southern DPS of North American green sturgeon. The long-term CVP/SWP OCAP is also likely to destroy or adversely modify critical habitat for Sacramento River winter run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, and proposed critical habitat for the Southern DPS of green sturgeon. The consultation on the effect of that proposed action on Southern Resident killer whales is ongoing. Therefore, no conclusion was reached for that species.

The final BiOp with the required Reasonable and Prudent Alternatives, Incidental Take Statements, and associated conservation recommendations were released on June 4, 2009.

At the time of publication of the Draft EIS/EIR in July 2009, Reclamation continued to have concerns regarding possible challenges to the USFWS and NMFS BiOps, but provisionally accepted the RPA contained in those BiOps. Reclamation implemented the near- term elements of the RPA by modifying the operations as required and continue with the planning and implementation associated with several major actions called for in the RPA, including construction of the Red Bluff Pumping Plant, replacement of the Whiskeytown Reservoir temperature curtain and fish passage improvements on Battle Creek. The provisional acceptance was conditioned on the need to further evaluate and develop many of the longer term actions. Those actions were subject to future appropriations, and Reclamation recognized that those future actions may be beyond Reclamation's authority, or require agreements from outside parties to implement, which are outside of Reclamation's control. Accordingly, Reclamation anticipated that re-initiation of Section 7 consultation could be needed when those actions were further developed.

It is important to note that the Proposed Action addressed in this FEIS, as defined in the CALSIM II modeling for the CVP-OCAP Biological Assessment, was included and, therefore, represents an assumed part of the long-term CVP/SWP operation by Reclamation action. The USFWS AND NMFS CVP-OCAP BiOps issued in 2008 and 2009, respectively, included the P.L.101-514 new CVP water service contract proposed under this action. The proposed action in this final EIS was included in the modeling analysis for the 2008 BA, 2008 BiOp, 2009, BiOp and 2019 ROC on LTO BA.

7.6.1.3 Section 7 Consultation Specific to the Proposed Action

7.6.1.3.1 USFWS Provisional BiOp for the P.L. 101-514 Proposed Action (June 2010)

Chapter 10 of the DEIS/EIR describes in detail the consultation and coordination activities undertaken as part of the environmental review process up to the time the DEIS/EIR was completed.

On June 9, 2010, Reclamation received a project-specific BiOp from the USFWS for the P.L. 101-514 Contract. At issue for the BiOp were the potential effects of the proposed contract diversions on the endangered Pine Hill ceanothus (*Ceanothus roderickii)*, Pine Hill flannelbush (*Fremontodendron decumbens*), Stebbins morning glory (*Calystegia stebbinsii*), El Dorado bedstraw (*Galium californicum* ssp. *sierrae*). The threatened Layne’s butterweed (*Packera layneae*), plants found on gabbro-derived soils, threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California red-legged frog (*Rana draytonii*) and Delta smelt (*Hypomesus transpacificus*).

With respect to Delta smelt, the 2010 provisional BiOp defers to the USFWS 2008 OCAP BiOp that evaluated the proposed 15,000 AFA diversion under P.L. 101-514. USFWS determined no further evaluation was needed.

With respect to the future construction of diversion facilities to serve GDPUD water users, the BiOp requires that further consultation be conducted prior to approval of these facilities to determine potential jeopardy to Layne's butterweed and California red-legged frog.

For impacts within EID's consolidated place of use for CVP water, USFWS found no jeopardy for diversions to EID that do not exceed 7,500 AFA. However, the BiOp states that, "the Service is concerned that the execution of any future contracts by Reclamation that provide for the delivery of additional water within EID's CVP POU have the potential to enable this shift in water [referring to the use of water from Sly Park reservoir to serve uses in areas outside of the CVP POU] and may result in effects to listed species outside of the CVP CPOU." As a result, USFWS determined that water diversions to EID in excess of 7,500 AFA would require additional analysis and consultation with the Service.

