BAY DELTA CONSERVATION PLAN / CALIFORNIA WATERFIX

FINAL ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

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DEPARTMENT OF WATER RESOURCES · STATE OF CALIFORNIA

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FINAL ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

FOR THE

BAY DELTA CONSERVATION PLAN/ CALIFORNIA WATERFIX

VOLUME I. FINAL EIR/EIS FOR THE BDCP/CALIFORNIA WATERFIX

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Introduction to Final EIR/EIS

The California WaterFix planning process began in 2006 when updates to the State Water Project (SWP) and coordinated operations of the Central Valley Project (CVP) were initially proposed as the Bay Delta Conservation Plan (BDCP). The BDCP envisioned updating the SWP by adding new points of diversion in the north Delta and by providing for large-scale species conservation through a 50-year habitat conservation plan (HCP)/natural communities conservation plan (NCCP). The HCP/NCCP was intended to comply with Section 10 of the federal Endangered Species Act (ESA) and to achieve compliance with the California Endangered Species Act (CESA) through the California Natural Community Conservation Planning Act (NCCPA). In December 2013, the California Department of Water Resources (DWR), U.S. Bureau of Reclamation (Reclamation), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) released the BDCP Draft Environmental Impact Report/Draft Environmental Impact Statement (Draft EIR/EIS) pursuant to the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), along with a Draft BDCP document.

In July of 2015, DWR and Reclamation issued a Partially Recirculated Draft EIR/Supplemental Draft EIS (RDEIR/SDEIS) that included for consideration three additional alternatives that would update the SWP without the large-scale conservation efforts in an HCP/NCCP. These alternatives were proposed to achieve compliance with the ESA through Section 7 and compliance with CESA through an incidental take permit under Section 2081(b) of CESA. The lead agencies proposed that one of these non-HCP alternatives, known as California WaterFix (Alternative 4A), be identified as the preferred alternative in replacement of the BDCP alternative (Alternative 4). The RDEIR/SDEIS also included updates to the BDCP alternative as well as other revisions and updates to the 2013 Draft EIR/EIS analyses. In addition, the state proposed as a separate program, apart from the RDEIR/SDEIS and this Final EIR/EIS, California EcoRestore to provide restoration efforts for species conservation independent of the SWP facility upgrades. As presented in the RDEIR/SDEIS and this Final EIR/EIS, the California WaterFix Project consists of new water conveyance facilities with three new diversion points in the north Delta, tunnel conveyance and ancillary facilities, operational elements, and habitat restoration and other environmental commitments to mitigate construction- and operation-related impacts of the new conveyance facilities. As with the RDEIR/SDEIS, DWR continues to be the CEQA lead agency and Reclamation is the sole NEPA lead agency for this Final EIR/EIS for the California WaterFix.

This Final EIR/EIS presents all of the analyses contained in the Draft EIR/EIS combined with the RDEIR/SDEIS analyses and other content required under CEQA and NEPA. The Final EIR/EIS includes the following material.

- Revisions based on comments on the content of the Draft EIR/EIS and RDEIR/SDEIS or based on additional information received since circulation of the RDEIR/SDEIS.
- A list of persons, agencies, and organizations commenting on the Draft EIR/EIS and RDEIR/SDEIS.

- Copies of comments received during public review on the Draft EIR/EIS and RDEIR/SDEIS.
- Responses to all of the substantive comments on the proposed project and alternatives and on environmental analysis contained in the Draft EIR/EIS and RDEIR/SDEIS and received during the applicable public review periods.

This Final EIR/EIS is organized into two main parts. Volume I contains all of the revised analyses included in the Draft EIR/EIS and RDEIR/SDEIS, organized by chapters originally presented in the Draft EIR/EIS, including revisions and additions to appendices. Volume II contains all of the comments received on the Draft EIR/EIS and RDEIR/SDEIS, along with responses to all of the comments. Volume II also contains introductory information on the public review process and approach to responding to all the comments, a list of commenters, master responses to broad resource comments, responses to individual comments in tabular form, and an appendix with all of the original comment letters received on the Draft EIR/EIS and RDEIR/SDEIS.

The lead agencies have prepared a Mitigation Monitoring and Reporting Program (MMRP), released concurrent with the Final EIR/EIS, that describes how the mitigation measures, environmental commitments, and avoidance and minimization measures for the preferred alternative would be implemented. The MMRP describes in detail the actions presented to reduce adverse/significant environmental impacts and specifies who will implement the action, when the action will take place, and how the action will be implemented.

The lead agencies also have prepared a Biological Assessment for the preferred alternative that provides additional information on listed species potentially affected by the project, consistent with the analysis in the Final EIR/EIS. The Biological Assessment is available at https://www.californiawaterfix.com.

Bay Delta Conservation Plan/California WaterFix
Final EIR/EIS
Executive Summary

ES.1 Introduction

ES.1.1 Background and Context

The Sacramento-San Joaquin Delta (Delta) is a vitally important ecosystem that supports hundreds of aquatic and terrestrial species, many of which are threatened or endangered. Located at the crux of two major watersheds that capture runoff from approximately 40 percent of the land in California, the Delta is also at the core of the state's most important water system, which serves millions of Californians throughout the San Francisco Bay Area, the Central Valley, the Central Coast, and southern California (Figure ES-1). This water supports agricultural, municipal, and industrial land uses that, taken together, are the source of much of California's financial stability and prosperity. The benefitting areas include farms and ranches from the north Delta to the Mexican border, as well as Silicon Valley, portions of the East Bay, and most of urban southern California.

Unfortunately, the Delta is in a state of crisis. Several threatened and endangered fish species, including Delta smelt and winter-run Chinook salmon, have recently experienced the lowest population numbers in their recorded history. Meanwhile, Delta levees and the infrastructure they protect are at risk from earthquake damage, continuing land subsidence, and rising sea level. A major seismic event causing levee failure could cause an interruption of water exports for as long as several months or even years. Additionally, the amounts of water available for human use south of the Delta have already decreased significantly in recent years, independent of the drought, due to regulatory actions to protect endangered and threatened fish species by the United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW). The biological opinions (BiOps) that USFWS and NMFS have issued in recent years have required the California Department of Water Resources (DWR) and the United States Bureau of Reclamation (Reclamation) to significantly change the manner in which they jointly operate the State Water Project (SWP) and the federal Central Valley Project (CVP).

For both environmental and economic reasons, there is an urgent need to improve and modernize the existing SWP/CVP conveyance system, which was designed and built long before many of the environmental regulations we have today were in place. Many of the current systemic problems exist because both the SWP and the CVP export water from intake facilities, including pumps, that are located at the far southern edge of the Delta, near the City of Tracy. Because of their far southerly location and their elevation above sea level, at certain times these pumps create "reverse flows" that pull river water southward (upstream, in effect) towards the intakes, rather than allowing it to flow downstream towards San Pablo Bay, San Francisco Bay, and, ultimately, the Pacific Ocean. Not surprisingly, these reverse flows can cause, or contribute to, direct and indirect impacts on fish species such as Delta smelt, which are pulled towards the pumps, where adverse conditions, including the presence of predator species, await them. The reverse flows can also adversely affect salmon migration patterns. In an attempt to reduce the adverse effects of the reverse flows on fisheries, regulators have substantially reduced water exports to SWP and CVP service areas, to the economic detriment of those areas. The recent historic drought has only made matters worse.

The ecological problems with the current water delivery system could be greatly reduced by the construction and use of new north Delta intake structures with state-of-the-art fish screens. With this future vision in mind, DWR and several state and federal water contractors (water agencies that receive water from the SWP and CVP), in coordination with Reclamation, have proposed a strategy for restoring ecological functions in the Delta while improving water supply reliability in California. These agencies', including the state and federal fish and wildlife agencies, initial approach, going back as far as 2006, focused on the development of an extensive conservation plan known as the Bay Delta Conservation Plan, or BDCP, which would add new water system intakes in the north Delta while at the same time pursuing a very large-scale, long-term habitat restoration program within the greater Delta. Under this potential approach, DWR would achieve compliance with the federal Endangered Species Act (ESA) through a habitat conservation plan (HCP) approved by both USFWS and NMFS under Section 10 of the ESA, and would achieve compliance with state endangered species laws through approval by CDFW of a natural community conservation plan (NCCP) prepared under the California Natural Community Conservation Planning Act (NCCPA). Both the HCP and NCCP elements of the BDCP requested incidental take authorization to permit any "take"[1] of endangered or threatened species resulting from construction and operation of the BDCP for a period of 50 years. Reclamation would achieve ESA compliance through Section 7 of that act.

In December 2013, after several years of preparation, DWR, Reclamation, USFWS, and NMFS, acting as joint lead agencies, published a Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) on the proposed BDCP. This document contained a total of 15 action alternatives, including Alternative 4, which was identified as DWR's preferred alternative. The 14 other action alternatives varied from Alternative 4 with respect to factors such as the number of proposed north Delta intakes, the types of conveyance facilities (e.g., surface canals versus underground pipelines), operational rules, and amounts of proposed habitat restoration. Alternative 4 included three new intakes located in the north Delta and two parallel underground pipelines conveying diverted water to the existing export facilities in the south Delta. The proposed operations for Alternative 4 reflected many years of coordination among DWR, Reclamation, USFWS, NMFS, CDFW, the scientific community, and other key stakeholders including public water agencies.

By July 2014, at the end of the public review period, the Lead Agencies had received numerous comments on the proposed BDCP from other agencies and members of the public. Many of these comments included concrete suggestions regarding how, from the commenters' perspectives, the project (i.e., Alternative 4, the BDCP) could be improved. For example, some people urged the Lead Agencies to reduce the level and scope of the construction activities, as well as the sheer size of the proposed facilities, as means of reducing air quality and noise impacts. Other commenters noted that Alternative 4, as envisioned, included substantial amounts of construction activity within Staten Island, which is prime habitat for the greater sandhill crane. Many commenters argued that, because the proposed project would lead to significant, unavoidable water quality effects, DWR could not obtain various approvals needed for the project to succeed (e.g., approval by the State Water Resources Control Board of new points of diversion for north Delta intakes). Yet others suggested that, because of the levels of uncertainty regarding both the future effects of climate change and the

[1] "Take" is defined by the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction).

long-term effectiveness of habitat restoration in recovering fish populations, DWR should pursue a permit term shorter than 50 years. Still other comments suggested that the proposed conveyance facilities should be separated from the habitat restoration components of the BDCP, with the latter to be pursued separately.

Consistent with much of this public input, the Lead Agencies substantially modified the version of Alternative 4 described in the Draft EIR/EIS to reduce environmental impacts, and formulated three new alternatives (Alternatives 4A, 2D, and 5A) that would seek incidental take authorization for a period of less than 50 years, and that would include only limited amounts of habitat restoration. The nature of the modifications to Alternative 4 are described at length in Chapter 3, *Description of Alternatives* of the Final EIR/EIS. Among the key changes included in Alternatives 4 (as well as Alternatives 4A, 2D, and 5A) are 1) the elimination of three pumping plants associated with new intake facilities; 2) associated reductions in construction-related activities that would cause higher air pollutant emissions at intake sites; 3) substantial reductions in the amount of construction occurring on Staten Island; 4) reductions in water quality effects; and 5) the relocation of key project features from private property to public property already owned by DWR.

Alternatives 4A, 2D, and 5A, which are called non-HCP alternatives in the Final EIR/EIS, embody a different implementation strategy that would not involve a 50-year HCP/NCCP approved under ESA Section 10 and the NCCPA. Instead, the non-HCP alternative would achieve incidental take authorization under ESA Section 7 and California Endangered Species Act (CESA) Section 2081(b) assuming a shorter project implementation period. These alternatives address the reverse flow problem by focusing on the construction and operation of new north Delta intakes and on habitat restoration commensurate with the mitigation requirements for construction impacts of these new facilities. This alternative implementation strategy would allow for other state and federal programs to address more extensive long-term habitat restoration efforts for species recovery in programs separate from the proposed project.

The construction and operation of new conveyance facilities, as now proposed under Alternatives 4A, 2D, and 5A, would help resolve many of the concerns with the current south Delta conveyance system while otherwise helping to reduce threats to endangered and threatened species in the Delta through limited but substantial amounts of habitat restoration, as necessary to mitigate significant environmental effects and satisfy applicable ESA and CESA standards. Implementing a dual conveyance system, in which water could be diverted from either the north or the south or both, depending on the needs of aquatic organisms and water quality conditions, would align water operations to better reflect natural seasonal flow patterns by creating new water diversions equipped with state-of-the-art fish screens in the north Delta. The new system would reduce the ongoing physical impacts associated with sole reliance on the southern diversion facilities and allow for greater operational flexibility to better protect fish, as well as to capture water during high flow events when pumping in the south Delta would otherwise be restricted. Minimizing south Delta pumping would provide more natural east–west flow patterns. The new diversions would also help protect critical water supplies against the threats of sea level rise and earthquakes.

Although Alternatives 4A, 2D, and 5A include only those habitat restoration measures needed to provide mitigation for specific regulatory compliance purposes, broader habitat restoration is still recognized as a critical component of the state's long-term plans for the Delta. Such larger endeavors, however, will likely be implemented over time under actions separate and apart from these alternatives. The primary parallel habitat restoration program is called California EcoRestore (EcoRestore), which will be overseen by the California Resources Agency and implemented under the California Water Action Plan. Under EcoRestore, the state will pursue restoration of more than 30,000 acres of fish and wildlife habitat by 2020. Consistent with the reduced scope of Alternatives 4A, 2D, and 5A, these habitat restoration actions will be implemented faster and more reliably by separating them from the water conveyance facility implementation.

Alternative 4A is also known as “The California WaterFix.” It is now DWR’s preferred alternative under the California Environmental Quality Act (CEQA) and Reclamation’s preferred alternative under the National Environmental Policy Act (NEPA). Please refer to Section 31.3, CEQA Environmentally Superior Alternative, of this Final EIR/EIS, for detailed discussion on choosing 4A as the preferred alternative.

Although DWR and Reclamation have identified Alternative 4A as the preferred alternative, the Final EIR/EIS includes consideration of the BDCP alternatives evaluated in the Draft EIR/EIS (Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5 6A, 6B, 7, 8 and 9), combined with the modifications to Alternative 4 and Alternatives 4A, 2D, and 5A as described in the Partially Recirculated Draft EIR/Supplemental Draft EIS (RDEIR/SDEIS) that was released for public review in July 2015. In addition to the combined alternatives, the Final EIR/EIS also includes a presentation of the written and oral comments submitted by the public and agencies on both the Draft EIR/EIS and RDEIR/SDEIS and responses to these comments. In some cases, these comments resulted in changes to the resources chapters, which are revised and republished in their entirety in the Final EIR/EIS. None of these changes involves significant new information requiring another round of recirculation under CEQA or another supplement to the Draft EIS under NEPA (see State CEQA Guidelines Sections 15088[a]; 40 Code of Federal Regulations [CFR] Section 1502.9[c].)

ES.1.1.1 Project Objectives and Purpose and Need

One of the primary challenges facing California is how to comprehensively address the increasingly significant conflict between the ecological needs of a range of at-risk Delta species and natural communities that have been, and continue to be, affected by human activities, while providing more reliable water supplies for people, communities, agriculture, and industry. As stated in the 2016 update to the California Water Action Plan, “There is broad agreement that the state’s water management system is currently unable to satisfactorily meet both ecological and human needs, too exposed to wet and dry climate cycles and natural disasters, and inadequate to handle the additional pressures of future population growth and climate change. Solutions are complex and expensive, and they require the cooperation and sustained commitment of all Californians working together. To be sustainable, solutions must strike a balance between the need to provide for public health and safety (e.g., safe drinking water, clean rivers and beaches, flood protection), protect the environment, and support a stable California economy.”

This challenge must be addressed in decisions by DWR, Reclamation, the U.S. Army Corps of Engineers (USACE), CDFW, and the State Water Resources Control Board (State Water Board) as they endeavor to strike a reasonable balance between these competing public policy objectives and various actions taken within the Delta, including this proposed project. State policy regarding the Delta is summarized in the Sacramento–San Joaquin Delta Reform Act of 2009, which states:

> *“[I]t is the intent of the Legislature to provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan” (California Water Code Section 85001, subd. [c]).*

The Delta "serves Californians concurrently as both the hub of the California water system and the most valuable estuary and wetland ecosystem on the west coast of North and South America" (California Water Code Section 85002).

The ecological health of the Delta continues to be at risk while the conflicts between species protection and Delta water exports have become more pronounced, as amply evidenced by the continuing court decisions regarding the intersection of ESA, CESA, and the operations criteria of the SWP and the CVP. Other factors, such as the continuing subsidence of lands within the Delta, increasing seismic risks and levee failures, and sea level rise and potentially wider variations in hydraulic conditions associated with climate change, serve to further exacerbate these conflicts. Simply put, the overall system as it is currently designed and operated does not appear to be sustainable from an environmental perspective, and so the proposal to implement a fundamental, systemic change to the current system is necessary. This change is necessary if California is to "[a]chieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" (California Public Resources Code Section 29702, subd. [a]).

A statement of Project Objectives by the Lead Agencies is required by the State CEQA Guidelines, and a Purpose and Need Statement is required by the Council on Environmental Quality (CEQ) NEPA Regulations.

ES.1.1.1.1 Project Objectives

CEQA requires that an EIR contain a "statement of the objectives sought by the proposed project." Under CEQA, "[a] clearly written statement of objectives will help the Lead Agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations. The statement of objectives should include the underlying purpose of the project" (State CEQA Guidelines Section 15124[b]). Here, as the CEQA lead agency, DWR is adopting project objectives separately from the federal agencies' purpose statement as set forth below and in Chapter 2, *Purpose and Need*.

DWR's fundamental purpose in proposing the proposed project is to make physical and operational improvements to the SWP system in the Delta necessary to restore and protect ecosystem health, water supplies of the SWP and CVP south of the Delta, and water quality within a stable regulatory framework, consistent with statutory and contractual obligations.

The fundamental purpose is informed by past efforts taken within the Delta and the watersheds of the Sacramento and San Joaquin Rivers, including those undertaken through the CALFED Bay-Delta Program and Delta Risk Management Strategy. The fundamental purpose, in turn, gives rise to the following project objectives.

- Address adverse effects to state and federally listed species related to:
  - The operation of existing SWP Delta facilities and construction and operation of facilities for the movement of water entering the Delta from the Sacramento Valley watershed to the existing SWP and CVP pumping plants located in the southern Delta;
  - The implementation of actions to improve SWP and/or CVP conveyance that have the potential to result in take of species that are listed under the ESA and CESA.
- Improve the ecosystem of the Delta by reducing the adverse effects of diverting water on certain listed species by siting additional intakes of the SWP and coordinated operations with the CVP;

- Restore and protect the ability of the SWP and CVP to deliver up to full contract amounts, when hydrologic conditions result in the availability of sufficient water, consistent with the requirements of state and federal law and the terms and conditions of water delivery contracts and other existing applicable agreements.

Additional project objectives that guided the development of the proposed project and alternatives can be found in Chapter 2, *Project Objectives and Purpose and Need*.

ES.1.1.1.2 Purpose and Need

NEPA requires that an EIS include a statement of purpose and need to which the federal agency is responding in proposing the alternatives, including the proposed action.

The need for this project is to improve California's water conveyance system to respond to increased demands upon and risks to water supply reliability, water quality, and the aquatic ecosystem. The Delta has long been an important resource for California, providing municipal, industrial, agricultural and recreational uses, fish and wildlife habitat, and water supply large portions of the state. However, by several key criteria, such as declines in populations of several fish species, seismic risk to levees and the Delta infrastructure, continuing land subsidence, and rising sea level, the Delta is now widely perceived to be in crisis. The operations of the CVP are currently constrained in the South Delta. Reclamation can increase its operational flexibility to provide water supply and minimize and avoid adverse effects to listed species by coordinating CVP operation with the proposed new SWP facilities and conveyance.

The federal agency purpose of the proposed action is to improve the movement of water entering the Delta from the Sacramento Valley watershed to the existing SWP and CVP pumping plants located in the southern Delta in a manner that minimizes or avoids adverse effects to listed species, supports coordinated operation with the SWP, and is consistent with the Project Objectives described above in Section ES.1.1.1.1, which in summary includes:

1. Restoring and protecting aquatic, riparian, and associated terrestrial natural communities and ecosystems of the Delta, and
2. Restoring and protecting the ability of the SWP and CVP to deliver up to full contract amounts of CVP Project water, when hydrologic conditions result in the availability of sufficient water, consistent with the requirements of applicable state and federal law and the terms and conditions of water delivery contracts and other existing applicable agreements.

Project Need

The Delta has long been an important resource for California, providing municipal, industrial, agricultural and recreational uses, fish and wildlife habitat, and water supply for large portions of the state. However, by several key criteria, such as declines in populations of several fish species, seismic risk to levees and the Delta infrastructure, continuing land subsidence, and rising sea level, the Delta is now widely perceived to be in crisis. Improvements to the water conveyance system are needed to respond to increased demands upon the system and risks to water supply reliability, water quality, and the aquatic ecosystem. CVP operations are currently constrained in the south Delta. Reclamation can increase its operational flexibility to provide water supply and minimize and avoid adverse effects on listed species by coordinating CVP operation with the proposed new SWP facilities and conveyance.

ES.1.1.2 Public Outreach

The BDCP/California WaterFix planning process has included public involvement, consultation, and coordination activities with a variety of stakeholders. Some of the outreach efforts prior to 2014 were conducted in collaboration with the EIR/EIS process to provide the stakeholders with information on the BDCP planning process, including the Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). In many other cases, BDCP/California WaterFix stakeholder groups have included outreach independent of the EIR/EIS process. The following provides a brief overview on public outreach conducted for the BDCP/CWF. More information can be found in Chapter 32 of the FEIR/EIS.

ES.1.1.2.1 BDCP Steering Committee and Working Groups

From 2006 through 2010, the BDCP planning process was guided by a Steering Committee consisting of representatives of many agencies and stakeholder organizations. Members of the Steering Committee are listed on the project website in the archived Steering Committee Agendas/Handout section. All meetings of the Steering Committee were open to the public, and all presentations and documents discussed at the meetings were available on the project website.

The Steering Committee formed a number of standing working groups, technical teams and ad hoc groups to focus on approaches and solutions to specific issues related to BDCP development. The working groups dealt with broad topics, such as conservation strategies and water conveyance, and developed recommendations that were presented to the Steering Committee for consideration. Technical teams were tasked with developing proposed approaches to technical and scientific issues. These teams were co-chaired by subject-matter experts who often represented Steering Committee members, and were staffed by appropriate technical experts. Meetings of the working groups and technical teams were noticed on the project website and open to the public.

ES.1.1.2.2 Scoping Meetings

Public scoping activities conducted as part of compliance with both CEQA and NEPA are intended to provide an open process for determining issues to be addressed and alternatives to be considered in the EIR/EIS. Between April 2008 and March 2009, the lead agencies conducted a total of 22 scoping meetings throughout California. The scoping meetings provided a 30 (2008 scoping meetings)- to 60-minute period during which the attendees could informally view informational posters and discuss issues pertaining to the project with DWR, CDFW, and Reclamation, USFWS, and NMFS staff. During the 2008 scoping process, 123 letters, emails, and comment cards were submitted. Transcripts from the 2008 scoping process included comments from 94 commenters. During the 2009 scoping process, 182 letters, emails, and comment cards were submitted. During 5 of the meetings, 84 comments were recorded. Based on all of this input, there were a total of 2,950 separate comments identified. More details regarding these scoping comments can be found in Appendix 1D, Final Scoping Report.

ES.1.1.2.3 Draft EIR/EIS and RDEIR/SDEIS Public Meetings and Comments

The release of the Draft EIR/EIS was not only a major milestone, but also a critical point for public review and involvement that is carefully guided by CEQA and NEPA. The Draft EIR/EIS was circulated for public review on December 13, 2013 for a 228-day comment period that closed on July 29, 2014. In January and February 2014, the lead agencies conducted 12 public meetings throughout California to take comments on the Draft EIR/EIS. On July 10, 2015, DWR and

Reclamation, as state and federal lead agencies under CEQA and NEPA, respectively, released the Recirculated DEIR/Supplemental DEIS for a 112-day public review period. A new alternative, 4A, also referred to as California WaterFix, was developed in response to public and agency input, replacing Alternative 4 (the proposed BDCP) as the CEQA Preferred Alternative. Public meetings were conducted during 2015 in Sacramento and Walnut Grove, California. Interested parties were encouraged to attend the public meetings to provide comments on the RDEIR/SDEIS. The goals and objectives of the meetings were to establish an open and transparent process to present information to the public, provide opportunities for interested members of the public to comment on the contents of the Draft BDCP and EIR/EIS documents and the alternatives under consideration, and address environmental justice needs to ensure opportunity for participation from all members of the public.