The 2010 BiOp determined that proposed diversions to EID were not likely to affect California red-legged frog or valley elderberry longhorn beetle within EID's CVP CPOU.

With regard to Pine Hill ceanothus, Pine Hill flannelbush, Stebbins morning glory, El Dorado bedstraw and Layne's butterweed, the 2010 BiOp states that previous BiOps in 2006 and 2009 analyzed the potential effects on these species and it is not necessary to reanalyze the effects of the proposed action. If, however, the conditions contained in the 2009 BiOp pertaining to modification of the CVP CPOU are not implemented, additional consultation would be needed to include conservation measures to offset the loss of gabbro plants and their habitat.

7.6.1.3.2 NMFS Letter of Concurrence (June 2, 2014)

To complete its obligation under Section 7 of the ESA for the Proposed Action, Reclamation prepared a Biological Assessment (BA) for NMFS based upon updated modeling assumptions. Reclamation completed the BA in December 2011 evaluating effects in the project area to federally listed species (anadromous fish species) or their designated critical habitat. The BA was prepared in accordance with legal requirements set forth under regulations defined in Section 7 of the ESA (50 CFR 402; 16 U.S.C. 1536 [c]) to assure that the proposed action does not jeopardize the continued existence of any Federally threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat. The BA also served to ensure appropriate integration and consistency with the ongoing re-consultation on the CVP/SWP OCAP.

The 2011 BA focused on those water bodies which serve as habitat or migration corridors for federally listed fish species and their critical habitats. The primary water bodies addressed in the

BA included Folsom Reservoir, the lower American River (LAR) from Nimbus Dam to the confluence with the Sacramento River), the Sacramento River (both upstream and downstream from its confluence with the American River), Shasta and Trinity reservoirs, and the Sacramento San Joaquin River Delta. More specifically, it was reasoned that effects of the proposed contracting action are most likely to influence anadromous species which may be present, at various times, within the LAR and Sacramento River. Six federally-protected fish species were identified as potentially occurring in the “Action Area.”

The six federally listed species addressed in the BA include: Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*); California Central Valley steelhead (*Oncorhynchus mykiss*); Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*); Delta smelt (*Hypomesus transpacificus*); Southern Distinct Population Segment green sturgeon (*Acipenser medirostris*); and Southern Resident Distinct Population Segment killer whale (*Orcinus orca*).

In addition to the above listed species, critical habitat is currently designated within the Action Area for Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and California Central Valley steelhead (*Oncorhynchus mykiss*).

In addition, Essential Fish Habitat (EFH) within the area potentially affected by the project is currently designated for Central Valley fall-/late fall-run Chinook salmon (*Oncorhynchus tshawytscha*).

After reviewing the current status of the federally-listed species included in the BA and based upon the best available hydrologic modeling output, the current status of the species, the environmental baseline for the action area, the effects of the Proposed Action, and the acknowledged cumulative effects, Reclamation concluded that the proposed action, as defined, may affect, but is not likely to adversely affect, the species addressed in the BA, and is not likely to destroy or adversely modify designated critical habitat.

The BA determined that the Proposed Action would have no effect on Delta smelt, Southern Distinct Population Segment green sturgeon, or Southern Resident Distinct Population Segment killer whale.

The BA also determined that the Proposed Action may affect but is not likely to adversely affect the critical habitat for Central Valley spring-run Chinook salmon; Central Valley steelhead; and Sacramento River winter-run Chinook salmon, or EFH for Central Valley fall-/late fall-run Chinook salmon.

The BA found that no incidental take of any of the above species is expected to occur as a direct result of the Proposed Action, nor is the Proposed Action expected to jeopardize the continued existence of any federally listed species. The conclusions presented in the BA were reached, based on the hydrologic modeling (i.e., CALSIM II and related water temperature modeling) undertaken and the fundamental characteristics of the proposed action, as defined in the BA. The completed BA was submitted to NMFS on December 15, 2011 for consideration of concurrence.

In response to Reclamation's Section 7 consultation request, NMFS provided to Reclamation a letter dated June 2, 2014 stating their concurrence with the impact determinations presented in the Reclamation's December 2011 Biological Assessment. The letter states in part:

> NMFS has received the information necessary to initiate consultation on federally listed anadromous fish species and their designated critical habitat within the action area. Based on our review of the material provided and the best scientific and commercial information currently available, NMFS concurs with Reclamation's determination that the proposed project may affect, but is not likely to adversely affect, the threatened California Central Valley steelhead DPS, threatened Central Valley spring-run Chinook salmon ESU, endangered Sacramento River winter-run Chinook salmon ESU, designated critical habitat of the California Central Valley steelhead DPS, and designated critical habitat of the Central Valley spring-run Chinook salmon ESU.

The letter further states:

> The proposed project is subject to the requirements of the current M&I water shortage policy and all applicable biological opinions. Reclamation, in cooperation with NMFS and EDCWA, will develop and implement improvements to the CWP [Folsom Reservoir coldwater pool] that will result in the most effective solution for managing the CWP, including but not limited to the CVP/SWP Opinion xRPA Action II.3. In addition, Reclamation will limit diversions until an action responsive to the needs of improved CWP management is implemented. This limitation will allow Reclamation to ensure that CVP water diversions remain at a level that, under existing conditions, will not affect listed species or critical habitat. For these reasons, the delivery of up to 15,000 afa of CVP water for M&I purposes will not result in any decreases to the CWP available in Folsom Reservoir and, therefore, the effects of the proposed project on the CWP and any resulting potential effects on California Central Valley steelhead and critical habitat designated for this DPS are discountable.

The above statement refers to Reclamation limiting diversions until "action responsive to the needs of improved CWP water diversions remain at a level that, under existing conditions, will not affect listed species or critical habitat." While not specified in the letter, we understand this limitation to refer to specified limits on the diversion of non-CVP water under EID's long-term Warren Act Contract with Reclamation. This limitation pertains to the diversion of Permit 21112 water. That diversion is restricted to no more than 8,500 AFA until the completion of a temperature control device the District's Folsom Reservoir intake, or implementation of an effective alternative. This limitation is presented in NMFS May 22, 2014 letter of concurrence to Reclamation concluding NMFS's Section 7 consultation with Reclamation on Reclamation's proposed Warren Act Contract with EID.

Reclamation understands that the 8,500 AFA limit on EID diversions specified in the May 22, 2014 letter of concurrence is not applicable to diversions of P.L. 101-514 contact water for the following reasons:

1. The May 22nd letter distinguishes Permit 21112 water as being "non-CVP" and therefore not subject to CVP contract conditions specific to the protection of the Folsom Reservoir CWP;
2. The Permit 21112 NMFS letter of concurrence specifies a limit of up to 8,500 AFA, whereas the P.L. 101-514 letter of concurrence does not; and
3. The June 2, 2014 NMFS letter of concurrence with Reclamation's BA for P.L. 101-514 specifies that, "For these reasons, the delivery of up to 15,000 afa of CVP water for M&I purposes will not result in any decreases to the CWP available in Folsom Reservoir and, therefore, the effects of the proposed project on the CWP and any resulting potential effects on California Central Valley steelhead and critical habitat designated for this DPS are discountable."

7.6.1.4 Fish and Wildlife Coordination Act

As noted in Section 10 of the DEIS/EIR, under the Fish and Wildlife Coordination Act (16 USC 661-666c), Reclamation is required to consult with USFWS and NMFS before approving water projects that will affect surface water bodies supporting fish and wildlife species. As noted above, Reclamation has been engaged in informal consultation with USFWS and NMFS on this Proposed Action. While the USFWS did prepare a Coordination Act Report (CAR) for the Sacramento County Water Agency (SCWA) portion of the P.L.101-514 new CVP water service contract EIS/EIR, Reclamation determined that preparation of a CAR for this Proposed Action is not required for compliance with the Act.