ES.1.1.3 Updated Environmental Analysis

The Final EIR/EIS combines the alternatives and analyses contained in the Draft EIR/EIS with those found in the RDEIR/SDEIS. Although the primary purposes of the Final EIR/EIS are to combine the information from the previous two documents, disclose and respond to public and agency comments, and modify the environmental analysis as appropriate, the lead agencies have also updated portions of the earlier documents based on refined analysis, new information, and in response to public and agency comments. Revisions to the Draft EIR/EIS and RDEIR/SDEIS incorporated into the Final EIR/EIS include the following updates.

- Hydrologic modeling was updated to include conditions under Alternative 4A. The initial range of operations is described as ranging between operational scenarios H3 and H4 at the early long-term time period. A description of Scenarios H3 and H4 can be found in Chapter 5, Section 5.3.3.9. The Alternative 4A analysis scenario H3 plus additional spring outflow (H3+) was used as an impact analysis starting point (see Table ES-5 in Section ES.2.3, *Alternative Implementation Strategy Alternatives (Non-HCP Alternatives*)), to be consistent with the assumptions in the BA, which were being completed at the time of the Alternative 4A analyses. While the analysis for Alternative 4A in the resource chapters is based on H3+ modeling results, since starting operations can move between H3 and H4, Appendix 5E, *Supplemental Modeling Requested by the State Water Resources Control Board Related to Increased Delta Outflows*, Attachment 1, includes the results of H3 and H4 modeling. This modeling translated into updated discussion in Chapter 5, *Water Supply*; Chapter 6, *Surface Water*; Chapter 8, *Water Quality*; Chapter 11, *Fish and Aquatic Resources*; and other chapters dependent on hydrodynamic changes (e.g., Chapter 13, *Agricultural Resources*, and Chapter 25, *Public Health*). In addition, following the initial operations, the adaptive management and monitoring program could be used to make long-term changes in initial operations criteria to address uncertainties about spring outflow for longfin smelt and fall outflow for delta smelt, among other species.

- Chapter 8, *Water Quality*, was revised to address design changes associated with the proposed project, to include additional analyses, to make clarifications and provide errata, to update analyses based on more recent water quality data and criteria, and to respond to comments raised by local, state, and federal agencies and the public. Water quality constituent sections that received the most updating address electrical conductivity, chloride, selenium, bromide, trace metals, and *Microcystis*. Additionally, an assessment of constituent effects downstream of the Plan Area (i.e., in San Francisco Bay) was added. Several other modifications and additions were made to the assessments for mercury, nutrients, trace metals, and dissolved oxygen.

- Chapter 11, *Fish and Aquatic Resources*, was revised to address design changes associated with the proposed project, to incorporate the latest engineering assumptions and modeling procedures, and to respond to comments raised by the public. The lead agencies received comments including, but not limited to, requests for elaboration on the methods used to arrive at CEQA conclusions and NEPA effects determinations and on the effects of contaminants, requests for analyses of the effects on downstream bays (i.e., San Francisco Bay), and requests that all analyses include a NEPA conclusion. These requests were incorporated into the RDEIR/SDEIS as well as the Final EIR/EIS. Since release of the Draft EIR/EIS, additional information has also been developed pertaining to the use of reusable tunnel material for restoration efforts, the construction effects of the modification to Clifton Court Forebay, the effects of underwater noise caused by pile driving, and the construction of an operable barrier at Head of Old River.
- Chapter 12, *Terrestrial Biological Resources,* was revised to reflect updated modeling and analysis for assessment of impacts. These revisions included updates to the models that assess potential impacts on San Joaquin kit fox and black tern. In addition, habitat value classes assigned to greater sandhill crane, tricolored blackbird, and Swainson's hawk were updated.
- Chapter 19, *Transportation*, was revised to incorporate the latest engineering assumptions that could result in substantive changes in other impact analyses.
- Chapter 22, *Air Quality and Greenhouse Gases,* and Appendix 22C, *Bay Delta Conservation Plan Health Risk Assessment for Construction Emissions*, were revised to address design changes associated with the proposed project, to incorporate the latest engineering assumptions and modeling procedures resulting in revised emissions calculations, and to respond to issues and concerns raised by the public regarding the health risk assessment. Where these design and engineering assumptions could result in substantive changes in other impact analyses, such revisions in other impact analyses were made.
- Chapter 23, *Noise*, was revised to incorporate the latest engineering assumptions that could result in substantive changes in other impact analyses.
- Appendix 3I, *BDCP Compliance with the 2009 Delta Reform Act*, and Appendix 3J, *Alternative 4A (Proposed Project) Compliance with the 2009 Delta Reform Act*, were updated to refine compliance discussions.
- Appendix 5E, *Supplemental Modeling Requested by the State Water Resources Control Board Related to Increased Delta Outflow*s, was further revised following coordination with the State Water Board.
- Appendix 6A, *BDCP/California WaterFix Coordination with Flood Management Requirements*, was added to enhance the previous discussion of impacts of operating the project on levees and flooding conditions within the study area.
- Appendix 29D, *Operations in Response to Climate Change*, was added to better reflect the potential the changes in water supply system operations attributable to climate change.
- Appendix 31B, *Mitigation Measure WQ-7e: CCWD Settlement Agreement*, was added to analyze any impacts resulting from implementation of the mitigation required by the Settlement Agreement entered into between DWR and CCWD.
- Revisions that respond to agency and public comments on the Draft EIR/EIS and RDEIR/SDEIS were provided.

- Impact summary discussions and figures were added to the beginning of each Final EIR/EIS resource chapter to allow readers to more easily compare the magnitude of impacts within that resource across alternatives.

ES.1.1.3.1 Lead Agencies

As a result of changes to the proposed project and the modified regulatory approach for gaining necessary permits, Reclamation is now acting as the sole federal Lead Agency implementing NEPA. The USFWS and NMFS, along with USACE, are now acting as NEPA cooperating agencies. DWR is continuing to act as the state Lead Agency implementing CEQA.

ES.1.2 Areas of Known Controversy

The Lead Agencies have prepared the Final EIR/EIS to provide the public and interested agencies with responses to their comments and to update the environmental analysis. Many of the comments received on the Draft EIR/EIS and the RDEIR/SDEIS helped identify ways in which the EIR/EIS could be improved or alternative implementation strategies could be proposed to increase benefits and reduce environmental effects. All of the comments were considered in preparing the Final EIR/EIS.

NEPA and CEQA require that the lead agencies identify areas of known controversy and issues to be resolved that have been raised during the scoping process, public review periods, and throughout the preparation of the EIR/EIS. Based on input from agency representatives and the general public during public scoping and the 2013–2015 comment periods, the following issue areas of particular concern have been identified.

- **Range of Alternatives.** In response to concerns raised on this topic in comment on the Draft EIR/EIS, the RDEIR/SDEIS provided three new alternatives (4A [preferred alternative], 2D, and 5A) that have been included in the Final EIR/EIS along with the alternatives evaluated in the Draft EIR/EIS. The alternatives development and screening process is discussed in Appendix 3A, *Identification of Water Conveyance Alternatives, Conservation Measure 1*, Attachments 1 through 7, which provide additional details on the information that was used in developing the alternatives.
- **Biological Resources.** The complexity of the project raises many concerns over environmental consequences for the aquatic ecosystem and fish species, and for the terrestrial ecosystem and plant and wildlife species. Identifying an alternative implementation strategy that separated the water conveyance plan from the broader habitat restoration elements of the BDCP alternatives and accelerating environmental restoration through EcoRestore may alleviate some of these concerns. The approach of separating water conveyance from broad environmental restoration is reflected in Alternatives 4A, 2D, and 5A. Theses alternatives are described in Chapter 3 *Description of Alternatives.*
- **Biological Goals and Objectives.** Controversy exists over the potential conflict between the BDCP alternatives' conservation goals and the reasonable use of natural resources and lands for economic development. This issue is somewhat reduced under Alternatives 4A, 2D, and 5A because of the revised approach to limit habitat improvements to those needed to offset conveyance facility effects. Generally, land-based impacts would be reduced under Alternatives 4A, 2D, and 5A when compared with the BDCP alternatives. These comparative changes are provided in the land-use based analysis in Chapters 9, 10, 12 through 20, and 24 through 27. This chapters address terrestrial biological resources, land use, agricultural resources,

recreation, cultural resources, mineral resources, paleontological resources, and other resources.

- **Climate Change.** The likely effects of climate changes on water supplies and the Delta ecosystem during the 50-year life of the BDCP alternatives prompted many comments during the formal public review process for the Draft EIR/EIS. Comments on the Draft EIR/EIS reflected widespread concerns that the anticipated effects of climate change and habitat restoration are too speculative and that there is too much uncertainty about such effects to allow for a 50-year permit period. These comments are among the reasons the Lead Agencies, in issuing the RDEIR/SDEIS, introduced Alternatives 4A, 2D, and 5A, which do not include a HCP/NCCP and do not seek 50-year incidental take permits. The effects of climate change are factored into the analysis of each alternative in each resource chapter, and are addressed in Chapter 29, *Climate Change*, and associated appendices.
- **Water Supply, Surface Water Resources, and Water Quality.** Water supply and surface water resources—key drivers for development of the proposed project and its alternatives—remain highly controversial issues for a wide array of stakeholders (e.g., agricultural interests, hunting and fishing interests, water agencies, local jurisdictions) because of the potential changes in Delta hydrologic conditions attributable to changes in the SWP and CVP points of diversion in the Delta. Water quality is an issue of concern because activities associated with conveyance facilities and restored habitat could change flow regimes, which could lead to discharge of sediment, possible changes in salinity patterns, and potential water quality changes. The project proponents will seek to obtain authorization from the State Water Board for new SWP points of diversion, which would likely include State Water Board conditions on DWR and Reclamation water rights to protect beneficial uses in the Delta. Such changes would not include changes in water rights; however, there are concerns that the proposed project could result in the potential for increased exports and redistribution of Delta water. These issues are addressed in Chapter 5 *Water Supply*, Chapter 6 *Surface Water*, and Chapter 8 *Water Quality*.
- **Flood Management.** Flood management is a potentially controversial issue because implementation of the proposed project would entail modification of some existing levees as well as changes in flow regimes and other changes, including habitat restoration in the Yolo Bypass and within ROAs in the Delta under the BDCP alternatives. These issues are addressed in Appendix 6A.
- **Agricultural Resources.** Because the Plan Area is largely devoted to agricultural uses, the effects of implementation of a broad habitat restoration program in the BDCP alternatives on existing agricultural activities are controversial, as expressed in comments on the Draft EIR/EIS. In addition to conversion of agricultural lands to other uses (i.e., water conveyance facilities and restored/enhanced natural habitat areas), there are concerns that conflicts could arise between continuing agricultural operations and management requirements in areas targeted for conservation actions (e.g., changes in cultivation or pest management practices). Although Alternatives 4A, 2D, and 5A partially address these concerns because each alternative would require much less conversion of agricultural land to habitat than the alternatives that include an HCP/NCCP, implementation of any action alternative would adversely affect agricultural activities. The impacts on agricultural resources are addressed in Chapter 14, *Agricultural Resources*.

- **Socioeconomics.** The key socioeconomic concerns involve the impacts of construction activities on local Delta communities, the potential losses of business revenues and employment associated with the decrease in agricultural production, and the potential decrease in tax revenues due to such a decline in agricultural activities. Alternatives 4A, 2D, and 5A would have lesser socioeconomic effects associated with agricultural land conversions than the BDCP alternatives would have because less land would be converted from agriculture to restored habitat. A comparative discussion of the socioeconomic impacts that would result under each alternative is provided in in Chapter 16, *Socioeconomics*.

- **Recreation.** Concerns relating to recreation include potential conflicts between construction and operation of new conveyance facilities and ongoing Delta recreational activities (e.g., boating, fishing, hunting, enjoyment of marinas). In addition, there are concerns about possible conflicts between operable barriers and gates in Delta waterways and recreational boating corridors. Alternatives 4A, 2D, and 5A would have fewer effects on recreation than the BDCP alternatives would have because HCP/NCCP conservation measures that would disrupt recreation activities would not be implemented under Alternatives 4A, 2D, and 5A. However, impacts resulting from constructing the water conveyance facilities under the non-HCP alternatives would be similar to impacts of the BDCP alternatives. The impacts are discussed in Chapter 15 *Recreation*.

- **Aesthetics/Visual Resources.** Potential effects of new facilities on aesthetics and visual resources are of interest to local Delta residents as well as others who utilize the Delta where construction of the facilities would be located. While aesthetic impacts are difficult to quantify and in many instances are difficult to mitigate, impacts related to the intake facilities would be reduced by proposed changes to reduce the size of the conveyance facilities under Alternatives 4, 4A, 2D, and 5A. Changes in the visual character of the areas that would be restored as a result of implementing HCP/NCCP conservation measures would be avoided under Alternatives 4A, 2D, and 5A because the conservation measures would not be implemented. These differences are discussed in Chapter 17, *Aesthetics and Visual Resources*.

- **Growth.** One of the proposed project objectives is to increase water supply reliability to SWP and CVP contractors south of the Delta. Increasing the reliability of water could be considered as removal of one of the obstacles related to growth south of the Delta or in export service areas. Concerns regarding the growth-inducing consequences of the proposed project or its alternatives generally focus on the potential effects of a stabilized water supply to the southern part of the state. The potential for growth resulting under each alternative is discussed in Chapter 30 *Growth Inducement and Other Indirect Effects*.

- **Community Issues.** Community issues, such as construction noise, air quality, and traffic circulation effects, conversion of existing land uses, access to private lands, and changes in the character of Delta communities are areas of concern for Delta residents. These issues have been addressed through evaluation of a wide range of resource impacts addressed in Chapter 23 *Noise*, Chapter 22, *Air Quality and Greenhouse Gases*, Chapter 19, *Transportation*, Chapter 13, *Land Use*, and Chapter 16, *Socioeconomics.*

No additional scoping is necessary under CEQA for a Recirculated Draft EIR or under NEPA for a Supplemental Draft EIS.

ES.1.3 Readers Guide to the Final EIR/EIS

The Final EIR/EIS combines the information contained in the Draft EIR/EIS with that of the RDEIR/SDEIS. The Final EIR/EIS Part I has adopted the organizational structure of the Draft EIR/EIS with the main body of the document organized as Chapters 1 through 36, along with a series of appendices that provide additional information in support of the chapters.

ES.1.3.1 Topical Summaries

The RDEIR/SDEIS included topical essays that addressed improved fish and aquatic habitat analyses; water quality revisions; air quality, health risk assessment, transportation, and noise revisions; revised project description and enhanced level of detail; and analysis of geotechnical investigations. The information contained in these topical essays was updated and incorporated into the respective resource chapters of the Final EIR/EIS and does not appear as a separate presentation in the Final EIR/EIS.

ES.1.3.2 Presentation of Alternatives in Resource Chapters

Preparation of an impact analysis under NEPA generally requires a comparison of the proposed action to the potential environmental conditions associated with not approving the action. Referred to as the "No Action Alternative baseline," the Final EIR/EIS contains two No Action Alternative baseline conditions due to the different timeframes assumed for the Draft EIR/EIS alternatives and the RDEIR/SDEIS alternatives, respectively. In the Draft EIR/EIS, the BDCP alternatives (Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9) were compared for NEPA purposes with a no action condition that was defined as a 50-year time period ending in 2060, associated with the 50-year permit term that would apply to these alternatives, and named "late long-term" (LLT). The No Action Alternative baseline in the late long-term reflects the environmental conditions expected to occur at the end of the proposed BDCP or HCP/NCCP Alternative permit period. In the RDEIR/SDEIS, the three additional alternatives that do not involve an HCP/NCCP component, and would not seek a 50-year permit authorization, were evaluated for NEPA purposes in comparison with a No Action Alternative baseline defined as a 15-year time period ending in 2025 and named "early long-term" (ELT). Both of these No Action Alternative baselines have been carried forward into the Final EIR/EIS.

ES.1.3.3 Resource Chapter Presentations

Because of the use of two no action baseline comparisons, the analysis of the BDCP alternatives is separate from the analysis of the non-HCP alternatives. In each resource chapter, the analysis of the No Action Alternative at 2060 against the Existing Conditions baseline, and the analysis of Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9 with the corresponding baseline of the No Action Alternative at 2060 are presented first. The analysis of Alternatives 4A, 2D, and 5A and the analysis of the No Action Alternative ELT baseline have been incorporated into each resource chapter following the analysis of Alternative 9.

Analyses of the alternatives presented in the Final EIR/EIS *Environmental Consequences* sections address impacts for all the resource topics considered in the Draft EIR/EIS and the RDEIR/SDEIS. In contrast to the BDCP HCP project alternatives analyzed in the Draft EIR/EIS, impacts analyses for the new sub-alternatives first presented in the RDEIR/SDEIS are analyzed at early-long term conditions (2025). The impact analyses from both documents have been combined into the same impact analysis format of the Draft EIR/EIS with CEQA conclusions and NEPA effects determinations, and proposed mitigation measures where they are feasible and required to reduce a significant impact. In certain cases, the impact analysis has also been updated and revised. Because of the extensive editing required to combine and update the analysis in most resource chapters, the impact analyses are presented without identification of revisions since the publication of the Draft EIR/EIS or the RDEIR/SDEIS.

ES.1.3.4 Supplemental Appendices

The Final EIR/EIS carries forward relevant appendices from the Draft EIR/EIS and RDEIR/SDEIS, some of which have been revised, and includes new appendices to support analysis in the Final EIR/EIS. These appendices include the following documents.

- Appendix 3B, *Environmental Commitments, AMMs, and CMs,* provides information on the environmental commitments, avoidance and minimization measures, and conservation measures proposed to avoid or minimize environmental impacts resulting from constructing and operating the project alternatives.
- Appendix 5E, *Supplemental Modeling Related to the State Water Resources Control Board*, which was Appendix C in the RDEIR/SDEIS, has been further updated and provides additional information as requested by the State Water Board for its consideration during its anticipated water rights hearing on the petition for changes in SWP and CVP authorized points of diversion necessary to implement the proposed project.
- Appendix 5F, *Comparison of FEIRS Alternatives 2D, 4A, and 5A Modeling Results to the RDEIR/SDEIS Modeling Results*, provides additional CALSIM II modeling results for Operational Scenario H3+ starting water operations that would be employed under Alternative 4A (the proposed project).
- Appendix 5G, *Comparison of FEIRS Alternative 4A Modeling Results to the California WaterFix Section BA Proposed Action Modeling Results*, provides a comparison between the modeling results for Operational Scenario H3+ starting water operations that would be employed under Alternative 4A (the proposed project) modeled using the 2010 version of CALSIM II, against the modeling results from the 2015 version of CALSIM II, as presented in the BA.
- Appendix 6A, *BDCP/California WaterFix Coordination with Flood Management Requirements,* describes the potential impacts of the proposed project on flood management and levees, as well as describes how Alternative 4A would coordinate with and complement existing flood management programs and plans.
- Appendix 8P: *Velocity Probability of Exceedance Curves.*
- Appendix 11F, *Substantive BDCP Revisions*, now also includes three attachments: (1) Responses to the Delta Science Program Independent Review Panel Phase 3 Report, Review of the BDCP Effects Analysis; (2) Responses to the Progress Reports developed by USFWS in response to the February 2013 Administrative Draft of the BDCP; (3) Responses to the Progress Reports developed by NMFS in response to the February 2013 Administrative Draft of the BDCP.
- Appendix 17F, *Surge Tower Shadow Data Sources and Assumptions*, provides information to support the visual resources assessment of shadows resulting from water conveyance surge towers.

- Appendix 24B, *2010 Initial Site Assessment*, provides an initial assessment of issues associated with realignment of State Route (SR) 160 near the proposed north Delta intakes.
- Appendix 29D, *Climate Change Analysis and Discussion of Future Uncertainty*, provides additional information and context about the assumptions and uncertainties embedded in the BDCP/California WaterFix EIR/EIS analysis of future conditions. This information is provided to explicitly acknowledge that the assessment of future conditions is highly uncertain.
- Appendix 31B, *Mitigation Measure WQ-7e: CCWD Settlement Agreement*, was added to analyze any impacts resulting from implementation of the mitigation required by the Settlement Agreement entered into between DWR and CCWD.
- Appendix 32B, *Draft EIR/EIS Public Review Summary Report,* provides copies of the notices of availability of the Draft EIR/DEIS for public review
- Appendix 32C, *RDEIR/SDEIS Public Review Summary Report*, provides copies of the notices of availability of the RDEIR/SDEIS for public review.

The content of RDEIR/SDEIS Appendix B, *Supplemental Modeling Results for New Alternatives*, has been updated and incorporated into Appendix 5F and Appendix 11E, *Sensitivity Analysis to Confirm RDEIR/SDEIS Determinations for Fish and Aquatic Species Using Updated Model Outputs for Alternatives 4A, 2D, and 5A*.

In addition, some of the appendices that were included in the RDEIR/SDEIS have been renumbered and are incorporated into the Final EIR/EIS. The content of these appendices has largely not changed.

- RDEIR/SDEIS Appendix D, *Substantive BDCP Revisions*, is now Final EIR/EIS Appendix 11F.
- RDEIR/SDEIS Appendix E, *Supplemental Information for U.S. Army Corps of Engineers Permitting Requirements*, is now Final EIR/EIS Appendix 1F.
- RDEIR/SDEIS Appendix F, *Supplemental Modeling Results at ELT for Alternative 4 at H1 and H2*, is now Final EIR/EIS Appendix 11G.
- RDEIR/SDEIS Appendix G, *Alternative 4A (Proposed Project) Compatibility with the Delta Plan*, is now Final EIR/EIS Appendix 3J, and has been renamed, *Alternative 4A (Proposed Project) Compliance with the 2009 Delta Reform Act*.

ES.1.3.5 Response to Comments

Final EIR/EIS Volume II contains the comments received on the Draft EIR/EIS and RDEIR/SDEIS and accompanying responses to those comments. Final EIR/EIS Volume II presents the comments submitted by agencies, interest groups, and the public in tabular format. Volume II contains master responses developed to address major issues or recurring comments. Although the lead agencies have responded individually to each comment received on the Draft EIR/EIS and RDEIR/SDEIS, the master responses provide general responses to several issues that were repeated in the comments or that required long thematic responses. Volume II concludes with responses to individual comments received from federal, state, and local agencies, non-governmental organizations, and individuals.

During the 228-day public review period on the Draft EIR/EIS, approximately 2,000 non-form comment letters were received. Of those letters, 56 were received from elected officials, 109 were received from governments or public agencies, 417 were received from non-governmental organizations, and 1,522 were received from the general public (because some letters were signed by more than one entity, these numbers total more than 2,017). Transcripts from the 2014 public meetings on the Draft EIR/EIS included oral comments from 104 commenters. Based on all of this input, a total of 18,532 separate comments were identified.

Public comment received on the RDEIR/SDEIS consisted of 21,700 comment letters—6,305 unique letters from individual members of the public, 48 from elected officials, 105 letters from governments or public agencies, and 491 from non-governmental organizations and stakeholder groups. The balance of comments consisted of form letters sent by individuals and organized by various organizations. A total of 12,494 separate comments on the RDEIR/SDEIS were received during the RDEIR/SDEIS public review period.

ES.1.4 Key Final EIR/EIS Terminology

Because of the changes to the proposed project and revisions in the EIR/EIS, readers should be aware of certain terminology when reviewing the discussions of Alternatives 4A, 2D, and 5A in the Final EIR/EIS.