7.6.1.5 Magnuson-Stevens Fishery Conservation and Management Act

This legislation requires consultation with NMFS regarding actions that may adversely affect "essential fish habitat", by way of a reduction in quantity or quality of habitat needed for spawning, breeding, feeding or maturation. Reclamation conducted informal consultation with NMFS on this Proposed Action in compliance with the Magnuson-Stevens Fishery Conservation and Management Act.

7.6.1.6 Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 makes it unlawful to "take" (i.e., kill, harm, or harass) any migratory bird listed in 50 CFR 10, including their nests, eggs, or products. Migratory birds include geese, ducks, shorebirds, raptors, songbirds, and many others. The Migratory Bird Executive Order of January 11, 2001, directs executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act, and defines the responsibilities of each federal agency taking actions that have, or are likely to make, a measurable effect on migratory bird populations. Reclamation has been in informal consultation with the USFWS on the terrestrial species potentially affected by the Proposed Action and have considered the Migratory Bird Treaty Act.

7.6.1.7 National Historic Preservation Act

“Cultural resources” is a term used to describe both archaeological sites depicting evidence of past human use of the landscape; and the built environment, which is represented in structures such as dams, roadways, and buildings. The National Historic Preservation Act (NHPA) of 1966 is the primary federal legislation which outlines the federal government’s responsibility for cultural resources. Section 106 of the NHPA requires the federal government to take into consideration the effects of an undertaking on cultural resources listed in or eligible for inclusion in the National Register of Historic Places (National Register); such resources are referred to as “historic properties.”

The Section 106 process is outlined in the federal regulations at 36 CFR Part 800. These regulations describe the process that the federal agency (Reclamation) takes to identify cultural resources and the level of effect that the proposed undertaking will have on historic properties. In summary, Reclamation must first determine if the action is the type of action that has the potential to affect historic properties. If the action is the type of action to affect historic properties, Reclamation must identify the area of potential effects (APE), determine if historic properties are present within that APE, determine the effect that the undertaking will have on historic properties, and consult with the State Historic Preservation Office, to seek concurrence on Reclamation’s findings. In addition, Reclamation is required through the Section 106 process to consult with Indian Tribes concerning the identification of sites of religious or cultural significance, and consult with individuals or groups who are entitled to be consulting parties or have requested to be consulting parties. Consultation correspondence was included in Appendix J in the Draft EIS/EIR.

A Class I survey of the area of potential effects was conducted in 2008. This survey consisted of a literature review and records search; no field reconnaissance was conducted for the action described in the DEIS/EIR. This Class I survey does not qualify as full compliance with the NHPA, but serves to aid in the initial stages of identification of cultural resources. Relevant information from this document is summarized in Section 4.9 of the DEIS/EIR and Section 4.9 of this FEIS.

Project-level analyses of potential future facilities projects are not included in this FEIS. Future proposals for such projects may require additional SHPO coordination at the time they are undertaken, including Class III (on-ground examination) surveys to further investigate the potential for impact on cultural resources on a project level. Such project-level, facilities-oriented consultations are premature at this time and, accordingly, have not been initiated.

7.6.1.8 Archaeological Resources Protection Act

The Archaeological Resources Protection Act of 1979 defines archaeological resources; requires federal permits for excavation; provides for curation of materials, records, and other data; provides for confidentiality of archaeological site locations; and, in the 1988 amendment, requires the inventorying of public lands for archaeological resources. In addition, Section 110 of the NHPA specifies that archaeological resources must be taken into consideration before implementing any federal action. Reclamation, as part of its NHPA Section 106 consultation, has incorporated requirements under the Archaeological Resources Protection Act into its approval process.

7.6.1.9 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1979 (PL 95-341) directs that Native American groups, who might use or have direct or indirect interest in the project be invited to participate in the planning process. Reclamation has coordinated with the Bureau of Indian Affairs and solicited input and comments from various rancherias and Native American groups as part of its consultation process under the NHPA.

7.6.1.10 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3049) as amended, outlines the federal government's responsibility for the treatment and ultimate disposition of human burials and grave-related materials. The Act requires consultation with certain Native American communities if circumstances regarding human remains, associated artifacts, or objects of cultural patrimony arise.

7.6.1.11 Indian Trust Assets and Native American Consultation

Reclamation is undertaking compliance procedures and documentation of the new P.L.101-514 CVP water service contract consistent with Section 106 of the NHPA. A Class I survey report has been prepared and will be used by Reclamation in its consultation with the State Office of Historical Preservation (SOHP). Reclamation has solicited input and comment from Native American Heritage Commission (NAHC) and will review the federal action area for Indian Trust Assets.

7.6.1.12 Clean Water Act

As noted previously, the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB), are responsible for ensuring implementation and compliance with the provisions of the federal Clean Water Act (CWA) and California's Porter-Cologne Water Quality Control Act. Along with the SWRCB and RWQCB, water quality protection is the responsibility of numerous water supply and wastewater management agencies, as well as city and county governments, and requires the coordinated efforts of these various entities.

A Section 401 CWA Water Quality Certification or waiver from the RWQCB is required before a Section 404 permit becomes valid. Associated with possible future facilities and infrastructure needs, the specific CWA requirements may apply at such time as these facilities/infrastructure projects are proposed.

7.6.1.13 Other Federal Statutes and Regulations of Relevance

Various laws, directives and orders have been promulgated over time, which collectively, serve to guide the operations of the CVP. These include:

- Rivers and Harbors Act (1935, 1937, 1940)
- Reclamation Project Act (1939)
- Flood Control Act (1944)
- CVP Water Service Contracts (1944)
- Water Rights Settlement Contracts (1950)
- Grasslands Development Act (1954)
- Trinity River Act (1955)
- Reclamation Project Act (1956, 1963)
- Auburn-Folsom South Unit Authorization Act (1965)
- Power Contract 2948A (1967)
- SWRCB Decision 1485 (1978)
- Energy and Water Development Appropriation Act (1980)
- Suisun Marsh Development Appropriation Act (1980)
- Corps of Engineers Flood Control Manuals for Shasta (1977), Folsom (1959) and New Melones (1980)
- Reclamation Reform Act (1982)
- Coordinated Operating Agreement (COA) (1986)

The Proposed Action is consistent with each of these federal statutes. As noted earlier, potential future actions associated with implementation of the Proposed Action and delivery of the P.L. 101-514 contract water, such as facilities construction, may require additional federal permits or compliance at the project-level at the time they are undertaken.

7.6.2 Executive Orders

7.6.2.1 Executive Order 12898 (Environmental Justice)

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs federal agencies to assess whether their actions have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. This is discussed in greater detail in Section 6.4 (Environmental Justice) of this FEIS.

7.6.2.2 Executive Order 11988 (Floodplain Management)

Executive Order 11988 directs federal agencies to enhance floodplain values, to avoid development in floodplains whenever there is a practicable alternative, and to avoid to the extent possible adverse impacts associated with occupancy or modification of floodplains. The Proposed Action, as defined, does not involve any new development activities. In the future, if any of the potentially required facilities or infrastructure were to traverse floodplain areas under Reclamation ownership or easements, the provisions of this Executive Order would apply.

7.6.2.3 Executive Order 11990 (Protection of Wetlands)

Executive Order 11990 directs federal agencies to enhance wetlands values, to avoid development in wetlands whenever there is a practicable alternative, and to avoid to the extent possible adverse impacts associated with occupancy or modification of wetlands. The Clean Water Act regulatory process requires compliance with Federal "no net loss of wetlands" policies, and includes a public and agency review process and a Clean Water Act Section 404 (b)(1) alternatives analysis that would in practice be likely to require avoidance of impacts on aquatic habitats or compensation for losses in extent and values. The Proposed Action, as defined, does not purport to alter any existing land areas. Existing wetlands, therefore, would not be affected by this action. Similar to Executive Order 11988, in the future, if any of the potentially required facilities or infrastructure were to affect wetland areas under Reclamation ownership or easements, the provisions of this Executive Order would apply.