- **Plan Area and Study Area.** The terms Plan Area and study area are still applied to the impact analysis of Alternatives 4A, 2D, and 5A and all associated figures and tables. Even though there is not habitat plan under Alternatives 4A, 2D, and 5A, the activities pursued under these alternatives would take place in the same geographical area as the Plan Area identified in the Draft EIR/EIS, and the potential impacts would still occur in what was defined as the study area in the Draft EIR/EIS. The Plan Area is shown in Figure ES-2.
- **Conservation Measures, Environmental Commitments, Avoidance and Minimization Measures, and Mitigation Measures**. Because Alternatives 4A, 2D, and 5A are not presented as conservation plans under an HCP/NCCP, these alternatives do not include conservation measures (which are specifically required for a HCP under Section 10 of the Federal ESA). Rather, limited elements of the previously proposed conservation measures for the BDCP alternatives are included as "Environmental Commitments" under Alternative 4A, 2D, and 5A to mitigate potentially significant environmental effects under CEQA and meet the regulatory standards of ESA Section 7, CESA Section 2081(b), and Section 404 of the Clean Water Act. To aid reviewers, the Environmental Commitments are numbered to parallel the BDCP (Alternative 4) conservation measures, as shown in the example below.

Table ES-1. Conservation Component Naming Convention Example

Alternative	Component Naming Convention	Component Name
Alternative 4A	Environmental Commitment 3	Natural Communities Protection and Restoration
Alternative 4	Conservation Measure 3	Natural Communities Protection and Restoration

Alternatives 4A, 2D, and 5A include Environmental Commitments 3, 4, 6, 7, 8, 9, 10, 11, 12, 15, and 16. Tables 3-9, 3-10, and 3-11 in Chapter 3 provide details on protection and restoration of natural communities and other actions that would be implemented under Alternatives 4A, 2D, and 5A, respectively. Environmental Commitments under Alternatives 4A, 2D, and 5A are not the same thing as environmental commitments detailed in Appendix 3B, such as implementation of best management practices, that would be used to avoid or reduce project effects.

Avoidance and minimization measures (AMMs) have been developed to address a wide range of measures to address impacts that could occur during construction. The 39 AMMs are applicable to all action alternatives and range from construction worker training to protocols for conducting preconstruction searches for sensitive animal species. A detailed discussion of each AMM is provided in Appendix 3B, *Environmental Commitments, AMMs, and CMs.*

Mitigation measures have also been developed to reduce significant impacts of each action alternative. These measures are included in each EIR/EIS resource section and are tabulated in Table ES-8, below. The Mitigation Monitoring and Reporting Plan for the California WaterFix (MMRP) provides a detailed description of the mitigation measures applicable to Alternative 4A, the preferred alternative. The MMRP describes how the lead agencies will implement each measure, the parties responsible for implementing each measure, the location for implementation of each measure, the timing of each measure, and monitoring procedures. Finally, the MMRP indicates the reporting requirement for each measures.

- **Biological Goals and Objectives and Resource Restoration and Protection Principles for Implementing Environmental Commitments.** Alternatives 4A, 2D, and 5A do not include specific Biological Goals and Objectives such as were included in the BDCP (Alternative 4) because these alternatives do not include a proposed HCP/NCCP. However, Alternatives 4A, 2D, and 5A do include species-specific resource restoration and protection principles for implementing Environmental Commitments that would ensure that the implementation of these commitments would achieve the intended mitigation of impacts. Again, these Environmental Commitments under Alternatives 4A, 2D, and 5A are separate and different from the environmental commitments referenced in resource chapter impact analyses and described in Appendix 3B, *Environmental Commitments, AMMs, and CMs*. Refer to Chapter 3, Section 3.3.2.2, *Non-HCP Alternative Environmental Commitments*, for a discussion of the Environmental Commitments associated with Alternatives 4A, 2D, and 5A.
- **Conservation Zones and Restoration Opportunity Areas.** The Plan Area is subdivided into 11 Conservation Zones (CZs) within which conservation targets for natural communities and covered species' habitats have been established within the BDCP (see Figure ES-2). The Restoration Opportunity Areas (ROAs) encompass those locations in the Plan Area considered most appropriate for the restoration of tidal habitats and where restoration goals for tidal and associated upland natural communities would be achieved. Although the CZs and ROAs were designated for the BDCP, the CZs and ROAs remain applicable to the impact analysis of Alternatives 4A, 2D, and 5A and all associated figures and tables because the activities pursued under these alternatives would take place in these same areas.
- **Covered Activities and Covered Species.** Alternatives 4A, 2D, and 5A do not include a list of "covered species" or "covered activities" because these concepts are not requirements of the ESA Section 7 or CESA Section 2081(b) permit processes. Under the BDCP alternatives, incidental take permits (ITPs) would be sought from USFWS and NMFS pursuant to Section 10(a)(1)(B) of the federal ESA and incidental take authorization by the CDFW, pursuant to California Fish and Game Code Section 2835. These permits would authorize take[2] of certain state- and federally listed species, fully protected species, and some nonlisted species (collectively, *covered species*) during the course of otherwise lawful activities (i.e., covered activities). However, the Final EIR/EIS does include analysis of the special-status species

[2] The broad definition of "take" under the ESA includes actions that harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct (16 USC 1532[19]).

addressed in the new permit process, to the extent that implementation of Alternatives 4A, 2D, and 5A could result in impacts on these species.

ES.1.5 Final EIR/EIS Review and Project Approvals

DWR is responsible for certifying the EIR as adequate in compliance with CEQA. Because of the level of public interest in the proposed project and because this is a Final EIR/EIS jointly prepared under the requirements of CEQA and NEPA, DWR will issue a notice for a 30-day period consistent with the federal notice described below, and prior to certification, that the Final EIR/EIS has been published. At the end of this 30-day period, DWR will conduct a public meeting regarding the certification of the Final EIR/EIS and consideration of project approval. If DWR chooses to approve a project, it will also be required to adopt "CEQA Findings," an MMRP, and a Statement of Overriding Considerations prior to approving the project (see State CEQA Guidelines Sections 15091–15093.) These project approval documents, which will memorialize DWR's choice amongst the alternatives developed in this EIR/EIS, would be referenced in a Notice of Determination. (State CEQA Guidelines Section 15094.) If Reclamation determines it will approve the proposed action, it is responsible for issuing a Record of Decision following a 30-day period after a Notice of Availability for the EIS has been published with the U.S. Environmental Protection Agency. The Record of Decision will also include consideration of a final biological opinion issued under ESA Section 7.

The Final EIR/EIS is available for review at these locations and websites.

- Lead Agency Offices
- Website
    - Bay Delta Conservation Plan (http://baydeltaconservationplan.com)

Federal and state permitting agencies will also be using the Final EIR/EIS to assist in their issuance of permits or other approvals. These agencies include USFWS and NMFS, which are responsible for enforcing the ESA; USACE, which issues permits under Section 404 of the Clean Water Act and Sections 10 and 14 of the Rivers and Harbor Act; USACE, which issues permits under Section 404 of the Clean Water Act; CDFW, which issues permits under CESA Section 2081(b); the State Water Board, which oversees petitions seeking a Change in Point of Diversion and Section 401 certification; and the Delta Stewardship Council, which reviews and acts as an appellate body for determinations of consistency with the Delta Plan. A detailed discussion of agency roles and responsibilities and uses of the Final EIR/EIS to support issuance of permits or approvals is provided in Chapter 1, *Introduction*.

ES.2 Alternatives

This section provides an overview of the process for developing both the alternatives evaluated in the Draft EIR/EIS (BDCP alternatives) and the alternatives evaluated in the RDEIR/SDEIS (non-HCP alternatives). Both sets of alternatives are described and analyzed in the Final EIR/EIR.

ES.2.1 Alternatives Development Process

ES.2.1.1 BDCP Alternatives Development Process

The process for developing the BDCP alternatives was initiated in 2006 with organization of the BDCP Steering Committee. The Steering Committee was composed of representatives from agencies and stakeholder organizations that have interest in or are involved in management of resources in the Delta. All meetings of the Steering Committee were open to the public, and all presentations and documents discussed at the meetings were made available on the BDCP website. The Steering Committee convened various working groups and technical teams to develop technical information or recommendations about aspects of alternative conservation plan concepts. The Steering Committee, working groups, and technical teams met from 2006 through 2010.

In 2006 and 2007, the Steering Committee conducted a preliminary analysis of broadly defined conveyance alignment concepts to evaluate and consider the benefits and constraints of different water conveyance alignment approaches. During this stage, the committee refined the range of the conveyance alignment concepts to four Conservation Strategy Options. In September 2007, the committee completed the *Conservation Strategy Options Evaluation Report* (BDCP Steering Committee 2007), which presented four options that generally encompassed two through-Delta conveyance variations, a dual conveyance option utilizing isolated conveyance and through-Delta conveyance, and an isolated conveyance option. As the name suggests, the *through-Delta* options would involve conveyance of water from the Sacramento River through the Delta using existing channels for diversion by the SWP/CVP south Delta facilities. A *dual conveyance* option would involve development of new north Delta diversion facilities to be operated in conjunction with existing SWP/CVP export facilities in the south Delta. An *isolated conveyance* option would consist only of new north Delta diversion facilities, and the existing pumping facilities in the south Delta would no longer be operated.

By early 2008, DWR and the federal lead agencies had initiated the public scoping process for the EIR/EIS; DWR conducted additional scoping in early 2009. During this time, the Steering Committee continued to meet and it corresponded with the California Natural Resources Agency regarding water conveyance alignment approaches. As a result of these combined processes, 15 water conveyance concepts, focused on the possible alternative alignments for the water conveyance facilities (BDCP Conservation Measure [CM]1), were developed. These concepts retained variations of the initial concepts of through-Delta, dual conveyance, and isolated conveyance approaches.

These 15 water conveyance concepts were then evaluated in a multi-level screening process referred to as the initial, or first, screening. The first screening utilized three levels of screening criteria to ensure legal compliance with CEQA and NEPA (Table ES-2). Eight of the 15 initial water conveyance concepts were eliminated through this first screening process.

Table ES-2. Screening Criteria for Water Conveyance Alternative Alignment Concepts

Level	Screening Criteria
First	Allow for the conservation and management of covered species; protect, restore, and enhance certain aquatic, riparian, and associated terrestrial natural communities and ecosystems; reduce adverse effects on certain listed species through use of existing SWP and CVP diversion facilities and new SWP intakes; and restore and protect SWP and CVP water reliability.
Second	Avoid or substantially lessen expected significant environmental effects of the proposed project, and address significant issues related to the proposed action.
Third	Define potentially feasible alternatives under CEQA and reasonable alternatives under NEPA; consider the technical and economic feasibility and practicality of alternatives; consider whether an alternative would violate federal or state statutes or regulations; and if an alternative would balance relevant economic, environmental, social, and technological factors.

In addition to the conveyance facility alignment alternatives, the Steering Committee working groups and technical teams developed screening evaluations to consider operations and habitat restoration activities. By 2011, the state and federal agencies and environmental organizations had identified a range of north Delta intake capacities and conveyance operation alternatives.

The water conveyance alignment concepts developed through the first screening process were combined with the operational concepts identified in 2011 and a second screening process was implemented. This process generated 21 possible alternatives, which were then evaluated using the same first, second, and third level screening criteria (Table ES-2). In addition, these alternatives were evaluated against the requirements of the Delta Reform Act[3] and for consistency with scoping comments from responsible and cooperating agencies related to the range of alternatives, and relative to legal rights and entitlements of entities that are not BDCP/California WaterFix participants. By using these criteria to narrow the range to a more manageable field, the alternatives were reduced by summer 2011 to a proposed project (the proposed BDCP), 14 *action alternatives* (also referred to as *BDCP alternatives*), and a no action/no project alternative.

On July 25, 2012, California Governor Edmund G. Brown Jr., Secretary of the Interior Ken Salazar, and National Oceanic and Atmospheric Administration Assistant Administrator for Fisheries Eric Schwaab outlined revisions to the proposed BDCP. As revised, the proposal included the following: 1) the construction of water intake facilities with a total capacity of 9,000 cubic feet per second (cfs), down from an earlier proposal of 15,000 cfs; 2) water facility operations that would be phased in over several years; and 3) a conveyance system designed to use gravity flow to maximize energy efficiency and to minimize environmental impacts. This revised proposal was analyzed in the BDCP Effects Analysis. It involves Intakes 2, 3, and 5; two tunnels to convey water by gravity; no

[3] At the time, the lead agencies assumed that the proposed BDCP, if ultimately approved, would be subject to Chapter 2 of the Delta Reform Act, called *Bay Delta Conservation Plan* (see California Water Code, Division 35 [*Sacramento-San Joaquin Delta Reform Act of 2009*], Part 4 [*Comprehensive Delta Planning*], and Chapter 2). Chapter 2 consists of Water Code Sections 85320, 8531, and 85322. Section 85320 would require the Delta Stewardship Council to incorporate an approved BDCP directly into the Delta Plan *if* the Department of Fish and Wildlife approves the BDCP as a Natural Community Conservation Plan under Chapter 10 (commencing with Section 2800) of Division 3 of the California Fish and Game Code and determines that the BDCP meets the specific requirements of Water Code Section 85320 and *if* the BDCP has been approved as a Habitat Conservation Plan (HCP) pursuant to Section 10 of the ESA (16 U.S. Code 1531 et seq.). Because the proposed California WaterFix would not be an HCP/NCCP, it would not be subject to the specific requirements and opportunities established in Sections 85320 through 85322.

intermediate pumping plant; and operations guided by Operational Scenario H (see Table ES-3). The EIR/EIS analyzes the proposed BDCP as Alternative 4.[4] The original CEQA proposed project, as set forth in the Draft EIR/EIS and as embodied in the draft BDCP document published together with the Draft EIR/EIS, would form a major portion of the HCP and NCCP that support applications for take authorization and other permits needed to proceed with implementation of the BDCP.

The BDCP alternatives consist of new diversion/intake structures, water conveyance facilities and associated operational criteria, conservation components to provide habitat restoration, and additional conservation components to reduce other stressors that affect covered species and their habitats in the Plan Area. The BDCP alternatives selected for analysis in the Draft EIR/EIS and incorporated into the Final EIR/FEIS are listed below.

- No Action Alternative
- Alternative 1A—Dual Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario A)
- Alternative 1B—Dual Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario A)
- Alternative 1C—Dual Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario A)
- Alternative 2A—Dual Conveyance with Pipeline/Tunnel and Five Intakes (15,000 cfs; Operational Scenario B)
- Alternative 2B—Dual Conveyance with East Alignment and Five Intakes (15,000 cfs; Operational Scenario B)
- Alternative 2C—Dual Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario B)
- Alternative 3—Dual Conveyance with Pipeline/Tunnel and Intakes 1 and 2 (6,000 cfs; Operational Scenario A)
- Alternative 4—Dual Conveyance with Modified Pipeline/Tunnel and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H): Original Proposed Project and CEQA Preferred Alternative
- Alternative 5—Dual Conveyance with Pipeline/Tunnel and Intake 1 (3,000 cfs; Operational Scenario C)
- Alternative 6A—Isolated Conveyance with Pipeline/Tunnel and Intakes 1–5 (15,000 cfs; Operational Scenario D)
- Alternative 6B—Isolated Conveyance with East Alignment and Intakes 1–5 (15,000 cfs; Operational Scenario D)
- Alternative 6C—Isolated Conveyance with West Alignment and Intakes W1–W5 (15,000 cfs; Operational Scenario D)
- Alternative 7—Dual Conveyance with Pipeline/Tunnel, Intakes 2, 3, and 5, and Enhanced Aquatic Conservation (9,000 cfs; Operational Scenario E)

[4] In February 2012, Alternative 4 included Intakes 1, 2, and 3 and an intermediate pumping plant, along with a set of operational criteria, including provisions for Fall X2. This alternative was updated in the Draft EIR/EIS to reflect the elements introduced in the July 2012 announcement.

- Alternative 8—Dual Conveyance with Pipeline/Tunnel, Intakes 2, 3, and 5, and Increased Delta Outflow (9,000 cfs; Operational Scenario F)
- Alternative 9—Through Delta/Separate Corridors (15,000 cfs; Operational Scenario G)

In December 2014, roughly 5 months after completion of the public review period on the Draft EIR/EIS, state and federal lead agencies, along with the administration of Governor Brown, announced several changes to reduce environmental impacts of the proposed water conveyance facilities. In 2014, the lead agencies made additional modifications to the proposed water conveyance facilities and operations, based on refined engineering analysis and in consideration of feedback received during the 2013 public comment period.

ES.2.1.2 California WaterFix Alternatives Development Process

In spring 2015, the lead agencies assessed whether additional alternatives should be developed in response to other agencies' comments regarding the challenges of meeting the standards required to issue long-term assurances associated with compliance with Section 10 of the ESA and the NCCPA. Comments suggested DWR should pursue permit terms shorter than 50 years because of the levels of uncertainty regarding effectiveness of habitat restoration and the future effects of climate change. Other comments suggested that the proposed water conveyance facilities be separated from the habitat restoration components of the BDCP.

Consistent with this input, the lead agencies analyzed an alternative implementation strategy with three new alternatives presented in the RDEIR/SDEIS, Alternatives 4A, 2D, and 5A. In addition, the RDEIR/SEIS included the December 2014 revisions to Alternative 4; however, this alternative continues to be considered an element of the BDCP. This modified strategy focuses on the conveyance facility improvements necessary for the SWP to address more immediate water supply reliability needs, and allows for other state and federal programs to address the long-term conservation efforts for species recovery through programs separate from Alternatives 4A, 2D, and 5A. Alternatives 4A, 2D, and 5A would enable DWR to construct and operate new conveyance facilities that improve conditions for endangered and threatened aquatic species in the Delta while improving water supply reliability. Constructing and operating the conveyance facilities alone would help resolve many of the concerns with the current south Delta conveyance system, would help reduce conveyance threats to endangered and threatened species in the Delta, and would allow for implementation of habitat restoration projects on an expedited schedule through the state's EcoRestore program. DWR and Reclamation identified Alternative 4A as the preferred alternative and developed Alternatives 2D and 5A to provide for a range of north Delta intake numbers, locations, and operational scenarios.

ES.2.2 BDCP Alternatives

ES.2.2.1 No Action Alternative

CEQ regulations for implementing NEPA require an EIS to include evaluation of a no action alternative (40 Code of Federal Regulations 1502.14). At the lead agencies' discretion under NEPA, the no action alternative may be described as the future circumstances without the proposed action and can also include predictable actions by persons or entities, other than the federal agencies involved in a proposed action, acting in accordance with current management direction or level of management intensity. When the proposed action involves updating an adopted management plan or program, the no action alternative includes the continuation of the existing management plan or program. The CEQ suggests that the no action alternative may provide a benchmark that allows federal decision makers to compare the magnitude of environmental effects of the action alternatives (46 Federal Register [FR] 18026, March 23, 1981).

Under the No Action Alternative, the ITPs related to the proposed BDCP alternatives would not be issued and permit applicants would remain subject to the take prohibition for listed species and other ESA requirements. Ongoing SWP and CVP activities or future actions that may result in the incidental take of federally listed species would need to be permitted through ESA Section 7 or through separate application under Section 10, unrelated to the elements of the alternatives considered in this EIR/EIS. Reclamation would continue to operate the CVP consistent with current management direction based on existing BiOps issued by USFWS (late 2008) and NMFS (early 2009). For the EIR/EIS analysis, the No Action Alternative assumptions are limited to Existing Conditions, programs adopted during the early stages of development of the EIR/EIS, facilities that were permitted or under construction during the early stages of development of the EIR/EIS, projects that are permitted or are assumed to be constructed by 2060, and changes due to climate change that would occur with or without the proposed action or alternatives. These assumptions represent continuation of the existing plans, policies, and operations, as well as conditions that represent continuation of trends in nature.

Because the BDCP No Action Alternative assumptions developed for this EIR/EIS are consistent with the requirements and limitations prescribed by CEQA, the No Action Alternative also represents the no project alternative. Under CEQA, an EIR is required to analyze a no project alternative. The no project alternative allows decision makers to use the EIR to compare the impacts of approving the proposed project with the future conditions of not approving the proposed project. Under CEQA, however, the no project alternative is not the baseline for assessing the significance of impacts of the proposed project. Rather, the “environmental setting” as it exists at the time of issuance of a Notice of Preparation “will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant” (State CEQA Guidelines Section 15125[a]). State CEQA Guidelines Section 15126.6, Subdivision (e)(2) indicates that no project conditions may include some reasonably foreseeable changes in existing conditions and changes that would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. Although the CEQA no project alternative is not the baseline for assessing the significance of impacts, the no project alternative “allow[s] decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (State CEQA Guidelines, § 15126.6[e][1]).

For ease of reference, the joint no action/no project alternative is referred to as the *No Action Alternative*. The No Action Alternative consists of assumptions related to the SWP and CVP, ongoing programs and policies by governmental and nongovernmental entities, projections related to climate change, and assumptions related to annual actions that vary every year. Among the ongoing programs by governmental entities that are included in the No Action Alternative are many of the actions required by the 2008 and 2009 USFWS and NMFS BiOps.

ES.2.2.2 BDCP Action Alternatives

The BDCP action alternatives in the Final EIR/EIS comprise combinations of the following: conservation measures identified in the BDCP conservation strategy that include a proposal for water conveyance facilities, the operation of which is intended to manage the routing, timing, and amount of flow through the Delta while establishing an interconnected system of conservation lands across the Plan Area (CM1–CM3); measures to protect, restore, enhance, and manage physical habitat by expanding the extent and quality of intertidal, floodplain, and other habitats across defined CZs and ROAs (CM2–CM11); and measures to reduce the effect of various ecological stressors on covered species, such as toxic contaminants, nonnative predators, illegal harvest, and nonproject water diversions, many of which are unrelated to operation and conveyance of water through SWP/CVP Delta facilities (CM12–CM21). CM1–CM21 are common to all the BDCP alternatives, with varying designs, locations, and operational scenarios for water conveyance facilities proposed under CM1 and varying amounts of habitat restoration, protection, and enhancement for CM2–CM11. Table ES-3 presents an overview of the action alternatives.

In general, the numbering of the BDCP alternatives in the Final EIR/EIS reflects the fact that three sets of three alternatives share many common elements and only one or a handful of differences. Thus, Alternatives 1A, 1B, and 1C would all involve *dual conveyance* scenarios with a total of 15,000 cfs of capacity operated under Operational Scenario A, developed in early 2010. They differ only in that Alternative 1A would use a pipeline/tunnel, rather than a surface canal, as its major conveyance facility. Alternative 1B would entail an eastside canal, while Alternative 1C would entail a combination of a westside canal and pipeline/tunnel. Similarly, Alternatives 2A, 2B, and 2C would use the same three dual conveyance designs as 1A, 1B, and 1C with a total capacity of 15,000 cfs, but they would be operated under Operational Scenario B rather than Operational Scenario A. Operational Scenario B was developed in early 2011 and reflects a greater degree of input from USFWS, NMFS, and CDFW than does Operational Scenario A. Alternatives 6A, 6B, and 6C represent a similar approach—that is, they use the same respective physical alignments as 1A, 1B, and 1C—but they would constitute an *isolated conveyance* facility with 15,000 cfs of capacity operated under Operational Scenario D, which is a modification of Operational Scenario A that eliminates the use of south Delta intakes. Most action alternatives share the same set of conservation components, with variations incorporated into Alternatives 5, 7, and 9. All action alternatives share the same measures to reduce other stressors.

The *dual conveyance* water delivery system would consist of the new north Delta diversion facilities and the existing SWP/CVP export facilities in the south Delta. The new north Delta diversion would be operated in conjunction with the existing south Delta diversion. Each diversion point (north and south Delta facilities) would have specific operating criteria, and the system as a whole would be required to comply with new and existing water quality and flow criteria.

The *isolated conveyance* water delivery system would consist only of new north Delta diversion facilities. The SWP/CVP south Delta diversion points would no longer be operated. For the SWP, this means DWR would no longer operate the gated intake on Old River, Clifton Court Forebay, and the John E. Skinner Delta Fish Protective Facility. For the CVP, this means Reclamation would no longer operate the diversion point on Old River and the Tracy Fish Collection Facility.

The *through delta/separate corridors* (Alternative 9) water delivery system would convey water from the Sacramento River through the Delta using existing Delta channels for diversion by the SWP and CVP pumping plants.