7.6.2.4 Executive Order 11593 (Historic Properties)

Executive Order 11593 and Section 110 of the NHPA) provide direction for inventorying and evaluation of historic properties, and for initiating measures and procedures to provide for the maintenance, through preservation, rehabilitation, or restoration, of federally owned and registered sites at professional standards prescribed by the Secretary of the Interior. Reclamation, in its preparation of a Class I Survey has fully complied with this Executive Order.

7.6.3 <u>State Laws</u>

7.6.3.1 California Environmental Quality Act

Under the California Environmental Quality Act (CEQA), El Dorado County Water Agency is the Lead Agency preparing the EIR; it is a joint EIS/EIR. EDCWA intends this joint EIS/EIR to be consistent with CEQA Guidelines. When this Draft EIS/EIR is completed, EDCWA will provide public notice in accordance with Section 15087 of the CEQA Guidelines. Upon certifying the Final EIS/EIR, EDCWA will adopt a reporting or monitoring program for the implementation of mitigation measures which were adopted, as necessary, and to record any changes to the project that it is considering. The program will be designed to ensure compliance during project implementation. The public record for the Final EIS/EIR will be completed by the filing of a Notice of Determination (NOD) and appropriate disposition of the Final EIS/EIR (CEQA Guidelines, Sections 15094-15095.)

7.6.3.2 California Endangered Species Act

The California Department of Fish and Game (CDFG) is responsible for implementation of the California Endangered Species Act (CESA). The Lead Agencies have been in informal consultation with CDFG, to keep it appraised of the project and environmental document progress. Upon review of the environmental documentation, CDFG will issue a written Finding of its determination of whether the Proposed Action poses a threat to survival of any species that CDFG lists as endangered, through adverse modification or destruction of the specie's essential habitat. Also included in the CDFG finding will be a determination of whether the Proposed Action will result in take of any of threatened or endangered species (as listed by CDFG).

The CDFG findings will also be given to the SWRCB for review with the petition for a change in place of use for El Dorado County's Middle Fork Project water, an action to be taken by PCWA before the Proposed Action can be fully implemented on behalf of GDPUD.

7.6.3.3 Porter-Cologne Water Quality Control Act

In 1969, the California Legislature enacted the Porter-Cologne Water Quality Control Act (the Act) to preserve, enhance and restore the quality of the State's water resources. The Act established the State Water Resources Control Board and nine Regional Water Quality Control Boards as the principal State agencies with the responsibility for controlling water quality in California. Under the Act, water quality policy is established using Water Quality Control Plans (also known as Basin Plans); using standards described in these plans, water quality standards are enforced for both surface and ground water and the discharges of pollutants from point and non-point sources are regulated. Under State law, the permit is officially called waste discharge requirement. Under federal law, the permit is officially called a NPDES permit. In the future, where new facilities or infrastructure are necessary to take, convey, treat or distribute the new water made available under this Proposed Action, close review of the requirements under this Act will be forthcoming. Any facilities requiring a waste discharge requirement will be acquired by the project proponent.

7.6.3.4 Section 1602 of the Fish and Game Code

CDFG regulates work that will substantially affect resources associated with rivers, streams, and lakes in California, pursuant to Fish and Game Code Sections 1600–1607. Any action from a public project that substantially diverts or obstructs the natural flow or changes the bed, channel, or bank of any river, stream, or lake or uses material from a streambed must be previously authorized by CDFG in a Lake or Streambed Alteration Agreement under Section 1602 of the Fish and Game Code. This requirement may, in some cases, apply to any work undertaken within the 100-year floodplain of a body of water or its tributaries, including intermittent streams and desert washes. As a general rule, however, it applies to any work done within the annual high-water mark of a wash, stream, or lake that contains or once contained fish and wildlife or that supports or once supported riparian vegetation.

Activities indirectly associated with this project that could require Section 1602 authorization and a Streambed Alteration Agreement include the eventual construction or alteration of diversion facilities, service-area related development that could have impacts on streams or drainages in El Dorado County, and potential conveyance improvements. These actions would result in the alteration of the flow within water bodies and occur within the annual high-water mark of water bodies that contain wildlife and support riparian vegetation. Prior to any activities that could affect rivers, streams or lakes, applications will be submitted to CDFG for authorization of activities under a new Streambed Alteration Agreement (California Fish and Game Code 1600 et seq.). In the future, where certain facilities or infrastructure are proposed that intend to cross a stream or waterbody, the project proponent at the time, will facilitate discussions with CDFG to acquire the necessary approvals under this Section of the Fish & Game Code.

7.6.3.5 Natural Community Conservation Planning Act

In 1991, the State's Natural Community Conservation Planning Act (NCCPA) was passed. The NCCPA is broader in its orientation and objectives than the California and Federal Endangered Species Acts, and is designed to identify and protect individual species that have already declined in number significantly. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land use. The program seeks to anticipate and prevent the controversies and gridlock caused by species' listings by focusing on the long-term stability of wildlife and plant communities and including key interests in the process.

An NCCP identifies and provides for the regional or area-wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. El Dorado County is currently in the process of developing an HCP/NCCP document, the Integrated Natural Resources Implementation Plan (INRMP) which has, and continues to include wide-ranging interagency support including Reclamation, Bureau of Land Management, and the USFWS.

7.6.3.6 Government Code Section 65040.12(e), Environmental Justice

State law defines environmental justice in Government Code Section 65040.12(e) as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies. Government Code Section 65040.12(a) designates the Governor’s Office of Planning and Research (OPR) as the coordinating agency in State government for environmental justice programs, and requires OPR to develop guidelines for incorporating environmental justice into general plans. There is currently no State requirement that environmental justice be addressed as a part of the CEQA review process for individual projects; however, this statute may be applicable to future facility-construction projects that could occur during the implementation of the Proposed Action.

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11 LIST OF ABBREVIATIONS

Acronym	Meaning
AF	Acre-feet
AFA	Acre-feet annually
AFRP	Anadromous Fish Restoration Plan
Ag	Agricultural
ANN	Artificial Neural Network
APE	Area of Potential Effects
AQMD	Air Quality Management District
ARFCP	American River Flood Control project
AROG	American River Operations Group
ASR	Aquifer Storage and Recovery
ATSP	Automated temperature selection procedure
BA	Biological Assessment
BDCP	Bay-Delta Conservation Plan
BiOp	Biological Opinion
BMP	Est management practices
CAAQS	California Ambient Air Quality Standards
CALSIM II	Latest version of the model used to simulate California State Water Project/Central Valley Project operations
CAR	Coordination Act Report
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	Chlorofluorocarbons
CFR	Code of Federal Regulations
Cfs	Cubic feet per second
CO	Carbon monoxide
COA	Coordinated Operating Agreement
Corps	U.S. Army Corps of Engineers
CPMM	Folsom Coldwater Pool Management Model
CPOU	Consolidated Place of Use
CSD	Community Services District
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVP/SWP OCAP	Central Valley Project and State Water Project Operations Criteria and Plan
CVPIA	Central Valley Project Improvement Act
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CWA	Clean Water Act