Table ES-3. BDCP Alternatives in the Final EIR/EIS

Final EIR/FEIS Alternative Number	Conveyance	Conveyance Alignment	Intakes Selected for Analysis	North Delta Diversion Capacity (cfs)	Operations[e]	Conservation Components	Measures to Reduce Other Stressors	Associated NMFS and USFWS Action
1A	Dual[a]	Pipeline/ Tunnel	1, 2, 3, 4, 5	15,000	Scenario A	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
1B	Dual[a]	East	1, 2, 3, 4, 5	15,000	Scenario A	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
1C	Dual[a]	West	West side intakes 1, 2, 3, 4, 5[g]	15,000	Scenario A	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
2A	Dual[a]	Pipeline/ Tunnel	1, 2, 3, 4, 5 (or 1,2, 3, 6, 7)[b]	15,000	Scenario B	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
2B	Dual[a]	East	1, 2, 3, 4, 5 (or 1, 2, 3, 6, 7)[b]	15,000	Scenario B	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
2C	Dual[a]	West	West side intakes 1, 2, 3, 4, 5[g]	15,000	Scenario B	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
3	Dual[a]	Pipeline/ Tunnel	1, 2[i]	6,000	Scenario A	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species

Final EIR/FEIS Alternative Number	Conveyance	Conveyance Alignment	Intakes Selected for Analysis	North Delta Diversion Capacity (cfs)	Operations[e]	Conservation Components	Measures to Reduce Other Stressors	Associated NMFS and USFWS Action
4 (Original CEQA Preferred Alternative)	Dual[a]	Modified Pipeline/ Tunnel	2, 3, 5	9,000	Scenario H	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
5	Dual[a]	Pipeline/ Tunnel	1	3,000	Scenario C	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f]); tidal habitat restoration limited to 25,000 acres	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
6A	Isolated[c]	Pipeline/ Tunnel	1, 2, 3, 4, 5	15,000	Scenario D	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
6B	Isolated[c]	East	1, 2, 3, 4, 5	15,000	Scenario D	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
6C	Isolated[c]	West	West side intakes 1, 2, 3, 4, 5[g]	15,000	Scenario D	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
7	Dual[a]	Pipeline/ Tunnel	2, 3, 5[i]	9,000	Scenario E	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f]); additional 20 linear miles of channel margin habitat enhancement and 10,000 acres of seasonally inundated floodplain	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species

Final EIR/FEIS Alternative Number	Conveyance	Conveyance Alignment	Intakes Selected for Analysis	North Delta Diversion Capacity (cfs)	Operations[e]	Conservation Components	Measures to Reduce Other Stressors	Associated NMFS and USFWS Action
8	Dual[a]	Pipeline/ Tunnel	2, 3, 5[i]	9,000	Scenario F	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species
9	Through-Delta[d]	Through-Delta/ Separate Corridors[d]	Screened intakes at Delta Cross Channel and Georgiana Slough	15,000[d]	Scenario G	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f]); changes in the south Delta[h]	per BDCP Steering Committee Proposed Project (3/25/10 BDCP Steering Committee Handout[f])	Issuance of 50-year Incidental Take Permits for BDCP Covered Species

[a] The *dual conveyance* water delivery system would consist of the new north Delta diversion facilities and the existing SWP/CVP export facilities in the south Delta. The new north Delta diversion would be operated in conjunction with the existing south Delta diversion. Each diversion point (north and south Delta facilities) would have specific operating criteria, and the system as a whole would be required to comply with water quality and flow criteria.

[b] Under Alternatives 2A, 2B, and 2C, a total of five intakes would be constructed and operated. Intake locations 1–5 or 1, 2, 3, 6, and 7 are analyzed for these alternatives.

[c] The *isolated conveyance* water delivery system would consist only of the new north Delta diversion facilities. The SWP/CVP south Delta diversion points would no longer be operated. For the SWP this means the gated intake on Old River, Clifton Court Forebay, and the John E. Skinner Delta Fish Protection Facility would no longer be operated. For the CVP this means the diversion point on Old River and the Tracy Fish Collection Facility would no longer be operated.

[d] The *through-Delta/separate corridors* water delivery system would convey water from the Sacramento River through the Delta using existing Delta channels for diversion by the SWP and CVP pumping plants. While the north Delta diversion capacity associated with this alternative is up to 15,000 cfs, it differs from the other action alternatives in that this capacity would be provided by flows through existing channels.

[e] See Table 3-6 in Chapter 3 for a summary of the individual rules that comprise the operational scenarios and a comparison by scenario and alternative. An overview of operational scenarios is provided in Section 3.4.1.2 while a more detailed description appears in Section 3.6.4.2.

[f] The BDCP Steering Committee Handout of 3/25/10 is available at: < http://baydeltaconservationplan.com/Library/ArchivedDocuments/SteeringCommittee/SteeringCommitteeAgendasAndHandouts.aspx>.

[g] The west side intakes would be located on the west bank of the Sacramento River.

[h] Under this alternative, lands acquired for restoration or enhancement in the south Delta would not be located alongside corridors designated for water supply.

[i] The intake locations listed represent those locations selected for the analysis of each BDCP alternative. Based on the results of an October 2011 workshop on the Phased Construction of North Delta Intake Facilities (see Appendix 3F, *Intake Location Analysis*), different combinations of intakes could be constructed under these alternatives.

ES.2.2.3 Components of the BDCP Action Alternatives

ES.2.2.3.1 Physical Components

The possible water diversion and conveyance facilities that could be included in one or more of the BDCP action alternatives are listed below. Not all components listed would be found in each alternative (see Table ES-4).

Table ES-4. Water Conveyance Facilities Components of BDCP Alternatives

	BDCP Alternative															
Component	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9[c]
New north Delta fish-screened intakes		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New intake pumping plants		X	X	X	X	X	X	X		X	X	X	X	X	X	
New diversion pumping plants																X
New intermediate pumping plant		X	X	X	X	X	X	X		X	X	X	X	X	X	
Use of existing SWP and CVP south Delta intake facilities	X	X	X	X	X	X	X	X	X	X				X	X	X
Operations of North Bay Aqueduct Alternative Intake Project	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Byron Tract Forebay[a]		X	X	X	X	X	X	X		X	X	X	X	X	X	
New consolidated pumping plants at Clifton Court Forebay									X							
Expanded Clifton Court Forebay[b]									X							
Intermediate forebay		X			X			X	X	X	X			X	X	
Primary Conveyance Facility																
Pipelines/tunnels		X		X	X		X	X	X	X	X		X	X	X	
Canals			X	X		X	X					X	X			
Channels	X															X
New operable barrier(s)					X	X	X		X							X
Fish movement and habitat corridor around Clifton Court Forebay																X

[a] *Byron Tract Forebay* refers to proposed forebays both north and south of Clifton Court Forebay.
[b] *Expanded Clifton Court Forebay* refers to modifications to Clifton Court Forebay and expansion on Byron Tract 2.
[c] For Alternative 9, *intakes* refer to fish screens that would divert water into existing Delta channels, specifically, Georgiana Slough and the Delta Cross Channel.

Intakes: Any single action alternative would include the construction of one to five intakes. With the exception of Alternative 9, these intakes would be new on-bank facilities constructed on the Sacramento River between Clarksburg and Walnut Grove. For Alternatives 1C, 2C, and 6C, the intakes would be on the west bank of the river instead of the east bank. Under Alternative 9, intakes would be placed at the Delta Cross Channel and Georgiana Slough. All intakes would be equipped with fish screens designed to protect salmonids and delta smelt and to comply with CDFW and NMFS fish screening criteria.

Pumping plants: These could consist of sedimentation basins, solids handling facilities, transition structures, surge towers, substation(s), transformers, a mechanical room, an access road, and other associated facilities and utilities. Some or all of these facilities would be associated with pumping plants under each action alternative. Alternative 4 pumping plants would be consolidated at Clifton Court Forebay.

Pipelines: Intake pipelines would carry water between intakes and intake pumping plants, while conveyance pipelines would carry water between intake pumping plants and other conveyance facilities such as the tunnels, canals, and forebays. In addition, a combination of pipelines/tunnels would be part of the primary conveyance facilities for Alternatives 1A, 1C, 2A, 2C, 3, 4, 5, 6A, 6C, 7, and 8 (Table ES-4).

Tunnels: Tunnel segments of various length and capacity would be needed to convey water in each of the alternatives, except for Alternative 9. In addition, a combination of pipelines/tunnels would be part of the primary conveyance facilities for Alternatives 1A, 1C, 2A, 2C, 3, 4, 5, 6A, 6C, 7, and 8 (Table ES-4).

Canals: Canals would be unlined (earthen) or lined with concrete. Canal lengths and capacities would vary among alternatives. Canals would be a primary component of the water conveyance structures for Alternatives 1B, 1C, 2B, 2C, 6B, and 6A (Table ES-4).

Forebays: An intermediate forebay would store water between intake facilities and other conveyance features, depending on the alternative (Table ES-4). Byron Tract Forebay would enhance water supply operational flexibility, using forebay storage capacity to regulate flows from north Delta intakes and flows to south Delta pumping plants. Under Alternative 4, the existing Clifton Court Forebay would be expanded and divided to provide a transition between the new conveyance structures and the existing SWP/CVP south Delta export facilities.

Fixed and operable barriers: These would allow the passage of fish, water, and boats through existing Delta channels. Operable barriers would be constructed for the through delta/separate corridors alternative (Alternative 9) and those alternatives using Operational Scenarios B and H (Alternatives 2A, 2B, 2C, 2D and 4).

New levees or levee modifications: These would vary among the action alternatives and would protect new channel fill areas and serve modified channels and intake facility sites.

Culvert siphons: These would convey water under existing channels and between sections of canals (i.e., through tunnels) or other conveyance facilities.

Gates or similar control structures: These structures would control the flow of water through conveyance facilities and facilitate maintenance of conveyance structures under all action alternatives.

Concrete batch plants and fuel stations: These would be built and located side by side at various work sites to support construction under each action alternative. Each batch plant would also require a suitable source of clean water.

Temporary barge unloading facilities: The facilities would be constructed at locations along the alternative alignments for the delivery of construction materials and would be removed following construction.

Other facilities: New bridges to connect existing roads and highways, new access roads, improvements to local drainage systems affected by the alternatives, and other utilities improvements would be constructed to support the function of the new conveyance facilities.

ES.2.3 Alternative Implementation Strategy Alternatives (Non-HCP Alternatives

ES.2.3.1 No Action Alternative ELT

NEPA and CEQA requirements for including a no action and no project alternative in an EIS and EIR are described in Section ES.2.3, *BDCP Alternatives*. For Alternatives 4A, 2D, and 5A, which were described for the first time in the RDEIR/SDEIS, a No Action Alternative baseline condition of 2025 was established because it best reflected the "without project" conditions that would be expected at the end of the water conveyance facilities construction period.

Because the California WaterFix No Action Alternative assumptions are consistent with the requirements and limitations prescribed by CEQA, the NEPA No Action Alternative also represents the CEQA No Project Alternative. The No Action Alternative assumptions include the basic description of the No Action Alternative, assumptions related to the SWP and CVP, ongoing programs and policies by governmental and nongovernmental entities, projections related to climate change, and assumptions related to annual actions that vary every year.

ES.2.3.2 Non-HCP Action Alternatives

ES.2.3.2.1 Alternative 4A (California WaterFix)

Under Alternative 4A, water would primarily be conveyed from the north Delta to the south Delta through tunnels. Water would be diverted from the Sacramento River through three fish-screened intakes on the east bank of the Sacramento River between Clarksburg and Courtland. Water would travel from the intakes to a sedimentation basin before reaching the tunnels. From the intakes, water would flow into an initial single-bore tunnel, which would lead to an intermediate forebay on Glannvale Tract. From the southern end of this forebay, water would pass through an outlet structure into a dual-bore tunnel, in which water would flow by gravity to the south Delta. Water would then reach pumping plants to the northeast of Clifton Court Forebay, where water would be pumped into the north cell of the expanded Clifton Court Forebay. The forebay would be dredged and redesigned to provide an area isolating water flowing from the new north Delta facilities. New siphon and canal connections would be constructed between the north cell of the expanded Clifton Court Forebay and the Harvey O. Banks and C.W. "Bill" Jones Pumping Plants, along with control structures to regulate the relative quantities of water flowing from the north Delta and the south Delta. Alternative 4A would entail the continued use of the SWP/CVP south Delta export facilities. A schematic of Alternatives 4, 4A, 2D, and 5A is provided in Figure ES-3. A map and a schematic diagram depicting the conveyance facilities associated with Alternative 4A are also provided in Figures 3-9 and 3-10 in Chapter 3, *Description of Alternatives*.

Under Alternative 4A, water conveyance facilities would be constructed and maintained identically to those proposed and analyzed under BDCP Alternative 4 (see Table ES-4).

Table ES-5 provides a side-by-side comparison of Alternative 4 with Alternative 4A.

Table ES-5. Comparison of Alternative 4 and Alternative 4A

Element of Project Description	Alternative 4 (BDCP)	Alternative 4A (California WaterFix)
Endangered Species Act compliance	Section 10 (DWR)/Section 7 (Reclamation)	Section 7
California endangered species law compliance	Natural Community Conservation Planning Act	California Endangered Species Act Section 2081(b) permit
Facilities	Modified Pipeline/Tunnel Alignment: three intakes, 9,000 cfs	Modified Pipeline/Tunnel Alignment: three intakes, 9,000 cfs
Operations	Dual Conveyance; Operational Scenarios H1–H4 with Decision Tree (see Chapter 3, Section 3.6.4.2); evaluated at LLT	Dual Conveyance; Operational Scenario H3+ (an operational scenario which includes a criterion for spring outflow bounded by the criteria associated with Operational Scenarios H3 and H4, as described in Chapter 3, Section 3.6.4.2); evaluated as Scenarios H3-H4 at ELT, which is associated with conditions around 2025, in the RDEIR/SDEIS
Conservation Measures/ Environmental Commitments	Conservation Measures 2–21; includes Yolo Bypass Improvements and 65,000 acres of tidal wetland restoration	Environmental Commitments 3, 4, 6, 7, 8, 9, 10, 11, 12, 15, 16; includes up to 295 acres of tidal wetland restoration
CEQA baseline	Existing Conditions	Existing Conditions
NEPA baseline	No Action Alternative at LLT	No Action Alternative at ELT

cfs = cubic feet per second.
ELT = early long-term.
LLT = late long-term.

Although all aspects of water conveyance facility design, construction, and maintenance would be identical to those described for Alternative 4, operational components would be similar, but not identical. Alternative 4A starting operations would be determined through the continued coordination process as outlined in the ESA Section 7 consultation process and CESA Section 2081(b) permit prior to the start of construction. An adaptive management and monitoring program would be implemented to develop additional scientific information during the course of project construction and operations to inform and improve conveyance facility operational limits and criteria. Additionally, operational elements associated with Fremont Weir modifications would not be incorporated as part of this alternative, because Yolo Bypass improvements previously contemplated in the BDCP (under CM2) would not be implemented as part of Alternative 4A; instead, the EIR/EIS assumes Yolo Bypass improvements would be implemented as part of the No Action Alternative because they are required by the existing BiOps (discussed below). Section 3.6.4 in Chapter 3, *Description of Alternatives*, provides a detailed characterization of operational criteria.

Implementation of Alternative 4A would include operation of both new and existing water conveyance facilities, thereby enabling joint management of north and south Delta diversions. Operational limits included in Alternative 4A for south Delta export facilities would supplement the south Delta operations currently implemented in compliance with the USFWS (2008) and NMFS (2009) BiOps. Alternative 4A incorporates existing criteria from the 2008 and 2009 BiOps (including Fall X2), and adds criteria for spring outflow and new minimum flow requirement at Rio Vista from January through August. The north Delta diversions and the head of Old River barrier (HORB) would be new facilities for the SWP and CVP and would be operated consistent with the proposed operating criteria for each of these facilities. SWP and CVP operations would continue to comply with all other criteria included in the USFWS (2008) and NMFS (2009) BiOps and State Water Board Water Right Decision 1641 (D-1641), subject to adjustments made pursuant to the adaptive management process as described in the 2008 and 2009 BiOps. Alternative 4A would provide modified or new operations and criteria of only the following elements.

- North Delta intakes.
- South Delta export facilities (including export rates and OMR flows).
- Head of Old River barrier.
- Delta Cross Channel gate.
- Suisun Marsh facilities.
- North Bay Aqueduct intake.

In addition, additional criteria for spring Delta outflow and a new Rio Vista minimum flow standard for January through August would apply under Alternative 4A.

Alternative 4A operations include a preference for south Delta pumping in July through September to provide limited flushing for improving general water quality conditions and reduced residence times.

To achieve the regulatory standards under ESA Section 7 and CESA Section 2081(b) while also complying with NEPA and CEQA, some of the actions proposed in the conservation strategy for the BDCP would be implemented as Environmental Commitments under Alternative 4A, 2D, or 5A, although on a smaller scale. These Environmental Commitments would mitigate significant environmental effects of the conveyance facilities. These Environmental Commitments consist primarily of habitat restoration, protection, enhancement, and management activities necessary to offset—that is, mitigate—adverse effects resulting from construction of the proposed water conveyance facilities, along with species-specific resources guidelines to ensure that implementation of these commitments would achieve the intended mitigation of impacts. Additionally, pertinent elements previously included as AMMs and the proposed Adaptive Management and Monitoring Program would be applied to the activities proposed under Alternative 4A. These AMMs, too, would serve a mitigation function under CEQA. All of these components would function as de facto CEQA and NEPA mitigation measures for the impacts of constructing and operating Alternative 4A. Chapter 3, Section 3.6.3 describes the Alternative 4A Environmental Commitments.

Portions of the actions contemplated under the BDCP alternatives as CM3, CM4, CM6, CM7, CM8, CM9, CM10, CM11, CM12, CM15, and CM16 would be included in Alternatives 4A, 2D, and 5A, but at different levels. Table ES-6 provides a comparison of the acreages or actions for each environmental commitment proposed for Alternatives 4A, 2D, and 5A.

Table ES-6. Comparison of Environmental Commitments under Alternatives 4A, 2D, and 5A

Environmental Commitments	4A	2D	5A
3: Natural Communities Protection & Restoration			
Valley/Foothill Riparian Habitat	103 acres	120 acres	87 acres
Grassland	1,060 acres	1,078 acres	1,033 acres
Vernal Pool Complex & Alkali Seasonal Wetland Complex	188 acres	188 acres	188 acres
Nontidal Marsh	119 acres	194 acres	119 acres
Cultivated Lands	11,870 acres	13,432 acres	11,301 acres
Total:	**Up to 13,340 acres**	**Up to 15,012 acres**	**Up to 12, 728 acres**
4: Tidal Natural Communities Restoration	Up to 295 acres	Up to 300 acres	Up to 292 acres
6: Channel Margin Enhancement	Up 4.6 levee miles	Up to 5.5. levee miles	Up to 3.1 levee miles
7: Riparian Natural Community Restoration	Up to 251 acres	Up to 293 acres	Up to 213 acres
8: Grassland Natural Community Restoration	Up to 1,070 acres	Up to 1,088 acres	Up to 1,043 acres
9: Vernal Pool & Alkali Seasonal Wetland Complex Restoration	Up to 48 acres	Up to 48 acres	Up to 48 acres
10: Nontidal Marsh Restoration	Up to 832 acres	Up to 1,356 acres	Up to 832 acres
11: Natural Communities Enhancement & Management	At sites protected or restored under Environmental Commitments 3–10	At sites protected or restored under Environmental Commitments 3–10	At sites protected or restored under Environmental Commitments 3–10
12: Methylmercury Management	At sites restored under Environmental Commitment 4	At sites restored under Environmental Commitment 4	At sites restored under Environmental Commitment 4
15: Localized Reduction of Predatory Fishes	At north Delta intakes and at Clifton Court Forebay	At north Delta intakes and at Clifton Court Forebay	At north Delta intakes and at Clifton Court Forebay
16: Nonphysical Fish Barriers	At Georgianna Slough	At Georgianna Slough	At Georgianna Slough

ES.2.3.2.2 Alternatives 2D and 5A

Under Alternatives 2D and 5A, water conveyance facilities would be constructed and maintained similarly to those proposed under Alternative 4 and 4A. However, Alternative 2D would entail five intakes in the same locations as those under Alternative 2A (as shown in Figure 3-7a in Chapter 3, *Description of Alternatives*), rather than three intakes. As proposed for Alternative 4, a new pumping facility would be constructed northeast of the north cell of the expanded Clifton Court Forebay, along with control structures to regulate the relative quantities of water flowing from the north Delta and the south Delta to the Harvey O. Banks and C. W. "Bill" Jones Pumping Plants. All alternatives would entail the continued use of the SWP/CVP south Delta export facilities.

Alternative 5A would include one intake rather than three. Construction of a single intake site (Intake 2) would preclude the need for ancillary facilities and features associated with Intakes 3 and 5. Alternative 5A would not require construction of a single-bore tunnel between Intake 5 and the intermediate forebay. An operable barrier would not be constructed at the head of Old River.

Operational components of the water conveyance facilities under Alternative 2D would be similar, but not identical, to those described under Operational Scenario B in Chapter 3, Section 3.6.4.2, *North Delta and South Delta Water Conveyance Operational Criteria*. Operational elements associated with Fremont Weir modifications would not be incorporated, because Yolo Bypass improvements previously contemplated for Alternative 2A would not be implemented as part of Alternative 2D; instead, the EIR/EIS assumes that Yolo Bypass improvements would be implemented as part of the No Action Alternative because they are required by the existing BiOps.

Implementation of Alternative 2D would include operation of both new and existing water conveyance facilities, thereby enabling joint management of north and south Delta diversions. Operations included in this alternative for south Delta export facilities would supplement the south Delta operations currently implemented in compliance with the USFWS (2008) and NMFS (2009) BiOps. The north Delta intakes and the HORB would be new facilities for the SWP and CVP. Compliance with all other criteria in the USFWS (2008) and NMFS (2009) BiOps and D-1641, including Fall X2, the Delta export: import ratio,[5] as well as operations of the Delta Cross Channel gates and the Suisun Marsh Salinity Control Gates, would continue as part of CVP and SWP operations. When compared with operations under the No Action Alternative, Alternative 2D would provide modified or new operations and criteria of only the following elements.

- North Delta intake facilities.
- South Delta export operations.
- HORB operations.
- Rio Vista minimum flow standard in January through August.

Alternative 2D operations include a preference for south Delta pumping in July through September to provide limited flushing for improving general water quality conditions and reduced residence times.

Operational components of the water conveyance facilities under Alternative 5A would be similar, but not identical, to those described under Operational Scenario C in Chapter 3, Section 3.6.4.2, *North Delta and South Delta Water Conveyance Operational Criteria*. Operational elements associated with Fremont Weir modifications would not be incorporated as part of this alternative, because Yolo Bypass improvements previously contemplated for Alternative 5 (under CM2) would not be implemented as part of Alternative 5A; instead, the EIR/EIS assumes that Yolo Bypass improvements would be implemented as part of the No Action Alternative because they are required by the existing BiOps.

Implementation of Alternative 5A would include operation of both new and existing water conveyance facilities, thereby enabling joint management of north and south Delta diversions. The north Delta intake would be a new facility for the SWP. Compliance with all other criteria included in the USFWS (2008) and NMFS (2009) BiOps and D-1641, including Fall X2, the Delta export: import ratio, as well as operations of the Delta Cross Channel gates and the Suisun Marsh Salinity Control Gates, would continue as part of the operation of the CVP and SWP. When compared with operations under the No Action Alternative, Alternative 5A would provide modified or new operations and criteria of only the following elements.

[5] Another parameter to ensure exports don't harm fish that are migrating down the San Joaquin River.

- North Delta intake facilities.
- Rio Vista minimum flow standard in January through August.

Alternative 5A operations include a preference for south Delta pumping in July through September to provide limited flushing for improving general water quality conditions and reduced residence times.

Portions of the actions contemplated under the BDCP alternatives as CM3, CM4, CM6, CM7, CM8, CM9, CM10, CM11, CM12, CM15, and CM16 would be included in Alternatives 2D and 5A, but at different levels. See Table ES-6 for a comparison of Environmental Commitment implementation.

Table ES-7 provides an overview of Alternatives 4, 4A, 2D, and 5A. Chapter 3, *Description of Alternatives*, provides complete descriptions of these alternatives.

Table ES-7. Comparison of Alternative 4, 2D, 4A, 5A

Alternative	Alignment Option	Conveyance Type	Intake Locations	North Delta Diversion Capacity	Operational Scenario	Federal ESA and CESA Compliance Approach
4	Pipeline/ Tunnel	Dual	2, 3, and 5	9,000 cfs	H	Section 10/NCCP
2D	Pipeline/ Tunnel	Dual	1 through 5	15,000 cfs	B	Section 7/2081(b) permit
4A[a]	Pipeline/ Tunnel	Dual	2, 3, and 5	9,000 cfs	H[b] (see Table ES-5)	Section 7/2081(b) permit
5A	Pipeline/ Tunnel	Dual	2	3,000 cfs	C	Section 7/2081(b) permit

[a] Alternative 4A is the CEQA and NEPA preferred alternative proposed by state and federal lead agencies.