Acronym	Meaning
D-1400	SWRCB Decision 1400
D-1641	SWRCB Decision 1641
D-893	SWRCB Water Right Decision 893
DEIS/EIR	Draft Environmental Impact Statement/Environmental Impact Report
Delta	Sacramento-San Joaquin River Delta
DOE	Department of Energy
DOI	U.S. Department of the Interior
DPS	Distinct Population Segment
DSA	Drainage service area
DSM2	Delta Simulation Model 2
DWR	California Department of Water Resources
E/I	Export to inflow
EA	Environmental Assessment
EC	Electrical conductivity
EDCWA	El Dorado County Water Agency
EFH	Essential Fish Habitat
EID	El Dorado Irrigation District
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act
ESU	Ecologically Significant Unit
EWA	California Environmental Water Account
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
Final EIS	Final Environmental Impact Statement
FIRM	Flood Insurance Rate Maps
FMS	Flow Management Standard
GDPUD	Georgetown Divide Public Utility District
GDRD	Georgetown Divide Recreation District
GHG	Greenhouse Gases
GPCD	Gallons per capita per day
HEC-5Q	Temperature model runs
ITA	Indian Trust Assets
Joint Project	Joint Federal Project for Folsom Dam
kW	Kilowatt hour
LAFCO	Local agency formation commission
LAR	Lower American River
LAR FMS	Lower American River Flow Management Standard
LTO	Long Term Operations Plan

Acronym	Meaning
LTO EIS	*Coordinated Long-Term Operation of the Central Valley Project and State Water Project Final Environmental Impact Statement*
LTO ROD	*Coordinated Long-Term Operation of the Central Valley Project and State Water Project Record of Decision*
M&I	municipal and industrial
MAF	Million acre-feet
MBTA	Migratory Bird Treaty Act
MFP	Middle Fork Project
Mgd	Million gallons per day
msl	Mean sea level
MTP	Metropolitan Transportation Plan
MW	Megawatt
NAAQS	U.S. National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMWC	Natomas Mutual Water Company
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Determination
NOI	Notice of Intent
NOP	Notice of Preparation
NOx	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NTU	Nephelometric turbidity unit
O&M	Operations & Management
OCAP	Operational Criteria and Plan
OEPC	Office of Secretary's Office of Environmental Policy and Compliance
PCFFA	Pacific Coast Federation of Fisherman Association
PCWA	Placer County Water Agency
PEIS	Programmatic EIS
PG&E	Pacific Gas and Electric Company
Plan	Water Resources Development and Management Plan
PM10	Particulate matter >10 microns in diameter
POU	Place of Use
PPD	Pollutant policy document
PROSIM	CALSIM Predecessor
PROSIM 2000	CALSIM Predecessor
PSA	Purveyor-Specific Agreement
Reclamation	U.S. Bureau of Reclamation
RO	Responsible Official
ROD	Record of Decision
ROG	Reactive Organic Gases

Acronym	Meaning
RPAs	Reasonable and Prudent Alternatives
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SB	Senate Bill
SCWA	Sacramento County Water Agency
SDIP	South Delta Improvement Program
SFAR	South Fork American River Project
SHPO	State Historic Preservation Officer
Sierra Nevada Region	WAPA's Sierra Nevada Customer Service Region
SJWD	San Juan Water District
SMUD	Sacramento Municipal Utility District
SOFAR	South Fork American River
SOHP	State Office of Historical Preservation (SOHP)
SRFCP	Sacramento River Flood Control Project
SRWRS	Sacramento River Water Reliability Study
SSWD	Sacramento Suburban Water district
SWB	State Water Board
SWP	California State Water Project
SWQCB	State Water Quality Control Board
SWRCB	State Water Resources Control Board
TAC	Toxic air contaminants
TAF	Thousand acre-feet
TCD	Temperature control device
TDS	Total dissolved solids
TGPA/ZOU	Targeted General Plan Amendment and Zoning Ordinance Update
TMDL	Total maximum daily loads
TOC	Total organic carbon
TRD	Trinity River Division
TU	Thermal units
UARM	Upper American River Model
UARP	Upper American River Project
USACE	U.S. Army Corps of Engineers
USDA	U.S Department of Agriculture
USFWS	U.S. Fish & Wildlife Service
UWMP	Urban Water Management Plan
VMT	Vehicle miles travelled
WAPA	Western Area Power Administration
West Slope Update	EDCWA's Water Resources Development and Management Plan 2014 West Slope Update, November 2014
WNA	Water Needs Assessments
WRESL	Water resources simulation language
WTP	Water Treatment Plant