[b] Operational Scenario H for Alternative 4A would not include the operation of the Fremont Weir modification associated with Yolo Bypass improvements because those improvements would not be implemented as part of Alternative 4A. Starting operations may be adjusted through the Endangered Species Act Section 7 and California Endangered Species Act Section 2081(b) permit processes, and an adaptive management and monitoring program would guide future operational limits and criteria. Operational Scenario H for Alternative 4A differs from how it would be applied to Alternative 4 in several key ways. These differences are outlined further in Chapter 3, *Description of Alternatives*.

ES.3 Mitigation and Adaptive Management

ES.3.1 Mitigation Measures, Avoidance and Minimization Measures, and Environmental Commitments

The Final EIR/EIS presents the impacts of the action alternatives and incorporates methods to reduce adverse/significant impacts on the physical and human environment whenever such methods would be feasible to implement. The methods used to reduce impacts consist of 1) modification of potential project designs and construction assumptions to avoid or reduce potential project impacts, 2) incorporation of environmental commitments, AMMs and conservation measures (Environmental Commitments under the non-HCP alternatives) into action alternatives, 3) application of mitigation measures to reduce the effects of alternatives, and 4) use of a collaborative science, monitoring and adaptive management approach to address uncertainties and adjust proposed project implementation as needed to avoid or reduce impacts. This section provides a summary of these methods that would reduce or avoid environmental effects with references to the various locations in the Final EIR/EIS.

ES.3.1.1 Project Definition and Design of Project Elements

The Final EIR/EIS provides analyses that reflect modification of the water conveyance facility designs for Alternative 4 that have also been incorporated into Alternatives 4A, 2D, and 5A. After preparation of the Draft EIR/EIS, design revisions were made to improve the constructability of the proposed conveyance facilities, reduce impacts on sensitive species and resources, avoid and reduce effects on private property owners, and reduce construction costs. Environmental effects have been reduced with the following means.

- Reducing visual and aesthetic resource and land use impacts of north Delta diversion intake pumping plants near the Sacramento River by consolidating and relocating the plants to Clifton Court Forebay.
- Eliminating the realignment of SR 160 at the north Delta diversion intake sites to reduce wetland/riparian impacts on Stone Lakes National Wildlife Refuge.
- Moving tunnel launch shaft sites off Staten Island to reduce effects on greater sandhill cranes and their habitat.
- Changing the location of permanent electric transmission lines to reduce potential effects on bird species and aesthetic and visual resources effects.
- Consolidating reusable tunnel material disposal sites to use more state-owned property and reduce potential agricultural effects.
- Changing the tunnel alignment to terminate at the northeast portion of Clifton Court Forebay on state-owned property.

Additionally, Alternatives 4A, 2D, and 5A have been designed to reduce the land use changes and agricultural land conversion. Please refer to Chapter 3, Section 3.6.1, *Water Conveyance Facility Components* for an overview of the conveyance facility construction design changes.

ES.3.1.2 Environmental Commitments, AMMs and Conservation Measures

The Final EIR/EIS identifies environmental commitments and AMMs, which typically function as best management practices, and other actions that have been incorporated into the action alternatives to avoid and reduce potential environmental impacts. These *environmental commitments* refer to design features, construction methods, and other BMPs that have been incorporated as part of the project description to preclude the occurrence of environmental effects that could arise without such commitments in place. A number of these commitments are similar to one or more of the AMMs described under Section 3.6.2.2, *Measures to Reduce Other Stressors*.

AMMs have been specifically designed to avoid and minimize effects on covered species and natural communities, parallel environmental commitments have been identified in order to recognize the capacity of these practices to avoid or minimize potential impacts related to other environmental topics. Environmental commitments and AMMs that would be incorporated in the project are described in Appendix 3B, *Environmental Commitments, AMMs, and CMs*, included along with a discussion of how the actions would be effective at reducing various environmental effects. These environmental commitments apply to both BDCP alternatives and non-HCP alternatives. These environmental commitments are separate and apart from those Environmental Commitments that are numbered and that are associated with conservation measures.

Conservation measures, which are part of the BDCP alternatives, are intended to offset the biological effects of these alternatives and establish a strategy to improve conditions for covered species.

ES.3.1.3 Mitigation Measures

To meet the requirements of CEQA and NEPA, mitigation measures are recommended in the Final EIR/EIS to reduce significant or adverse impacts of the action alternatives to the extent possible. Mitigation measures are recommended when the project design, environmental commitments, AMMs and conservation measures would not be sufficient to reduce adverse (NEPA) or significant (CEQA) impacts or when these project elements are not relevant to a particular adverse or significant impact. In many cases, mitigation measures are recommended to reduce the effects of conveyance facilities construction on resources located within the conveyance facility alignments. For example, impacts on agriculture, recreation, aesthetics and visual resources, and cultural resources within conveyance facility alignments are identified as significant impacts for which mitigation measures are recommended to reduce the level of impact. In other cases, mitigation measures are proposed to reduce impacts of the conveyance facilities on sensitive receptors or infrastructure, such as in the cases of air quality, noise, transportation, and public services impacts. Although many of the operational effects of the conveyance facilities have been reduced by design of the facility operational criteria and rules, which reflect state and federal requirements of SWP/CVP operation, additional mitigation measures are included for some of the water quality and fish and aquatic resources impacts. In a number of cases, significant impacts are identified for CEQA purposes that cannot be fully mitigated to a less-than-significant level. In all of these cases, mitigation measures are recommend to attempt to reduce the potential impact to the greatest extent possible.

Please refer to Table ES-8 *Summary of BDCP/California WaterFix Final EIR/EIS Impacts and Mitigation Measures*, for a detailed summary of all of the impacts and mitigation measures in the Final EIR/EIS. Full text of the mitigation measures is provided within each resource chapter and in the MMRP. The mitigation measures may be adopted by the lead agencies as part of project approval.

ES.3.2 Adaptive Management and Monitoring Program

Considerable scientific uncertainty exists regarding the Delta ecosystem, including the effects of CVP and SWP operations and the related operational criteria. To address this uncertainty, DWR, Reclamation, CDFW, USFWS, NMFS, collectively called the agencies, are committing to adaptively managing the ongoing operation of the CVP and SWP and future implementation and operation of the California WaterFix. For the purposes of analysis, it is assumed that the Adaptive Management and Monitoring Program (adaptive management program) developed for Alternative 4A would not, by itself, create nor contribute to any new significant environmental effects; instead, the adaptive management program would influence the operation and management of facilities and protected or restored habitat associated with Alternative 4A.

Collaborative science and adaptive management would support the proposed project by helping to address scientific uncertainty where it exists, and as this uncertainty relates to the benefits and impacts of the construction and operations of the new water conveyance facility and existing CVP and SWP facilities. Specifically, agencies would employ collaborative science and adaptive management to develop and use new information and insight gained during the course of project construction and operation to inform and improve the following project aspects.

- Design of fish facilities, including the intake fish screens.
- Operation of the water conveyance facilities under the ESA Section 7 biological opinion and CESA Section 2081(b) permit.
- Habitat restoration and other mitigation measures conducted under the biological opinions and CESA Section 2081(b) permit.

In summary, the broad purposes of the program would be to 1) undertake collaborative science, 2) guide the development and implementation of scientific investigations and monitoring for both permit compliance and adaptive management, and 3) apply new information and insights to management decisions and actions. Each purpose is further described below.

ES.3.2.1 Collaborative Science

The program would provide guidance and recommendations on relevant science related to the operations of the CVP and SWP within the Delta to inform implementation of BiOps for the coordinated operations of the SWP and CVP and the CESA Section 2081(b) permit for the SWP facilities and operations; as well as for the new biological opinion and Section 2081(b) for this proposed project. The collaborative science effort would build on the progress being made by the existing Collaborative Science and Adaptive Management Program (CSAMP) that was established to make recommendations on the science needed to inform implementation of, or potential changes to, the existing BiOps for the SWP and CVP operations. The information from this process will help inform the CWF managers, recommend potential changes in BiOps, and propose alternative management actions. The CSAMP process and its Collaborative Adaptive Management Team rely on the Delta Science Program to provide independent peer review of both science proposals and products.

Collaborative science for the proposed project will have the following primary functions:

- lead active evaluation through studies, monitoring, and testing of current and new hypotheses associated with key water operating parameters, habitat restoration, and other mitigation;
- gather and synthesize relevant scientific information;
- develop new modeling or predictive tools to improve water management in the Delta; and
- inform the testing and evaluation of alternative operational strategies and other management actions to improve performance from both biological and water supply perspectives.

Results from the collaborative science produced under the adaptive management program would inform policymakers from the agencies implementing or overseeing the proposed project. These policymakers would determine whether and how to act on the information within the regulatory contexts of the biological opinions, CESA Section 2081(b) permit, and other relevant authorizations (e.g., USACE permits, State Water Board authorizations).

ES.3.2.2 Monitoring

Monitoring is a critical element of the adaptive management program and a required component of ESA Section 7 biological opinions and CESA Section 2081(b) permits. In addition, monitoring is a critical element of the collaborative science process that informs adaptive management decision-making. The proposed compliance and effectiveness monitoring program for the CESA Section 2081(b) permit is described in Chapter 6 of that permit application. These monitoring programs overlap but have distinct elements owing to their overlapping but distinct species lists.

Monitoring is essential to carry out this collaborative science process.

ES.3.2.3 Management Recommendations, Decisions, and Actions

The adaptive management program also involves developing recommendations for adaptive changes to management actions and monitoring and research consistent with ESA and CESA authorizations through a process of engaging stakeholders, scientists and other relevant groups to collaborate in the development of management and research. The process is intended to address the needs presented by new understanding derived from monitoring, research and synthesis and operations assessment. The options must be science-based and operation-relevant and address the needs and uncertainties that have been identified.

The collaborative science effort is expected to inform operational decisions within the ranges established by the biological opinion and the CESA Section 2081(b) permit for the proposed project. However, if new science suggests that appropriate operational changes may fall outside of the operational ranges evaluated in the biological opinion and authorized by the Section 2081(b) permit, the appropriate agencies would determine whether those changes should be implemented. An analysis of the biological effects of any such changes would be conducted to determine if those effects fall within the range of effects analyzed and authorized under the biological opinion and Section 2081(b) permit.

If it is determined that the new understanding is a significant insight or change in understanding that is relevant to making a change in implementation of management actions, the agencies will then develop management measures, and more effective management approaches and make that recommendation to the agency Directors for approval. These recommendations would be used to make management decisions which may involve a management change through adjustments in water operations, restoration tactics, or monitoring and research support related to the project.

The agencies, based on their authorities related to CVP/SWP (Existing BiOps/CESA, Coordinated Operations Agreement, California WaterFix) as implementing or regulatory agencies, would consider management changes, such as:

- Changes in project operations within BiOps and CESA authorizations, consistent with WQCP.
- Changes in monitoring to support project operations.
- Re-initiation of consultation (ESA Section 7) and 2081(b) permit amendment (CESA) to address changes outside of existing authorizations. In the unlikely event that analysis shows that impacts on water supply are greater than those analyzed in this EIR/EIS, it may be necessary to complete additional environmental review to comply with CEQA or NEPA.

ES.4 Summary of Impacts

This section provides a summary discussion of each major impact for each resource evaluated in the Final EIR/EIS. Each summary is accompanied by an alternatives comparison figure that allows readers to easily compare a specific resource impact across all BDCP and non-HCP alternatives.

Following these summary discussions, a table that summarizes all of the impacts across all alternatives is provided (Table ES-8). The summary table identifies the significance of impacts and mitigation measures that would reduce the impacts. Table ES-8 also identifies the level of impact after mitigation measures are applied.

ES.4.1 Chapter Summaries

In response to public comments regarding the length and complexity of the Draft EIR/EIS, and in order to make the Final EIR/EIS more reader-friendly, summaries of each individual resource chapter are provided here and in the beginning of each resource chapter. The summaries for each chapter include text descriptions and color-coded figures, which discuss and compare a selection of highlighted impacts across all alternatives. These impacts were chosen based on their pertinence to each resource, and because they are quantifiable. In several resource chapters, potential changes due to project alternative implementation were estimated using hydrological modeling and other modeling tools to best demonstrate potential differences relative to the CEQA (Existing Conditions) and NEPA (No Action Alternative) baseline conditions. The figures quantify the selected impacts before mitigation, and depict a range of severity of the impacts across all alternatives, with dark blue indicating the most severe impacts and light blue indicating the least severe impacts. The significance conclusions, after mitigation, are listed as well.

ES.4.1.1 Chapter 5, Water Supply

Figure ES-4 provides information on the magnitude of the most pertinent water supply-related impacts, both adverse and beneficial, that are expected to result from implementation of alternatives. Important impacts to consider include the changes in CVP and SWP deliveries.

As depicted in Figure ES-4, each alternative, including the No Action Alternative, would result in a change to the total annual SWP water deliveries. The greatest negative change would occur under Alternative 8, with a 9% decrease in the average annual total delivery, while the greatest positive change would occur under Alternatives 1A, 1B, 1C, 3, and 4 under Operational Scenario H1, with a 6% increase in average annual total delivery. Alternatives 4A, 2D, and 5A fall in the middle of this range, with no change under Alternative 4A, a 2% increase in deliveries under Alternative 2D, and a 3% increase in deliveries under Alternative 5A.

Each alternative, including the No Action Alternative, would result in a change to the total annual CVP water deliveries. The greatest negative change would occur under Alternative 8, with a 30% decrease in the average annual total delivery, while the greatest positive change would occur under Alternatives 1A, 1B, and 1C, with a 23% increase in average annual total delivery. Alternatives 4, 4A, 2D, and 5A would fall in the middle of this range, with a 17% increase under Alternative 4 (Operational Scenario H1), a 3% decrease under Alternative 4 (Operational Scenario H4), a 5% increase under Alternative 4A, a 15% increase under Alternative 2D, and a 9% increase under Alternative 5A.

ES.4.1.2 Chapter 6, Surface Water

Figure ES-5 provides information on the magnitude of the most pertinent and quantifiable surface water impacts that are expected to result from implementation of alternatives. Important impacts to consider include changes in Sacramento River flood flows, changes in San Joaquin River flood flows, and changes in reverse flow conditions in the Old and Middle Rivers.

As depicted in Figure ES-5, each alternative has an effect on Sacramento River flood flows at Freeport. Under the No Action Alternative, Sacramento River flood flows would increase by 1%. Compared with the No Action Alternative early long-term, Alternatives 4A, 2D, and 5A would increase flood flows at this location by 3%. Under all other alternatives, flood flows would decrease 1% when compared with the No Action Alternative late long-term. The difference is due to the different timeframes for the No Action Alternative.

Under every alternative, San Joaquin River flood flows at Vernalis would increase by less than 1% when compared with the No Action Alternative.

Each alternative would affect reverse flow conditions in the Old and Middle Rivers. The greatest negative effect would occur under Alternative 9, with increases in in reverse flow conditions in all months except June. The greatest positive effect would occur under Alternatives 6A, 6B, 6C, 7, and 8, with no reverse flow conditions. Alternatives 4, 4A, 2D, and 5A would feature some reduction in reverse flow conditions. Under Alternatives 4 and 4A, reverse flows would be reduced in all months except April and May, while under Alternatives 2D and 5A, reverse flows would be reduced in all months except April.

ES.4.1.3 Chapter 7, Groundwater

A summary comparison of important groundwater impacts is provided in Figure ES-6. This figure provides information on the magnitude of the most pertinent and quantifiable groundwater impacts that are expected to result from implementation of alternatives. Important impacts to consider include depletion of groundwater supplies during the construction and operation of the water conveyance facilities.

As depicted in Figure ES-6, each alternative, with the exception of the No Action Alternative and Alternative 9, would reduce local groundwater supplies during the construction of the water conveyance facilities as a result of temporary dewatering. Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 6A, 6B, 6C, and 7 would reduce groundwater levels in the vicinity of intakes by an estimated 10 feet and in the vicinity of Clifton Court Forebay by an estimated 20 feet. Dewatering required to construct Alternatives 3, 4, 5, 8, 4A, 2D, and 5A would result in slightly less impact on the groundwater table than under the other alternatives. Construction of Alternative 9 is not expected to result in adverse impacts on groundwater levels. Groundwater levels would return to preproject conditions within months of dewatering cessation.

Each action alternative would also have impacts on groundwater levels in the water delivery areas during operation of the water conveyance facilities. Under the No Action Alternative, 4,043 thousand acre-feet per year (TAF/year) would be delivered to regions south of the Delta. Among the action alternatives, Alternative 8 would result in the lowest deliveries, at 2,899 total TAF/year, resulting in more groundwater pumping; Alternatives 1A, 1B, and 1C would result in the greatest deliveries, at 4,974 TAF/year, resulting in less groundwater pumping. Alternatives 4, 4A, 2D, and 5A would all result in more deliveries and less groundwater pumping than under the No Action Alternative, by delivering 4,782 TAF/year under Alternative 4 (Operational Scenario H); 4,470 TAF/year under Alternative 4A; 4,886 TAF/year under Alternative 2D; and 4,704 TAF/year under Alternative 5A.

ES.4.1.4 Chapter 8, Water Quality

A summary comparison of important water quality impacts is provided in Figures ES-7a and ES-7b. These figures provides information on the magnitude of the most pertinent water quality-related impacts, both adverse and beneficial, that are expected to result from implementation of the alternatives. Important impacts to consider include the potential for increased electrical conductivity, increased mercury levels in fish, and increased production of *Microcystis* in the Delta.

As depicted in Figure ES-7a, the modeling shows that all action alternatives would exceed the water quality objective for electrical conductivity (EC) in the Sacramento River at Emmaton. Alternatives 1A and 6A would exceed the objective more than the other alternatives. The percentage of days the Emmaton EC objective would be exceeded for the entire period modeled (1976–1991) would increase from 6% under Existing Conditions and 14% under the No Action Alternative late long-term (No Action Alternative LLT) to 31% under Alternative 1A and 32% under Alternative 6A. Alternatives 4A, 2D, and 5A would result in the fewest exceedances of the threshold of 16%, 7%, and 10%, respectively. However, in reality, staff from DWR and Reclamation constantly monitor Delta water quality objectives. Their water system operational decisions take into account real-time conditions and are able to account for many factors that the best available models cannot simulate. It is likely that some of the objective exceedances simulated in the modeling would be avoided under the real-time monitoring and operational paradigm that would be in place to help prevent such exceedances.

Modeling results show that most of the action alternatives, as well as the No Action Alternative, would result in increased mercury levels in fish tissue concentrations at Delta locations. Alternatives 6A and 9 would result in the highest increases in mercury levels in fish tissue, increasing by up to 64% to 66% compared with Existing Conditions at certain Delta locations, and by 58% to 59% compared to the No Action Alternative LLT. Alternative 4A would increase mercury levels by 8% or less compared with Existing Conditions and No Action Alternative Early Long Term (ELT), Alternative 2D would result in a 10% or less increase compared with Existing Conditions and No Action Alternative ELT, and Alternative 5A would result in a 5% or less increase compared with Existing Conditions and No Action Alternative (ELT).

Modeling results show that the action alternatives would result in increased production of *Microcystis* in the Delta compared with the No Action Alternative LLT as a result of a number of factors. Blooms of *Microcystis* require high levels of nutrients and low turbidity, as well as high water temperature and, because the species is fairly slow growing, long residence time (Lehman et al. 2008; Lehman et al. 2013). In addition, low vertical mixing (due to low water flow) associated with high residence time allows *Microcystis* colonies to float to the surface of the water column, where they outcompete other species for light. Increases in ambient air temperatures due to climate change relative to Existing Conditions are expected under all action alternatives. Increases in ambient air temperatures are expected to result in warmer ambient water temperatures, and thus conditions more suitable to *Microcystis* growth, in the water bodies of the SWP/CVP Export Service Areas. The incremental increase in long-term average air temperatures would be less at the ELT (2.0°F) than at the LLT (4.0°F). For Figure ES-7b, *Microcystis* predictions were ranked qualitatively, based on a combination of these factors. Lower numbers (e.g., 1 or 2) signify less suitable conditions for *Microcystis* blooms than higher numbers indicate (e.g., 4 or 5). Alternatives 4A, 2D, and 5A, when compared to the No Action Alternative ELT, would have a ranking of 2 because operations and the ELT timeframe under those alternatives would lead to less suitable conditions for *Microcystis* to bloom. The BDCP alternatives would have a ranking of 4, with the exception of Alternative 5, which would result in a ranking factor of 3; these alternatives would provide more suitable conditions for *Microcystis* to bloom.

Additional impacts discussed in the summary table include bromide concentrations, chloride levels, and increases in organic carbon and selenium.

ES.4.1.5 Chapter 9, Geology and Seismicity

A summary comparison of important geologic impacts is provided in Figure ES-8. This figure provides information on the magnitude of both adverse and beneficial geologic impacts that are expected to result from implementation of the alternatives. Important impacts to consider include the loss of property or likelihood of personal injury or death as a result of settlement caused by dewatering during construction of water conveyance facilities.

Each alternative, with the exception of the No Action Alternative, would have conveyance segments that pose a greater risk of settlement than do Existing Conditions. Six segments would be at risk under Alternatives 1B, 2B, and 6B, whereas only one segment would be at risk under Alternatives 1C, 2C, and 6C. Alternative 4A would fall within this range, with two segments at risk.

ES.4.1.6 Chapter 10, Soils

A summary comparison of important soil impacts is provided in Figure ES-9. This figure includes information on the magnitude of the most pertinent and quantifiable soil impacts that are expected to result from implementation of the alternatives. Important impacts to consider include loss of topsoil from excavation, overcovering, and inundation associated with construction of water conveyance facilities and loss of topsoil from excavation, overcovering, and inundation associated with restoration activities.

As depicted in Figure ES-9, topsoil loss would be significant and unavoidable for each alternative, with the exception of the No Action Alternative. During construction of the water conveyance facilities, Alternative 1B, 2B, and 6B would result in the greatest loss of topsoil, at 21,832 acres, whereas Alternatives 4 and 4A would result in the a loss of 7,590 acres of topsoil. Alternative 2D would result in slightly more than 7,590 acres of lost topsoil because of construction of two more intakes than Alternatives 4 and 4A would have. Alternative 5A would affect slightly less than 7,590 acres because of construction of only one intake.

During restoration activities, Alternative 7 would result in the greatest loss of topsoil, with a total of 87,600 acres lost, and Alternative 5 would result in the least amount of topsoil loss, with slightly less than 77,600 acres affected.

ES.4.1.7 Chapter 11, Fish and Aquatic Resources

Figure ES-10 differs slightly from the other summary figures. To produce the color results in Figure ES-10 for upstream effects, CALSIM and water temperature model outputs were examined for each life stage (spawning, rearing, and migration) and a category (no, small, moderate, and strong biologically meaningful effects) was assigned for each life stage. The resulting category was the combination of flows and water temperatures in all upstream locations where a fish species could be present and during the months of year when the species could be present by water year type. In the most extreme case of steelhead, the determination for each impact for an alternative was based on combining effects of five water types for 12 months at 10 model output locations in seven waterways. These categories for the three life stages were then combined with no weighting.

The alternatives could affect the upstream life stages of salmonid and sturgeon species, specifically, spawning and egg incubation, larval and juvenile rearing, and juvenile and adult migration. These life stages could be affected by the alternatives through changes in reservoir storage releases, which can affect patterns in flow and water temperatures in upstream waterways.

Figure ES-10 also presents CEQA and NEPA determinations, although they may not be entirely consistent with categorical results for flow and temperature effects for three reasons. First, these determinations were based on biological models in addition to flow and water temperature model outputs. Second, because NEPA determinations were weighted evenly across life stages, some nuances may not be apparent. Third, when a NEPA determination was not adverse and the CEQA determination appeared significant, the CEQA determination was informed by results of the NEPA determination because, unlike the NEPA baseline (No Action Alternative), the model results for the CEQA baseline (Existing Conditions) did not include the effects of climate change. By comparing an alternative to the NEPA baseline, the effect of the alternative can be isolated from that of climate change because the effects of climate change are in both the alternative and the NEPA baseline. Therefore, the CEQA categorical results in Figure ES-10 did not include information from NEPA results and look more negative than those in the NEPA/CEQA determinations.

For winter-run Chinook salmon, under NEPA, flow and water temperature-related effects would range from no effect for Alternatives 4–4A, 5–5A, 6A–6C, 7, and 9, to moderate biologically meaningful effects for Alternatives 1A–1C, 2A–2C, and 3. There would also be small negative effects for Alternatives 2D and 8. Under CEQA, effects would all be negative and would be of small magnitude for Alternatives 2D, 4–7 (including 4A and 5A) and 9, and of moderate magnitude for Alternatives 1A–1C, 2A–2C, 3, and 8.

For spring-run Chinook salmon, under NEPA, there would be no biologically meaningful effects resulting from Alternatives 2A–2D, 4–7 (including 4A and 5A), and 9, and small negative effects resulting from Alternatives 1A–1C, 3, and 8. Under CEQA, effects would all be negative and would be of small magnitude for Alternatives 2D, 4–7 (including 4A, and 5A) and 9, and of moderate magnitude for Alternatives 1A–1C, 2A–2C, 3, and 8.

For steelhead, under NEPA, there would be no biologically meaningful effects resulting from Alternatives 1A–1C, 2D, 4–7 (including 4A and 5A), and 9, and small negative effects resulting from Alternatives 2A–2C, 3, and 8. Under CEQA, effects would all be negative and would be of small magnitude for Alternatives 1A–1C, 2D, 3, 4, 4A, 5A, 7, and 9, and moderate magnitude for Alternatives 2A–2C, 5, 6A–6C, and 8.

For green sturgeon, under NEPA, there would be no biologically meaningful effects resulting from Alternatives 2A–2D, 4–7 (including 4A and 5A), and 9, and small negative effects resulting from Alternatives 1A–1C, 3, and 8. Under CEQA, effects would range from no effect of Alternative 5 to moderate negative effects resulting from Alternatives 3 and 4. There would be small negative effects resulting from Alternatives 1A–1C, 2A–2D, 4A, and 5A–9.

ES.4.1.8 Chapter 12, Terrestrial Biological Resources

Figure ES-11 provides a summary comparison of important terrestrial biological impacts. This figure provides information on the magnitude of both adverse and beneficial terrestrial biological impacts that are expected to result from implementation of the alternatives. An important impact to consider is the loss of specific natural community land types because of water conveyance facility construction.

As depicted in Figure ES-11, construction of the water conveyance facilities would have direct effects on natural communities and cultivated lands in the terrestrial biological resources study area. For the tidal freshwater emergent wetland natural community, Alternative 9 would affect the greatest acreage at 194 acres, while Alternatives 4A, 2D, and 5A would affect the least, at 1 acre. The west alignments (Alternatives 1C, 2C,and 6C) would affect 10 acres, while the other alternatives would affect between 18 and 33 acres. For the valley/foothill riparian natural community, Alternative 9 would affect the greatest acreage at 1,116 acres, while Alternatives 4A, 2D, and 5A would affect the least, ranging from 52 to 55 acres. The other alternatives would affect approximately 900 acres. For the nontidal freshwater perennial emergent wetlands natural community, Alternative 9 would affect the greatest acreage at 150 acres, while Alternatives 4A, 2D, and 5A would affect the least, at 3 acres. The other alternatives would affect close to 130 acres. For the vernal pool complex natural community, Alternatives 1C, 2C, and 6C would affect the greatest acreage, at 438 acres, while Alternatives 4A, 2D, and 5A would affect the least, at 44 acres. The other alternatives would affect close to 375 acres.

Construction of the water conveyance facilities of any action alternative would also require fill of wetlands and other waters of the United States. The greatest amount of fill would result from implementation of Alternative 9, at 1,004 acres, while Alternative 5 would result in fill of the least, at 355 acres. Alternatives 4 and 4A are roughly in the middle, requiring 698 acres of fill. The pipeline/tunnel alignments would affect approximately 400 acres, while the east and west alignments would affect approximately 800 acres.

ES.4.1.9 Chapter 13, Land Use

A summary comparison of important land use impacts is provided in Figure ES-12. This figure provides information on the magnitude of the most pertinent and quantifiable land use impacts, both adverse and beneficial, that are expected to result from implementation of the alternatives. Important impacts to consider are conflicts with existing land uses as a result of constructing the proposed water conveyance facilities.

As depicted in Figure ES-12, construction of the proposed water conveyance facilities of each action alternative would result in incompatibilities with applicable land use designations, goals, and policies. Alternatives 1B, 2B, and 6B would result in the most acreage with incompatibilities, with close to 22,000 acres. Alternative 9 would result in the fewest acres with incompatibilities, with 4,884 acres. Alternatives 4 and 4A would fall somewhere in the middle, with 7,957 acres of incompatible land.

Conflicts with existing structures would be a significant and unavoidable/adverse effect under each alternative, with the exception of the No Action Alternative ELT and LLT. Alternatives 1C, 2C, and 6C would have the greatest impact, peaking at 726 conflicts with existing structures, whereas Alternatives 4, 4A, and 5A would result in the least impact, with 85 conflicts with existing structures.

ES.4.1.10 Chapter 14, Agriculture

Figure ES-13 provides information on the magnitude of the most pertinent and quantifiable agricultural impacts that are expected to result from implementation of the alternatives. Important impacts to consider include the conversion of land classified as Important Farmland and farmland under Williamson Act contracts or in Farmland Security Zones on a temporary or permanent basis.

As depicted in Figure ES-13, each alternative would result in the permanent conversion of Important Farmland. The greatest amount of permanent farmland conversion would result from Alternative 2B, at 18,868 acres, followed by Alternatives 1B and 6B, at 18,875 acres. The No Action Alternative would result in the least permanent conversion of Important Farmland, at 65 acres. Among the action alternatives, Alternative 9 would result in the least permanent conversion, at 2,459 acres. The amount of farmland permanently that would be converted under Alternatives 4, 4A, 2D, and 5A falls in the lower middle portion of this range, at 3,909 acres for Alternatives 4 and 4A, 4,040 acres for Alternative 2D, and 3,452 acres for Alternative 5A.

Important Farmland would be converted temporarily under each alternative. The greatest amount of temporary farmland conversion would result from Alternatives 1C, 2C, and 6C, at 3,170 acres. The least amount of temporary farmland conversion would result from the No Action Alternative, at 40 acres. Among the action alternatives, Alternative 9 would result in the least temporary conversion of Important Farmland, at 559 acres. The amount of farmland converted temporarily under Alternatives 4, 4A, 2D, and 5A would fall in the lower middle portion of this range, at 1,495 acres for Alternatives 4 and 4A, 981 acres for Alternative 2D, and 902 acres for Alternative 5A.

Each alternative would result in the permanent conversion of Williamson Act farmland or farmland in a Farmland Security Zone. Alternative 2B would result in the greatest permanent conversion of protected farmland, at 14,125 acres. The No Action Alternative would result in the least permanent conversion of protected farmland, at 30 acres. Among the action alternatives, Alternative 5A would permanently convert the least amount of protected farmland, at 1,836 acres. Alternatives 4, 4A, and 2D would fall in the lower end of this range, at 2,035 acres for Alternatives 4 and 4A and 1,994 acres for Alternative 2D.

Each alternative would result in the temporary or short-term conversion of Williamson Act farmland and farmland in a Farmland Security Zone. Alternative 2B would have the greatest temporary affect on protected farmland, at 1,877 acres. The No Action Alternative would temporarily affect the least amount of protected farmland, at 415 acres. Among the action alternatives, Alternative 5A would temporarily affect the least amount of protected farmland, at 617 acres. The amount of protected farmland that would be temporarily converted under Alternatives 4, 4A, and 2D falls in the middle of this range, at 1,132 acres for Alternatives 4 and 4A and 657 acres for Alternative 2D.

The conversion of Williamson Act contracted farmland or land in a Farmland Security Zone would involve not only the direct effect on the land resources, but also may create conflicts with the use restrictions that the contracts or Farmland Security Zones impose. Project activities in Farmland Security Zones are more likely to create compatible use conflicts.

ES.4.1.11 Chapter 15, Recreation

Figure ES-14 provides a summary comparison of important recreation. This figure provides information on the magnitude of the most pertinent and quantifiable recreation impacts that are expected to result from implementation of the alternatives. Important impacts to consider include displacement of existing recreation facilities and the reduction of recreation opportunities.

As depicted in Figure ES-14, construction of some alternatives would result in the displacement of existing well-established recreation facilities available for public access. Alternative 9 would result in the greatest number of recreation sites (six) displaced by the water conveyance facilities. Alternatives 1A, 1C, 2A, 2B, 2C, 3, 5, 6A, 6C, 7, and 8 would result in the displacement of no recreation sites. Alternatives 4, 4A, 2D, and 5A would result in the displacement of two recreation sites.

Each alternative, with the exception of the No Action Alternative, would reduce recreation opportunities at some sites as a result of the construction of the water conveyance facilities. Alternatives 1B, 2B, and 6B would result in the greatest number of sites (18) with reduced opportunities. Alternative 9 would result in the lowest number of sites (three) with reduced opportunities. Alternatives 4, 4A, 2D, and 5A would result in the reduction of recreation opportunities at eight sites.

ES.4.1.12 Chapter 16, Socioeconomics

Figure ES-15 provides a summary comparison of important socioeconomic impacts. This figure provides information on the magnitude of the most pertinent and quantifiable socioeconomic impacts, both adverse and beneficial, that are expected to result from implementation of the alternatives. Important impacts to consider include changes in employment and income, and impacts on agricultural economics.

As depicted in Figure ES-15, regional employment and income would benefit from each action alternative. During construction, Alternative 1B would result in the greatest annual increase in employment and income, peaking at 12,985 construction-related jobs, whereas Alternative 5 would result in the lowest annual increase in employment, with 3,059 construction-related jobs at its lowest year. Construction-related employment under Alternative 4A would peak at 8,673 jobs. During operations and maintenance, Alternatives 1B, 2B, and 6B would result in the greatest increase in employment, with a total of 294 full-time equivalent (FTE) jobs, and Alternative 4A would increase employment by 183 jobs. Alternative 9 would result in the fewest operation and maintenance jobs, with 177 jobs. Alternatives 4A, 4, 2D, and 5A would bring 183 operations and maintenance jobs.

Each alternative, with the exception of the No Action Alternative, would result in permanent losses in agricultural employment as a result of the conversion of agricultural lands necessary to construct water conveyance facilities. During construction, Alternatives 1B, 2B, and 6B would result in the greatest permanent losses, estimated at 340 jobs, whereas Alternatives 9 and 5A would result in fewest losses, estimated at 38 and 37 jobs, respectively. Alternatives 4 and 4A would result in the loss of 47 jobs. During operations and maintenance, Alternatives 1B, 2B, and 6B would result in the greatest permanent losses at 321 agricultural jobs, and Alternatives 4, 9, 4A, 2D, and 5A would result in the smallest loss of agricultural jobs, 39.

Each alternative would result in a loss of agricultural cropland due to construction, and operation and maintenance of the conveyance facilities. During construction, Alternatives 1B, 2B, and 6B would result in the largest loss of agricultural cropland, 19,600 acres. Alternative 9 would result in the smallest loss, 2,600 acres. Alternatives 4, 4A, 2D, and 5A would result in a loss of 4,700 acres. During operation and maintenance of the project, Alternatives 1B, 2B, and 6B would result in the largest loss of cropland, 17,700 acres. Alternative 9 would result in the smallest, 2,900 acres of lost cropland. Alternative 4A, along with 2D, 5A, and 4 would result in a loss of 3,400 acres of cropland.

ES.4.1.13 Chapter 17, Aesthetics and Visual Resources

A summary comparison of important aesthetic impacts is provided in Figure ES-16. This figure provides information on the magnitude of both adverse and beneficial aesthetic impacts that are expected to result from all alternatives. An important impact to consider is the permanent impact on visual resources after the completion of construction of water conveyance facilities.

As depicted in Figure ES-16, construction of the water conveyance facilities would result in effects on viewers. Implementation of Alternatives 1A, 2A, 3, 5, 6A, 7, or 8 would result in the greatest number of effects, with 16 effects deemed "very noticeable," one "noticeable" effect, and three "moderately noticeable" effects. Alternative 5A would result in the fewest overall effects, with six very noticeable effects and two moderately noticeable effects. Effects on visual resources under Alternatives 4, 4A, and 2D would fall roughly in the middle, with 10 very noticeable effects and two moderately noticeable effects under Alternatives 4 and 4A, and 13 very noticeable effects and two moderately noticeable effects under Alternative 2D.

ES.4.1.14 Chapter 18, Cultural

A summary comparison of important cultural impacts is provided in Figure ES-17. This figure provides information on the magnitude of the most pertinent and quantifiable cultural impacts, both adverse and beneficial, that are expected to result from implementation of the alternatives. Important impacts to consider include effects on known archaeological sites, and impacts on historic structures.

As depicted in Figure ES-17, each alternative would affect known archeological sites. Alternative 1B would affect the most archeological sites, 17 sites, whereas Alternative 9 would affect the fewest archaeological sites, 4 sites. Alternatives 4, 4A, and 2D would affect 10 known sites, while Alternative 5A would affect 7 sites.

Each alternative, including the No Action Alternative, would result in effects on historic structures during construction of the water conveyance facilities. Alternatives 1A, 1B, 2A, 2B, and 6A–6C would affect the most historic structures, 24 structures, whereas Alternative 9 would result in the fewest effects, 10 structures. Alternatives 4, 4A, 2D, and 5A would fall in the middle, affecting 13 structures.

ES.4.1.15 Chapter 19, Transportation

A summary comparison of important transportation impacts is provided in Figure ES-18. This figure provides information on the magnitude of the most pertinent and quantifiable transportation impacts that are expected to result from implementation of the alternatives. Important impacts to consider include effects on levels of service, exacerbation of unacceptable pavement conditions, disruption of marine traffic due to use of barges for construction, and increased traffic volumes during implementation of restoration measures.

As depicted in Figure ES-18, each alternative, including the No Action Alternative, would result in unacceptable level of service conditions on roadway segments in and around the water conveyance facilities construction sites. Among action alternatives, the greatest number of roadway segments would be affected under Alternatives 1C, 2C, 6C, and 9, each affecting 56 separate roadway segments. Among action alternatives, Alternative 5A would affect the smallest number of roadway segments, 33 segments. Alternatives 4 and 4A would affect 38 segments, while Alternative 2D would affect 45 roadway segments.

Each alternative, including the No Action Alternative, would contribute to unacceptable pavement conditions on roadway segments. The No Action Alternative would result in the greatest contribution, with 61 roadway segments affected. Among action alternatives, Alternatives 1B, 2B, and 6B would result in the greatest exacerbation of unacceptable pavement conditions, 48 segments. The least exacerbation would result under Alternative 2D, 41 segments. Alternatives 4 and 4A would exacerbate conditions on 46 segments, while Alternative 5A would affect slightly fewer segments, 42.

Each alternative, with the exception of the No Action Alternative, would require use of barge traffic and unloading facilities. The greatest number of barge unloading facilities would be needed under Alternative 4, at eight facilities. The smallest number of barge facilities would be needed under Alternatives 1B, 1C, 2B, 2C, 6B, 6C, and 9, with only one unloading facility. Alternatives 4A, 2D, and 5A would each require two unloading facilities. Alternatives 1A, 2A, 3, 5, 6A, 7, and 8, would require the smallest number of barge trips, 3,000 trips. Alternatives 4, 4A, 2D, and 5A would require the most barge trips, 5,500 trips.

ES.4.1.16 Chapter 20, Public Services and Utilities

A summary comparison of important impacts on public services and utilities is provided in Figure ES-19. This figure provides information on the magnitude of the most pertinent and quantifiable impacts on public services and utilities that are expected to result from implementation of the alternatives. Important impacts to consider include the number of transmission lines, pipelines, aqueducts, or wells affected, and the number of miles of agricultural canals affected.

As depicted in Figure ES-19, all action alternatives would affect regional or local utilities. Alternative 1C, 2C, and 6C would affect the greatest amount of transmission lines, pipelines, aqueducts, or wells, at 34, whereas Alternative 9 would result in the smallest number of public services and utilities affected, at 6. Thirty public services and utilities would be affected under Alternative 4, 4A, 2D, and 5A.

Each alternative, with the exception of the No Action Alternative, would adversely affect agricultural canals as a result of water conveyance facilities construction. Alternatives 1B, 2B, 6B and would result in the greatest number of miles affected, estimated at 136, 138, and 136 miles, respectively, whereas Alternative 9 would result in fewest miles affected, at 27.

ES.4.1.17 Chapter 21, Energy

A summary comparison of important energy impacts is provided in Figure ES-20. This figure provides information on the magnitude of the most pertinent and quantifiable energy impacts that are expected to result from implementation of the alternatives. Important impacts to consider include the energy needed to construct the water conveyance facilities as well as the energy required to operate the facilities.

As depicted in Figure ES-20, each alternative, with the exception of the No Action Alternative, would require use of electric energy during the construction of the water conveyance facilities. Among the action alternatives, Alternative 9 would require the least energy for construction, 186 gigawatt hours [GWh]). Alternative 2D would require the most electric energy, 2,148 GWh. Alternatives 4, 4A, and 5A would require a similar amount of electric energy, 2,132 GWh for Alternatives 4 and 4A and 2,116 GWh for Alternative 5A.

Each alternative would require an increased amount of electric energy for the operation of the proposed conveyance facilities, compared to the No Action Alternative and Existing Conditions. Among the action alternatives, Alternative 9 would require the least electric energy for operation, 18 GWh per year (GWh/yr). Alternative 6A would require the most electric energy, 421 GWh/yr. Alternatives 4, 4A, 2D, and 5A would fall in the low end of this range, with Alternative 4 requiring up to 62 GWh/yr under Operational Scenario H4, Alternative 4A requiring 61 GWh/yr, Alternative 2D requiring 107 GWh/yr, and Alternative 5A requiring 26 GWh/yr.

ES.4.1.18 Chapter 22, Air Quality and Greenhouse Gas Emissions

A summary comparison of important air quality impacts is provided in Figures ES-21a, b, and c. These figures provide information on the magnitude of the most pertinent and quantifiable air quality impacts that are expected to result from implementation of the alternatives within the four air quality management districts with jurisdiction over different portions of the overall project area. Important impacts to consider include the maximum daily emissions of nitrous oxides (NO_X), exposure to health hazards from localized particulate matter, and exposure to health hazards from diesel particulate matter.

As depicted in Figures ES-21a, b, and c, construction of the proposed water conveyance facility would result in an increase of daily NO_X emissions under each action alternative across four air quality management districts. The highest maximum daily NO_X emissions within the Sacramento Metropolitan Air Quality Management District (SMAQMD) would result from Alternatives 1A, 2A, and 6A, at 4,992 pounds per day, followed by Alternative 9 at 4,980 pounds per day. The lowest maximum daily NO_X emissions within SMAQMD would result from Alternatives 1C, 2C, and 6C, with 684 pounds per day. Maximum emissions under Alternatives 4 and 4A would be in the lower middle portion of this range, with 1,273 pounds per day. Maximum emissions under Alternative 5A would be similar, with 1,230 pounds per day, while maximum emissions under Alternative 2D would be in the higher middle range, with 3,573 pounds per day.

The highest maximum daily NO_X emissions within the Yolo-Solano Air Quality Management District (YSAQMD) would result from Alternatives 1C, 2C, and 6C, with maximum daily emissions of 3,620 pounds per day. The lowest NO_X emissions would result under Alternatives 4, 5, 4A, and 5A, with maximum daily NO_X emissions of 124 to 174 pounds per day.

The highest maximum daily NO_X emissions within the Bay Area Air Quality Management District (BAAQMD) would result from Alternatives 1C, 2C, and 6C, with maximum daily emissions of 3,619 pounds per day. The lowest NO_X emissions would result from Alternatives 1B, 2B, 3, 5, 6B, 7, and 8, with 909 to 960 pounds per day. Alternatives 4 and 4A would fall in the middle of this range, resulting in maximum daily NO_X emissions of 1,700 pounds per day within the BAAQMD.

The highest maximum daily NO_X emissions within the San Joaquin Valley Air Pollution Control District (SJVAPCD) would result from Alternative 1B, with maximum daily emissions of 327 pounds per day. The lowest NO_X emissions would result from Alternative 9, with 69 pounds per day. Alternatives 4A, 2D, 5A, and 4, would result in maximum daily NO_X emissions of 112 pounds per day within the SJVAPCD.

Each alternative, with the exception of the No Action Alternative, would increase exposure of sensitive receptors to health hazards from localized particulate matter (PM, which consists of PM 10 microns in diameter or less [PM10] and PM 2.5 microns in diameter or less [PM2.5]). Within the SMAQMD, the greatest exposure would result from Alternative 9, with predicted maximum PM10 concentrations of 2.9 micrograms per cubic meter ($\mu g/m^3$) annually and 131 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.45 $\mu g/m^3$ annually and 21 $\mu g/m^3$ daily. The least exposure would result from Alternatives 1C, 2C, and 6C, with predicted maximum PM10 concentrations of 0.13 $\mu g/m^3$ annually and 6.7 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.002 $\mu g/m^3$ annually and 1.13 $\mu g/m^3$ daily. Alternatives 4, 4A, 2D, and 5C would be in the middle of this range, with maximum PM10 concentrations of 0.4 $\mu g/m^3$ annually and 3.2 $\mu g/m^3$ daily under Alternatives 4, 4A, and 5A, and 0.5 annually and 11 daily under Alternative 2D. The maximum PM2.5 concentrations would be 0.06 $\mu g/m^3$ annually and 0.52 $\mu g/m^3$ daily under Alternatives 4, 4A, and 5A, and 0.09 $\mu g/m^3$ annually and 1.7 $\mu g/m^3$ daily under Alternative 2D.

Within the YSAQMD, the greatest exposure of sensitive receptors to health hazards from localized PM would result from Alternatives 4 and 4A, with predicted maximum PM10 concentrations of 0.6 $\mu g/m^3$ annually and 2.5 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.01 $\mu g/m^3$ annually and 0.4 $\mu g/m^3$ daily. The lowest exposure would result from Alternatives 1B, 2B, and 6B, with predicted maximum PM10 concentrations of 0.2 $\mu g/m^3$ annually and 6.6 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.03 $\mu g/m^3$ annually and 1.1 $\mu g/m^3$ daily.

Within the BAAQMD, the greatest exposure of sensitive receptors to health hazards from localized PM would result from Alternatives 1C, 2C, and 6C, with predicted maximum PM10 concentrations of 1.1 $\mu g/m^3$ annually and 108 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.2 $\mu g/m^3$ annually and 19 $\mu g/m^3$ daily. The lowest exposure would result from Alternatives 4, 4A, 2D, and 5A, with predicted maximum PM10 concentrations of 0.21 $\mu g/m^3$ annually and 37 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.04 $\mu g/m^3$ annually and 6 $\mu g/m^3$ daily; and under Alternative 9, with predicted maximum PM10 concentrations of 0.2 $\mu g/m^3$ annually and 18 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.05 $\mu g/m^3$ annually and 4 $\mu g/m^3$ daily.

Within the SJVAPCD, the greatest exposure of sensitive receptors to health hazards from localized PM would result from Alternatives 1B, 2B, and 6B, with predicted maximum PM10 concentrations of 0.7 $\mu g/m^3$ annually and 88 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.1 $\mu g/m^3$ annually and 13 $\mu g/m^3$ daily. The lowest would result from Alternatives 4, 4A, 2D, and 5A, with predicted maximum PM10 concentrations of 0.09 $\mu g/m^3$ annually and 6.9 $\mu g/m^3$ daily, and predicted maximum PM2.5 concentrations of 0.02 $\mu g/m^3$ annually and 1.1 $\mu g/m^3$ daily.

Each alternative, with the exception of the No Action Alternative, would increase exposure of sensitive receptors to health hazards from diesel particular matter. Within the SMAQMD, the greatest exposure would result from Alternatives 1A, 1B, 2A, 2B, 6A, and 6B, with a chronic health hazard assessment of 0.003 and cancer health risk maximum of 9 parts per million. The least exposure would result from Alternatives 1C, 2C, and 6C, with a chronic health hazard assessment of 0.001 and cancer health risk maximum of 3 parts per million. Alternatives 4, 4A, 2D, and 5A would fall in the middle of this range, with a chronic health hazard assessment of 0.001 and 5 parts per million under Alternatives 4, 4A, and 2D, and less risk under Alternative 5A.

Within the YSAQMD, the greatest exposure of sensitive receptors to health hazards from diesel particular matter would result from Alternatives 1C, 2C, and 6C, with a chronic health hazard assessment of 0.003 and cancer health risk maximum of 9 parts per million. The least exposure would result from Alternatives 4, 4A, 2D, and 5A, with a chronic health hazard assessment of 0.0003 and cancer health risk maximum of 1 parts per million.

Within the BAAQMD, the greatest exposure of sensitive receptors to health hazards from diesel particular matter would result from Alternative 9, with a chronic health hazard assessment of 0.019 and cancer health risk maximum of 57 parts per million. The least exposure would result from Alternatives 4, 4A, 2D, and 5A, with a chronic health hazard assessment of 0.001 and cancer health risk maximum of 5 parts per million.

Within the SJVAPCD, the greatest exposure of sensitive receptors to health hazards from diesel particular matter would result from Alternatives 1C, 2C, and 6C, with a chronic health hazard assessment of 0.006 and cancer health risk maximum of 18 parts per million. The least exposure would result from Alternatives 4, 4A, 2D, and 5A, with a chronic health hazard assessment of 0.0008 and cancer health risk maximum of 3 parts per million.

ES.4.1.19 Chapter 23, Noise

A summary comparison of important noise impacts is provided in Figure ES-22. This figure provides information on the magnitude of the most pertinent and quantifiable noise impacts that are expected to result from implementation of the alternatives. Important impacts to consider include exposure to noise from construction of the intakes and water conveyance facilities, vibrations from pile driving during construction, and noise generated by the operation of the pumping plants.

As depicted in Figure ES-22, residential parcels would be subject to noise from the construction of intakes and conveyance facilities. Alternatives 1C, 2C, and 6C would affect the greatest number of residential parcels, with intake construction noise affecting 48 parcels during the day and 122 parcels at night in Sacramento County, and 15 parcels during the day and 107 at night in Yolo County. Conveyance facility construction under Alternatives 1C, 2C, and 6C would affect 27 parcels during the day and 107 at night in Sacramento County, 23 parcels during the day and 129 at night in Yolo County, and 1,098 parcels during the day and 2,851 at night in Contra Costa County. Alternative 5 would affect the fewest residential parcels, with no residential parcels affected by intake construction noise, and conveyance facility construction noise affecting 116 parcels during the day and 119 at night in Sacramento County, no parcels during the day and 89 at night in Yolo County, and 9 parcels during the day and 18 at night in San Joaquin County. Alternatives 4, 4A, 2D, and 5A would fall in the middle of this range, with Alternatives 4 and 4A resulting in intake construction noise affecting 87 residential parcels during the day and 106 at night in Sacramento County, and 27 parcels during the day and 71 at night in Yolo County. Alternatives 4, 4A, 2D, and 5A conveyance facility construction noise would affect 118 parcels during the day and 120 at night in Sacramento County, 10 parcels during the day and 105 at night in Yolo County, and 8 parcels during the day and 18 at night in San Joaquin County. Under Alternative 2D, intake construction noise would affect 121 parcels during the day and night in Sacramento County, and 27 parcels during the day and 71 at night in Yolo County. Alternative 2D conveyance facility construction noise would affect 119 parcels during the day and 120 at night in Sacramento County, 11 parcels during the day and 95 at night in Yolo County, and 8 parcels during the day and 18 at night in San Joaquin County. Under Alternative 5A, intake construction noise would be identical to what would occur under Alternative 2D, and conveyance facility construction noise would affect 1 additional Sacramento County parcel at night compared with Alternative 2D.

Each alternative, with the exceptions of the No Action Alternative and Alternative 9, would expose residential parcels to vibrations from pile driving as part of the construction of new intakes. Implementation of Alternatives 1A, 6A, and 8 would result in the greatest number of parcels affected by vibrations from pile driving, with 88 parcels affected in Sacramento County, one parcel in Yolo County, and 13 parcels in San Joaquin County. Of the remaining alternatives, Alternative 5A would affect the fewest parcels, with 24 parcels affected in Sacramento County, 7 parcels in San Joaquin County, and 1 parcel in Contra Costa County. Alternatives 4, 4A, and 2D would be in the middle of this range, with 62 parcels in Sacramento County, 7 parcels in San Joaquin County, and 1 parcel in Contra Costa County affected by vibrations from pile driving under Alternatives 4 and 4A, and 75 parcels in Sacramento County, 3 parcels in San Joaquin County, and 1 parcel in Contra Costa County affected under Alternative 2D.

Some of the alternatives would expose residential parcels to noise from the operation of the pumping plants. Operation of the pumping plants under Alternatives 1A, 1B, 6A, and 6B would affect the most parcels, with 108 parcels affected during the day and 121 parcels affected at night in Sacramento County. Operation of the pumping plants under Alternatives 2A, 2B, 3, 4, 5, 7, 8, 9, 4A, 2D, and 5A would not affect any parcels. Under Alternatives 1C, 2C, and 6C, 2 parcels would be affected by noise from the operation of the pumping plants during the day and 76 parcels would be affected at night in Sacramento County, and 6 parcels would be affected at night in Yolo County.

ES.4.1.20 Chapter 24, Hazards

A summary comparison of important hazards-related impacts is provided in Figure ES-23. This figure provides information on the magnitude of adverse impacts related to hazards and hazardous materials that are expected to result from implementation of the alternatives.

As depicted in Figure ES-23, each action alternative would lie within 0.5 mile of sites of concern for hazards and hazardous materials. Alternatives 1B, 1C, 2B, 2C, 6B, and 6C would have the greatest potential to conflict with a known hazardous materials site and, as a result, create a significant hazard to the public or environment, because those alternatives would be implemented within 0.5 mile of nine sites of concern. Alternatives 4, 2D, 4A, and 5A would have the least potential to conflict with known hazardous sites because those alternatives would be implemented within 0.5 mile of only three sites of concern.

ES.4.1.21 Chapter 25, Public Health

A summary comparison of important public health impacts is provided in Figure ES-24. This figure provides information on the magnitude of the most pertinent and quantifiable public health impacts that are expected to result from implementation of the alternatives. Important impacts to consider include the increase in surface water that could result in an increase in vector-borne diseases as a result of the construction and operation of the water conveyance facilities or as a result of an increase in habitat from the implementation of conservation actions.

As depicted in Figure ES-24, increases in surface water because of construction and operation of the water conveyance facilities could result in an increase in vector-borne disease in the Plan Area. Alternative 2D would result in the greatest number of water bodies that could host disease vectors, 26. No such water bodies would be created under the No Action Alternative or Alternative 9. Alternatives 4 and 4A would fall near the top of this range, at 24 water bodies.

Each alternative, with the exception of the No Action Alternative, would provide restored habitat that could be a breeding ground for disease vectors. Of the BDCP alternatives, almost all would include the greatest amount of restoration, 83,839 acres. The non-HCP alternatives would provide far less habitat restoration. Alternative 5A would restore the least amount of habitat, 15,516 acres. Alternative 4A would restore 15,836 acres of habitat, and Alternative 2D would restore 18,097 acres of habitat.

ES.4.1.22 Chapter 26, Minerals

A summary comparison of an important mineral resource impact is provided in Figure ES-25. This figure provides information on the magnitude of the most pertinent and quantifiable impact on mineral resources that is expected to result from implementation of the alternatives. This impact to consider is the loss of availability of extraction potential from natural gas fields as a result of constructing the water conveyance facilities.

As depicted in Figure ES-25, construction of the water conveyance facilities would reduce availability of extraction potential from natural gas fields in the Plan Area. Each alternative, with the exception of the No Action Alternative, would result in such a reduction. Of the action alternatives, Alternatives 1B, 2B, and 6B would have the greatest impact on natural gas fields by eliminating access to 924 acres. Alternative 9 would have the smallest impact on natural gas fields by reducing access by only 32 acres. Alternatives 4, 4A, 2D, and 5A would result in the loss of access to 352 acres of natural gas fields.

ES.4.1.23 Chapter 27, Paleontological Resources

A summary comparison of an important impact on paleontological resources is provided in Figure ES-26. This figure provides information on the magnitude of the most pertinent and quantifiable impact on paleontological resources that is expected to result from implementation of the alternatives. The impact to consider is the potential destruction of significant paleontological resources due to excavation for borrow and for construction of tunnels and canals.

As depicted in Figure ES-26, construction of the water conveyance facilities under each action alternative would potentially result in the destruction of unique or significant paleontological resources. During construction, Alternatives 1B, 2B, and 6B would result in the greatest amount of material excavated, at approximately 239 million cubic yards, whereas Alternative 9 would result in the least amount of material excavated, at approximately 4.6 million cubic yards. Alternatives 4 and 4A would fall in the lower middle portion of this range, at approximately 56 million cubic yards.

ES.4.1.24 Chapter 28, Environmental Justice

Figure ES-27 summarizes the number of environmental justice impacts that would result from implementation of the alternatives. As depicted in Figure ES-27, environmental justice would be adversely affected under each alternative, with the exception of the No Action Alternative. Alternatives 4, 6B, and 7 would result in 22 environmental justice impacts, whereas Alternatives 3, 5, and 4A would result in 18 environmental justice impacts. Environmental justice impacts resulting from the remaining alternatives would fall within the 18 to 22 impact range. Potentially adverse impacts span many resource areas. The preferred alternative, 4A, would cause environmental justice-related impacts with respect to land use, socioeconomics, aesthetics, cultural resources, public services and utilities, noise, and public health. Mitigation and environmental commitments are available to reduce these effects; however, effects would remain adverse.

ES.4.1.25 Chapter 30, Growth

A summary comparison of the most important growth inducing effects is provided in Figure ES-28. This figure provides information on the magnitude of the effects of increased water supply deliveries for removing a portion of the water supply obstacles to growth in the regions of California receiving south of Delta CVP and SWP deliveries under each alternative. Some alternatives would increase the water supply deliveries and have growth-inducing effects; other alternatives would reduce the water deliveries and would not have growth-inducing effects.

As depicted in Figure ES-28, potential increases in water supply deliveries would remove obstacles to growth in each region receiving CVP and SWP Delta exports. The projected growth in the population of each hydrologic region was estimated from available information to calculate the increased urban water supplies needed in 2050. The increased urban water supply for each region was compared with the calculated change in water deliveries for each alternative to determine the portion of the water supply obstacles to growth that could be provided by each alternative. Some alternatives would result in reduced CVP/SWP deliveries and not have any growth-inducing effects. However, reduced water deliveries may cause additional environmental impacts from developing local water supplies to replace the reduced CVP/SWP deliveries.

Compared with south of Delta average water deliveries of 4,940 TAF/year under Existing Conditions, Alternatives 1A, 1B and 1C would have the greatest increase in CVP/SWP deliveries, with an average increase of 338 TAF/year or 7% of the Existing Conditions deliveries. Alternatives 2D and 3 would increase CVP/SWP deliveries by about 250 TAF/year, Alternative 4 with the Operational Scenario H1 outflow requirements would increase CVP/SWP deliveries by about 140 TAF/year, and Alternative 5A would increase deliveries by about 100 TAF/year. All other alternatives would have reduced deliveries compared with Existing Conditions and would not have any growth-inducing effects.

Compared with the No Action Alterative (ELT) south of Delta average water deliveries of 4,690 TAF/year (250 TAF/year less than Existing Condition) or No Action Alternative (LLT) south of Delta average water deliveries of 4,290 TAF/year (650 TAF/year less than Existing Conditions), Alternatives 1A, 1B, and 1C would have the greatest increase in CVP/SWP deliveries, with an average increase of 988 TAF/year (23% of LLT). Alternative 3 would increase deliveries by 903 TAF/year, Alternative 4 with the Operational Scenario H1 outflow requirements would increase deliveries by 788 TAF/year, Alternatives 2A, 2B, and 2C would increase deliveries by 602 TAF/year, Alternatives 2D and Alternative 4 with the Operational Scenario H3 outflow requirements would increase deliveries by about 500 TAF, Alternatives 5 and 5A would increase deliveries by about 350 TAF/year, Alternative 4 with the Operational Scenario H2 outflow requirements would increase deliveries by 274 TAF/year, and Alternative 4A would increase deliveries by about 90 TAF/year. The other alternatives would have reduced deliveries compared with the No Action Alternative (ELT or LLT) and would not have any growth-inducing effects.

ES.4.2 Executive Summary Impact Table

Table ES-8, *Summary of BDCP/California WaterFix Final EIR/EIS Impacts and Mitigation Measures*, summarizes, by resource area, the environmental impacts of implementing each of the action alternatives. The table presents NEPA and CEQA conclusions for all of the impacts identified in the Final EIR/EIS, and recommended mitigation measures that would reduce impacts. The table also identifies the level of impact after mitigation measures are applied.

Table ES-8. Summary of BDCP/California WaterFix EIR/EIS Impacts and Mitigation Measures

Notes:

1. The conclusions for Alternatives 1A–1C, 2A–2C, 3, 4, 5, 6A–6C, and 7–9 reflect implementation of environmental commitments (described in detail in Appendix 3B), as well as Conservation Measure (CM) 2–CM21 and Avoidance and Minimization Measures (AMMs [described in detail in Chapter 3, *Description of Alternatives*, Section 3.3.2]), which are considered a part of each action alternative. The conclusions for Alternatives 2D, 4A, and 5A reflect implementation of Environmental Commitments 3, 4, 6–12, 15 and 16 (as described in Chapter 3, *Description of Alternatives*), environmental commitments (described in detail in Appendix 3B), and Avoidance and Minimization Measures which are considered a part of each action alternative.
2. For all action alternatives, in some cases, mitigation measures proposed under one resource section (e.g., terrestrial biological resources) are also proposed to reduce effects on another resource topic (e.g., recreation). These mitigation measures are cross-referenced wherever they may reduce effects. Additional discussion of each effect and mitigation measure can be found under the referenced resource-specific chapter(s).
3. Although many impact headings (see "Potential Impact" column) describe specific effects associated with BDCP action alternatives (e.g., the effects of implementing one or more conservation measures proposed as part of the BDCP), the conclusions provided for No Action Alternative (NAA) represent the anticipated effects on a resource as a result of future conditions in the absence of BDCP implementation. For the EIR/EIS analysis, the No Action Alternative assumptions are described in Appendix 3D, *Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions*.
4. Impact headings within this table are consistent with the Draft EIR/EIS and as they apply to the BDCP alternatives. However, the impact headings may appear slightly different for Alternatives 4A, 2D, and 5A within the resource chapters so that the headings are specific to that alternative (referencing Environmental Commitments 3, 4, 6–12, 15 and 16 instead of CM2–CM21). TO reduce repetition, a separate line was not included within this table for non-HCP alternative impact headings because the impact mechanism remains the same whether analyzing the impacts of habitat conservation measures or habitat actions under the Environmental Commitments.
5. For all action alternatives except Alternatives 2D, 4A, and 5A, the NEPA baseline, or point of comparison for NEPA purposes, is the NAA late long-term (LLT). For Alternatives 2D, 4A, and 5A, the NEPA baseline is the NAA early long-term (ELT). Relative to the NAA (LLT), the NAA (ELT) assumes a shorter time horizon of approximately 15 years following project approval. Impact conclusions for both the NAA (LLT) and the NAA (ELT) are included in this table.
6. Unless otherwise noted, where a "ND" (no determination) is noted for an impact conclusion, this indicates that a finding was not made for the impact due to the analysis approach. For a discussion on the analysis approach taken, please see the "Determination of Effects" section contained in each resource chapter.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
Water Supply[1]					
WS-1: Changes in SWP/CVP water deliveries during construction	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
WS-2: Change in SWP and CVP deliveries	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	ND		ND	ND
WS-3: Effects of water transfers on water supply	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	ND		ND	ND

[1] This chapter does not consider the significance of changes or mitigation for water supplies that could be related to changes in SWP/CVP exports and deliveries under CEQA. These types of environmental effects are addressed throughout this FEIR/FEIS in appropriate chapters. However, Chapter 5, Water Supply, only reports the quantitative changes to water supply as a result of the various alternatives being analyzed without making specific impact determinations.

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).
S = significant.
LTS = less than significant.
NI = no impact.
B = beneficial.
ND = no determination.

NEPA

A = adverse.
NA = not adverse.
NE = no effect.
B = beneficial.
ND = no determination.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
Surface Water					
SW-1: Changes in SWP or CVP reservoir flood storage capacity	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SW-2: Changes in Sacramento and San Joaquin River flood flows	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SW-3: Change in reverse flow conditions in Old and Middle Rivers	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	ND		ND	ND
SW-4: Substantially alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner that would result in flooding during construction of conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SW-4: Implement measures to reduce runoff and sedimentation	LTS	NA
SW-5: Substantially alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner that would result in flooding during construction of habitat restoration area facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SW-4: Implement measures to reduce runoff and sedimentation	LTS	NA
SW-6: Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SW-4: Implement measures to reduce runoff and sedimentation	LTS	NA
SW-7: Expose people or structures to a significant risk of loss, injury or death involving flooding due to the construction of new conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SW-7: Implement measures to reduce flood damage	LTS	NA
SW-8: Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding due to habitat restoration	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SW-8: Implement measures to address potential wind fetch issues	LTS	NA
SW-9: Place within a 100-year flood hazard area structures which would impede or redirect flood flows, or be subject to inundation by mudflow	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SW-4: Implement measures to reduce runoff and sedimentation	LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
Groundwater					
Changes in North, Central, and South Delta flow	NAA (LLT), NAA (ELT)	NI		NI	NE
Changes in Delta Groundwater Levels[2]	NAA (LLT), NAA (ELT)	NI		NI	NE[3]
Changes in Delta Groundwater Quality[4]	NAA (LLT), NAA (ELT)	LTS		LTS	NA
Changes in Delta Agricultural Drainage[5]	NAA (LLT), NAA (ELT)	LTS		LTS	NA
San Joaquin Basin Groundwater Levels[6]	NAA (LLT), NAA (ELT)	S		S	A
Tulare Basin Groundwater Levels[7]	NAA (LLT), NAA (ELT)	S		S	A
Tulare Basin Groundwater Flow[8]	NAA (LLT), NAA (ELT)	LTS		LTS	NA
San Joaquin Basin and Tulare Basin Land Subsidence[9]	NAA (LLT), NAA (ELT)	LTS		LTS	NA
Other Portions of the Export Service Areas–Groundwater supplies, recharge, and local groundwater table levels	NAA (LLT), NAA (ELT)	S		S	A
Ongoing Plans, Policies, and Programs	NAA (LLT), NAA (ELT)	LTS		LTS	NA
GW-1: During construction, deplete groundwater supplies or interfere with groundwater recharge, alter local groundwater levels, or reduce the production capacity of preexisting nearby wells	1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8	S	GW-1: Maintain water supplies in areas affected by construction dewatering	SU	A
	9	S	GW-1: Maintain water supplies in areas affected by construction dewatering	LTS	NA
	4, 2D, 4A, 5A	LTS	GW-1: Maintain water supplies in areas affected by construction dewatering	LTS	NA
GW-2: During operations, deplete groundwater supplies or interfere with groundwater recharge, alter local groundwater levels, or reduce the production capacity of preexisting nearby wells	1A, 2A, 3, 4, 5, 6A, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1B, 1C, 2B, 2C, 6B, 6C	S	GW-2: Maintain water supplies in areas affected by changes in groundwater levels during operation of canals	SU	A
GW-3: Degrade groundwater quality during construction and operation of conveyance facilities	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GW-4: During construction of conveyance facilities, interfere with agricultural drainage in the Delta	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	S	GW-5: Agricultural lands seepage minimization	LTS	NA

[2] Includes effects of climate change and sea level rise at 2060 for the NAA (LLT) and 2025 for the NAA (ELT)
[3] Increased groundwater level due to sea level rise in San Francisco Bay may result in a beneficial effect on shallow well yields
[4] Includes effects of climate change and sea level rise at 2060 for the NAA (LLT) and 2025 for the NAA (ELT)
[5] Includes effects of climate change and sea level rise at 2060 for the NAA (LLT) and 2025 for the NAA (ELT)
[6] SWP/CVP Export Service Areas
[7] SWP/CVP Export Service Areas
[8] SWP/CVP Export Service Areas
[9] SWP/CVP Export Service Areas

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
GW-5: During operations of new facilities, interfere with agricultural drainage in the Delta	1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8	S	GW-5: Agricultural lands seepage minimization	SU	A
	4, 2D, 4A, 5A	S	GW-5: Agricultural lands seepage minimization	LTS	NA
	9	LTS		LTS	NA
GW-6: Deplete groundwater supplies or interfere with groundwater recharge, alter local groundwater levels, reduce the production capacity of preexisting nearby wells, or interfere with agricultural drainage as a result of implementing CM2–CM21	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	GW-5: Agricultural lands seepage minimization	SU	A
GW-7: Degrade groundwater quality as a result of implementing CM2–CM21	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A 5A	S	GW-7: Provide an alternate source of water	SU	A
GW-8: During operations, deplete groundwater supplies or interfere with groundwater recharge, alter groundwater levels, or reduce the production capacity of preexisting nearby wells	1A, 1B, 1C	B		B	B
	3	LTS		LTS	B
	2A, 2B, 2C, 5, 2D, 5A, 4A	LTS		LTS	NA
	4, 6A, 6B, 6C, 7, 8, 9	S[10]	No feasible mitigation to address this impact	SU	A
GW-9: Degrade groundwater quality	1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 2D, 5A	LTS		LTS	NA
	4, 6A, 6B, 6C, 7, 8, 9	S[11]	No feasible mitigation to address this impact	SU	A
	4A	S[10]		SU	NA
GW-10: Result in groundwater level-induced land subsidence	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
Water Quality					
WQ-1: Effects on ammonia concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A 5A	LTS		LTS	NA
WQ-2: Effects on ammonia concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A 5A	LTS		LTS	NA
WQ-3: Effects on boron concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A 5A	LTS		LTS	NA

[10] For Alternative 4A, the impact could be significant/adverse in certain areas of Southern California depending on the range of Spring Delta outflows that affect the surface water deliveries and associated groundwater usage.

[11] For Alternative 4A, the impact could be significant/adverse, as related to impact GW-8.

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
WQ-4: Effects on boron concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A 5A	LTS		LTS	NA
WQ-5: Effects on bromide concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-5: Avoid, minimize, or offset, as feasible, adverse water quality conditions; site and design restoration sites to reduce bromide increases in Barker Slough	SU	A
WQ-6: Effects on bromide concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-7: Effects on chloride concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT)	S		S	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-7: Conduct additional evaluation and modeling of increased chloride levels and develop and implement phased mitigation actions WQ-7a: Conduct additional evaluation of operational ability to reduce or eliminate water quality degradation in western Delta incorporating site-specific restoration areas and updated climate change/sea level rise projections, if available WQ-7b: Site and design restoration sites to reduce or eliminate water quality degradation in the western Delta WQ-7c: Consult with Delta water purveyors to identify means to avoid, minimize, or offset for reduced seasonal availability of water that meets applicable water quality objectives WQ-7d: Site and design restoration sites and consult with CDFW/USFWS, and Suisun Marsh stakeholders to identify potential actions to avoid or reduce chloride concentration increases in the Marsh	SU	A
	4A	LTS	WQ-7e: Implement Terms of the Contra Costa Water District Settlement Agreement	LTS	NA
	2D, 5A	LTS		LTS	NA
WQ-8: Effects on chloride concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-9: Effects on dissolved oxygen resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-10: Effects on dissolved oxygen resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

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NEPA

A = adverse.
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
WQ-11: Effects on electrical conductivity concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-11: Avoid, minimize, or offset, as feasible, reduced water quality conditions WQ-11a: Conduct additional evaluation of operational ability to reduce or eliminate water quality degradation in western Delta incorporating site-specific restoration areas and updated climate change/sea level rise projections, if available WQ-11b: Site and design restoration sites to reduce or eliminate water quality degradation in the western Delta WQ-11c: Design restoration sites to reduce effects on compliance with the Fish and Wildlife EC objective between Prisoners Point and Jersey Point, evaluate striped bass monitoring data, and consult with CDFW/USFWS/NMFS to determine whether additional actions are warranted WQ-11d: Site and design restoration sites and consult with CDFW/USFWS, and Suisun Marsh stakeholders to identify potential actions to avoid or reduce EC level increases in the Marsh	SU	A
	2D, 5A	S	WQ-11: Avoid, minimize, or offset, as feasible, reduced water quality conditions	LTS	NA
	4A	S	WQ-11: Avoid, minimize, or offset, as feasible, reduced water quality conditions WQ-11e: Adaptively Manage Diversions at the North and South Delta Intakes to Reduce or Eliminate Water Quality Degradation in Western Delta WQ-11f: Adaptively Manage Head of Old River Barrier and Diversions at the North and South Delta Intakes to Reduce or Eliminate Exceedances of the Bay-Delta WQCP Objective at Prisoners Point	LTS	NA
WQ-12: Effects on electrical conductivity concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-13: Effects on mercury concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S	No feasible mitigation to address this impact	SU	A
WQ-14: Effects on mercury concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	No available mitigation to address this impact	SU	A
WQ-15: Effects on nitrate concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-16: Effects on nitrate concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
WQ-17: Effects on dissolved organic carbon concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S	WQ-17: Consult with Delta water purveyors to identify means to avoid, minimize, or offset increases in long-term average DOC concentrations	SU	A
WQ-18: Effects on dissolved organic carbon concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-18: Design wetland and riparian habitat features to minimize effects on municipal intakes	SU	A
WQ-19: Effects on pathogens resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-20: Effects on pathogens resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-21: Effects on pesticide concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S	No feasible mitigation to address this impact	SU	A
WQ-22: Effects on pesticide concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-22: Implement principals of integrated pest management	SU	A
WQ-23: Effects on phosphorus concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-24: Effects on phosphorus concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-25: Effects on selenium concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S		SU	A
WQ-26: Effects on selenium concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
WQ-27: Effects on trace metal concentrations resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-28: Effects on trace metal concentrations resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-29: Effects on TSS and turbidity resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-30: Effects on TSS and turbidity resulting from implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-31: Water quality impacts resulting from construction-related activities (CM1–CM21)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
WQ-32: Effects on *Microcystis* bloom formation resulting from facilities operations and maintenance (CM1)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-32a: Design restoration sites to reduce potential for increased *Microcystis* blooms WQ-32b: Investigate and implement operational measures to manage water residence time	SU	A
	2D, 4A, 5A	LTS		LTS	NA
WQ-33: Effects on *Microcystis* bloom formation resulting from other conservation measures (CM2–CM21)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-32a: Design restoration sites to reduce potential for increased *Microcystis* blooms	SU	A
	2D, 4A, 5A	LTS		LTS	NA
WQ-34: Effects on San Francisco Bay water quality resulting from facilities operations and maintenance (CM1) and implementation of CM2–CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S		SU	A
Geology and Seismicity					
GEO-1: Loss of property, personal injury, or death from structural failure resulting from strong seismic shaking of water conveyance features during construction	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
GEO-2: Loss of property, personal injury, or death from settlement or collapse caused by dewatering during construction of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-3: Loss of property, personal injury, or death from ground settlement during construction of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-4: Loss of property, personal injury, or death from slope failure during construction of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-5: Loss of property, personal injury, or death from structural failure resulting from construction-related ground motions during construction of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-2a: Prohibit construction activity on physically deficient roadway segments TRANS-2b: Limit construction activity on physically deficient roadway segments	LTS	NA
GEO-6: Loss of property, personal injury, or death from structural failure resulting from rupture of a known earthquake fault during operation of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 4A	NI		NI	NA
	2D, 5A	LTS		LTS	NA
GEO-7: Loss of property, personal injury, or death from structural failure resulting from strong seismic shaking during operation of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-8: Loss of property, personal injury, or death from structural failure resulting from seismic-related ground failure (including liquefaction) during operation of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-9: Loss of property, personal injury, or death from landslides and other slope instability during operation of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-10: Loss of property, personal injury, or death from seiche or tsunami during operation of water conveyance features	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	NEPA
GEO-11: Ground failure caused by increased groundwater surface elevations from unlined canal seepage as a result of operating the water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 2A, 3, 4, 5, 6A, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
	1B, 1C, 2B, 2C, 6B, 6C	LTS		LTS	NA
GEO-12: Loss of property, personal injury, or death resulting from structural failure caused by rupture of a known earthquake fault at Restoration Opportunity Areas	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-13: Loss of property, personal injury, or death from structural failure resulting from strong seismic shaking at Restoration Opportunity Areas	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-14: Loss of property, personal injury, or death from structural failure resulting from seismic-related ground failure (including liquefaction) beneath Restoration Opportunity Areas	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-15: Loss of property, personal injury, or death from landslides and other slope instability at Restoration Opportunity Areas	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
GEO-16: Loss of property, personal injury, or death from seiche or tsunami at Restoration Opportunity Areas as a result of implementing the conservation actions	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
Soils					
SOILS-1: Accelerated erosion caused by vegetation removal and other soil disturbances as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SOILS-2: Loss of topsoil from excavation, overcovering, and inundation as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SOILS-2a: Minimize extent of excavation and soil disturbance SOILS-2b: Salvage, stockpile, and replace topsoil and prepare a topsoil storage and handling plan	SU	A
SOILS-3: Property loss, personal injury, or death from instability, failure, and damage from construction on or in soils subject to subsidence as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT)	B		B	B
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
SOILS-4: Risk to life and property as a result of constructing the proposed water conveyance facilities in areas of expansive, corrosive, and compressible soils	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SOILS-5: Accelerated bank erosion from increased channel flow rates as a result of operations	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SOILS-6: Accelerated erosion caused by clearing, grubbing, grading, and other disturbances associated with implementation of proposed conservation measures CM2–CM11, CM18 and CM19	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SOILS-7: Loss of topsoil from excavation, overcovering, and inundation associated with restoration activities as a result of implementing the proposed conservation measures CM2–CM11	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	SOILS-2a: Minimize extent of excavation and soil disturbance SOILS-2b: Salvage, stockpile, and replace topsoil and prepare a topsoil storage and handling plan	SU	A
SOILS-8: Property loss, personal injury, or death from instability, failure, and damage from construction on soils subject to subsidence as a result of implementing the proposed conservation measures CM2–CM11	NAA (LLT), NAA (ELT)	B		B	B
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
SOILS-9: Risk to life and property from construction in areas of expansive, corrosive, and compressible soils as a result of implementing the proposed conservation measures CM2–CM11	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
Fish and Aquatic Resources					
AQUA-NAA1: Effects of construction of facilities on covered fish species	NAA (LLT), NAA (ELT)	LTS		LTS	NA
AQUA-NAA2: Effects of maintenance of facilities on covered fish species	NAA (LLT), NAA (ELT)	LTS		LTS	NA
AQUA-NAA3: Effects of water operations on entrainment of covered fish species	NAA (LLT), NAA (ELT)	LTS		LTS	NA
AQUA-NAA4: Effects of water operations on spawning and egg incubation habitat for covered fish species	NAA (LLT)	LTS S (winter-run Chinook salmon and green sturgeon)	No feasible mitigation to address this impact on Chinook salmon	SU	NA A (winter-run Chinook salmon and green sturgeon)
	NAA (ELT)	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-NAA5: effects of water operations on rearing habitat for covered fish species	NAA (LLT)	S[12]		SU	NA
	NAA (ELT)	LTS		LTS	NA
AQUA-NAA6: Effects of water operations on migration habitat for covered fish species	NAA (LLT), NAA (ELT)	S		SU	NA
AQUA-NAA7: Effects of habitat restoration on covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA8: Effects of other Conservation Measures on covered fish species	NAA (LLT)	LTS		LTS	B
	NAA (ELT)	NI		NI	NI
AQUA-NAA9: Effects of construction of facilities on non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA10: Effects of maintenance of facilities on non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA11: Effects of water operations on entrainment of non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA12: Effects of water operations on spawning and egg incubation habitat for non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA13: Effects of water operations on rearing habitat for non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA14: Effects of water operations on migration habitat for non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA15: Effects of habitat restoration on non-covered fish species	NAA (LLT)	LTS		LTS	NA
	NAA (ELT)	NI		NI	NI
AQUA-NAA16: Effects of other Conservation Measures on non-covered fish species	NAA (LLT)	LTS		LTS	B
	NAA (ELT)	NI		NI	NI
AQUA-1: Effects of construction of water conveyance facilities on delta smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-2: Effects of maintenance of water conveyance facilities on delta smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

[12] Reduced summer flows would affect rearing habitat conditions for winter-run Chinook salmon and green and white sturgeon, which would include increased water temperatures, and could result in decreased survival over the NAA period. The effect could be adverse for these covered species over the NAA period. The overall effects of the No Action Alternative would be less than significant for the other covered fish species.

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-3: Effects of water operations on entrainment of delta smelt	1A, 1B, 1C, 4	LTS		LTS	B
	2A, 2B, 2C, 3, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	B		B	B
AQUA-4: Effects of water operations on spawning and egg incubation habitat for delta smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-5: Effects of water operations on rearing habitat for delta smelt	1A, 1B, 1C, 3	LTS		LTS	A
	2A, 2B, 2C, 4, 5, 7, 8, 9, 2D, 5A	LTS		LTS	NA
	6A, 6B, 6C	B		B	NA
	4A	LTS		LTS	NE
AQUA-6: Effects of water operations on migration conditions for delta smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-7: Effects of construction of restoration measures on delta smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-8: Effects of contaminants associated with restoration measures on delta smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-9: Effects of restored habitat conditions on delta smelt	2A, 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
AQUA-10: Effects of methylmercury management on delta smelt (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-11: Effects of invasive aquatic vegetation management on delta smelt (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-12: Effects of dissolved oxygen level management on delta smelt (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-13: Effects of localized reduction of predatory fish on delta smelt (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
AQUA-14: Effects of nonphysical fish barriers on delta smelt (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	LTS		LTS	NA

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A = adverse. NE = no effect. ND = no determination.
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-15: Effects of illegal harvest reduction on delta smelt (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-16: Effects of conservation hatcheries on delta smelt (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-17: Effects of urban stormwater treatment on delta smelt (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-18: Effects of removal/relocation of nonproject diversions on delta smelt (CM21)	1A, 1B, 1C, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2A	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-19: Effects of construction of water conveyance facilities on longfin smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-20: Effects of maintenance of water conveyance facilities on longfin smelt=	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-21: Effects of water operations on entrainment of longfin smelt	1A, 1B, 1C	S	AQUA-21a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce entrainment impacts AQUA-21b: Conduct additional evaluation and modeling of impacts on longfin smelt entrainment following initial operations of CM1 AQUA-21c: Consult with USFWS and CDFW to identify and implement potentially feasible means to minimize effects on longfin smelt entrainment consistent with CM1	SU	NA
	2A, 2B, 2C, 2D	B		B	B
	3	S	AQUA-21a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce entrainment impacts AQUA-21b: Conduct additional evaluation and modeling of impacts on longfin smelt entrainment following initial operations of CM1 AQUA-21c: Consult with USFWS and CDFW to identify and implement potentially feasible means to minimize effects on longfin smelt entrainment consistent with CM1	SU	A
	4	B		B	NA
	5, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 9	B		B	B
	8	LTS		LTS	B

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-22: Effects of water operations on spawning, egg incubation, and rearing habitat for longfin smelt	1A, 1B, 1C, 3, 5, 6A, 6B, 6C, 7	S	AQUA-22a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce impacts to spawning and rearing habitat AQUA-22b: Conduct additional evaluation and modeling of impacts on longfin smelt rearing habitat following initial operations of CM1 AQUA-22c: Consult with USFWS and CDFW to identify and implement feasible means to minimize effects on longfin smelt rearing habitat consistent with CM1	LTS	NA
	2A, 2B, 2C, 4, 8, 9	LTS		LTS	NA
	2D, 5A	S	AQUA-22a: Following initial operations of CM1,[13] conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce impacts to spawning and rearing habitat AQUA-22b: Conduct additional evaluation and modeling of impacts on longfin smelt rearing habitat following initial operations of CM1 AQUA-22c: Consult with USFWS and CDFW to identify and implement feasible means to minimize effects on longfin smelt rearing habitat consistent with CM1	SU	A
	4A	S	AQUA-22d: DWR will consult with CDFW as part of the 2081 incidental take permit process to include spring outflow criteria as necessary to fully mitigate any impacts of operation-related take of longfin smelt attributable to the project, with adjustments through Adaptive Management as appropriate. Implementation of any necessary spring outflow criteria will occur through coordinated operations of the CVP and SWP.	LTS	NA
AQUA-23: Effects of water operations on rearing habitat for longfin smelt	1A, 1B, 1C, 3, 5, 6A, 6B, 6C, 7	S	AQUA-22a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce impacts to spawning and rearing habitat AQUA-22b: Conduct additional evaluation and modeling of impacts on longfin smelt rearing habitat following initial operations of CM1 AQUA-22c: Consult with USFWS and CDFW to identify and implement feasible means to minimize effects on longfin smelt rearing habitat consistent with CM1	LTS	NA
	2A, 2B, 2C, 4, 8, 9	LTS		LTS	NA
	2D, 5A	S	AQUA-22a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce impacts to spawning and rearing habitat AQUA-22b: Conduct additional evaluation and modeling of impacts on longfin smelt rearing habitat following initial operations of CM1 AQUA-22c: Consult with USFWS and CDFW to identify and implement feasible means to minimize effects on longfin smelt rearing habitat consistent with CM1	SU	A

[13] Reference to CM1 in the title of any mitigation measures being applied to non-HCP alternatives should be taken to mean "water conveyance facilities."

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
	4A	S	AQUA-22d: DWR will consult with CDFW as part of the 2081 incidental take permit process to include spring outflow criteria as necessary to fully mitigate any impacts of operation-related take of longfin smelt attributable to the project, with adjustments through Adaptive Management as appropriate. Implementation of any necessary spring outflow criteria will occur through coordinated operations of the CVP and SWP.	LTS	NA
AQUA-24: Effects of water operations on migration conditions for longfin smelt	1A, 1B, 1C, 3, 5, 6A, 6B, 6C, 7	S	AQUA-22a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce impacts to spawning and rearing habitat AQUA-22b: Conduct additional evaluation and modeling of impacts on longfin smelt rearing habitat following initial operations of CM1 AQUA-22c: Consult with USFWS and CDFW to identify and implement feasible means to minimize effects on longfin smelt rearing habitat consistent with CM1	LTS	NA
	2A, 2B, 2C, 4, 8, 9	LTS		LTS	NA
	2D, 5A	S	AQUA-22a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to longfin smelt to determine feasibility of mitigation to reduce impacts to spawning and rearing habitat AQUA-22b: Conduct additional evaluation and modeling of impacts on longfin smelt rearing habitat following initial operations of CM1 AQUA-22c: Consult with USFWS and CDFW to identify and implement feasible means to minimize effects on longfin smelt rearing habitat consistent with CM1	SU	A
	4A	S	AQUA-22d: DWR will consult with CDFW as part of the 2081 incidental take permit process to include spring outflow criteria as necessary to fully mitigate any impacts of operation-related take of longfin smelt attributable to the project, with adjustments through Adaptive Management as appropriate. Implementation of any necessary spring outflow criteria will occur through coordinated operations of the CVP and SWP.	LTS	NA
AQUA-25: Effects of construction of restoration measures on longfin smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	B
	5, 2D, 4A, 5A	LTS		LTS	NA
AQUA-26: Effects of contaminants associated with restoration measures on longfin smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-27: Effects of restored habitat conditions on longfin smelt	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 8, 9, 2D, 4A, 5A	B		B	NA
	7	B		B	B
AQUA-28: Effects of methylmercury management on longfin smelt (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-29: Effects of invasive aquatic vegetation management on longfin smelt (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-30: Effects of dissolved oxygen level management on longfin smelt (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-31: Effects of localized reduction of predatory fish on longfin smelt (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	B
AQUA-32: Effects of nonphysical fish barriers on longfin smelt (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
AQUA-33: Effects of illegal harvest reduction on longfin smelt (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-34: Effects of conservation hatcheries on longfin smelt (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-35: Effects of urban stormwater treatment on longfin smelt (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-36: Effects of removal/relocation of nonproject diversions on longfin smelt (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-37: Effects of construction of water conveyance facilities on Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-38: Effects of maintenance of water conveyance facilities on Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-39: Effects of water operations on entrainment of Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 6A, 6B, 6C, 9	B		B	B
	4, 5, 7, 2D, 4A, 5A	LTS		LTS	NA
	8	B		B	NA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
AQUA-40: Effects of water operations on spawning and egg incubation habitat for Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 8, 2D	S	AQUA-40a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to winter-run Chinook salmon to determine feasibility of mitigation to reduce impacts to spawning habitat AQUA-40b: Conduct additional evaluation and modeling of impacts on winter-run Chinook salmon spawning habitat following initial operations of CM1 AQUA-40c: Consult with NFWS, USFWS, and CDFW to identify and implement potentially feasible means to minimize effects on winter-run Chinook salmon spawning habitat consistent with CM1	SU	A
	4, 5, 6A, 6B, 6C, 7, 9, 4A, 5A	LTS		LTS	NA
AQUA-41: Effects of water operations on rearing habitat for Chinook salmon (winter-run ESU)	1A, 1B, 1C, 3, 8	S	AQUA-41a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to winter-run Chinook salmon to determine feasibility of mitigation to reduce impacts to rearing habitat AQUA-41b: Conduct additional evaluation and modeling of impacts on winter-run Chinook salmon rearing habitat following initial operations of CM1 AQUA-41c: Consult with NMFS and CDFW to identify and implement potentially feasible means to minimize effects on winter-run Chinook salmon rearing habitat consistent with CM1	SU	A
	2A, 2B, 2C, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-42: Effects of water operations on migration conditions for Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 6A, 6B, 6C, 8, 2D	S	AQUA-42a: Following Initial Operations of CM1, Conduct Additional Evaluation and Modeling of Impacts to Winter-Run Chinook Salmon to Determine Feasibility of Mitigation to Reduce Impacts to Migration Conditions AQUA-42b: Conduct Additional Evaluation and Modeling of Impacts on Winter-Run Chinook Salmon Migration Conditions Following Initial Operations of CM1 AQUA-42c: Consult with NMFS and CDFW to Identify and Implement Potentially Feasible Means to Minimize Effects on Winter-Run Chinook Salmon Migration Conditions Consistent with CM1	SU	A
	3	LTS		LTS	A
	4, 5, 7, 9, 4A, 5A	LTS		LTS	NA
AQUA-43: Effects of construction of restoration measures on Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 8, 9	LTS		LTS	NA/B[14]
	7, 2D, 4A, 5A	LTS		LTS	NA
AQUA-44: Effects of contaminants associated with restoration measures on Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-45: Effects of restored habitat conditions on Chinook salmon (winter-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	LTS		LTS	NA
AQUA-46: Effects of methylmercury management on Chinook salmon (winter-run ESU) (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

[14] The effects of short-term restoration construction activities would be not adverse; the overall long-term effects of habitat restoration are expected to be beneficial to winter-run Chinook salmon and other covered species by providing additional or improved habitat.

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CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-47: Effects of invasive aquatic vegetation management on Chinook salmon (winter-run ESU) (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-48: Effects of dissolved oxygen level management on Chinook salmon (winter-run ESU) (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-49: Effects of localized reduction of predatory fish on Chinook salmon (winter-run ESU) (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
AQUA-50: Effects of nonphysical fish barriers on Chinook salmon (winter-run ESU) (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-51: Effects of illegal harvest reduction on Chinook salmon (winter-run ESU) (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-52: Effects of conservation hatcheries on Chinook salmon (winter-run ESU) (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-53: Effects of urban stormwater treatment on Chinook salmon (winter-run ESU) (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-54: Effects of removal/relocation of nonproject diversions on Chinook salmon (winter-run ESU) (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-55: Effects of construction of water conveyance facilities on Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-56: Effects of maintenance of water conveyance facilities on Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
AQUA-57: Effects of water operations on entrainment of Chinook salmon (spring-run ESU)	1A, 1B, 1C, 3	S	AQUA-57a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to spring-run Chinook salmon to determine feasibility of mitigation to reduce entrainment impacts AQUA-57b: Conduct additional evaluation and modeling of impacts on spring-run Chinook salmon entrainment following initial operations of CM1 AQUA-57c: Consult with NMFS and CDFW to identify and implement potentially feasible means to minimize effects on spring-run Chinook salmon entrainment consistent with CM1	SU	A
	4, 7, 8	B		B	NA
	2A, 2B, 2C, 2D, 4A, 5A	LTS		LTS	NA
	5	LTS		LTS	B
	6A, 6B, 6C, 9	B		B	B
AQUA-58: Effects of water operations on spawning and egg incubation habitat for Chinook salmon (spring-run ESU)	1A, 1B, 1C, 3	S	AQUA-58a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to spring-run Chinook salmon to determine feasibility of mitigation to reduce impacts to spawning habitat AQUA-58b: Conduct additional evaluation and modeling of impacts on spring-run Chinook salmon spawning habitat following initial operations of CM1 AQUA-58c: Consult with NMFS and CDFW to identify and implement potentially feasible means to minimize effects on spring-run Chinook salmon spawning habitat consistent with CM1	SU	A
	2A, 2B, 2C, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-59: Effects of water operations on rearing habitat for Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
	8	S	AQUA-59a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to spring-run Chinook salmon to determine feasibility of mitigation to reduce impacts to rearing habitat AQUA-59b: Conduct additional evaluation and modeling of impacts on spring-run Chinook salmon rearing habitat following initial operations of CM1 AQUA-59c: Consult with NMFS, USFWS, and CDFW to identify and implement potentially feasible means to minimize effects on spring-run Chinook salmon rearing habitat consistent with CM1	SU	A
AQUA-60: Effects of water operations on migration conditions for Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 6A, 6B, 6C, 8, 2D	S	AQUA-60a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to spring-run Chinook salmon to determine feasibility of mitigation to reduce impacts to migration conditions AQUA-60b: Conduct additional evaluation and modeling of impacts on spring-run Chinook salmon migration conditions following initial operations of CM1 AQUA-60c: Consult with NMFS and CDFW to identify and implement potentially feasible means to minimize effects on spring-run Chinook salmon migration conditions consistent with CM1	SU	A
	3, 4, 5, 7, 9, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
AQUA-61: Effects of construction of restoration measures on Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 8, 9	LTS		LTS	NA/B[15]
	7, 2D, 4A, 5A	LTS		LTS	NA
AQUA-62: Effects of contaminants associated with restoration measures on Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-63: Effects of restored habitat conditions on Chinook salmon (spring-run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	LTS		LTS	NA
AQUA-64: Effects of methylmercury management on Chinook salmon (spring-run ESU) (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-65: Effects of invasive aquatic vegetation management on Chinook salmon (spring-run ESU) (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-66: Effects of dissolved oxygen level management on Chinook salmon (spring-run ESU) (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-67: Effects of localized reduction of predatory fish on Chinook salmon (spring-run ESU) (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
AQUA-68: Effects of nonphysical fish barriers on Chinook salmon (spring-run ESU) (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-69: Effects of illegal harvest reduction on Chinook salmon (spring-run ESU) (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-70: Effects of conservation hatcheries on Chinook salmon (spring-run ESU) (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-71: Effects of urban stormwater treatment on Chinook salmon (spring-run ESU) (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-72: Effects of removal/relocation of nonproject diversions on Chinook salmon (spring-run ESU) (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI

[15] The effects of short-term restoration construction activities would be not adverse; the overall long-term effects of habitat restoration are expected to be beneficial to spring-run ESU Chinook salmon and other covered species by providing additional or improved habitat.

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-73: Effects of construction of water conveyance facilities on Chinook salmon (fall- and late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-74: Effects of maintenance of water conveyance facilities on Chinook salmon (fall- and late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-75: Effects of water operations on entrainment of Chinook salmon (fall-/late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 7, 8, 2D	B		B	NA
	3	S	AQUA-75a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to fall-/late fall-run Chinook salmon to determine feasibility of mitigation to reduce entrainment impacts AQUA-75b: Conduct additional evaluation and modeling of impacts on fall-/late fall-run Chinook salmon entrainment following initial operations of CM1 AQUA-75c: Consult with NMFS and CDFW to identify and implement potentially feasible means to minimize effects on fall-/late fall-run Chinook salmon entrainment consistent with CM1	SU	A
	4, 4A, 5A	LTS		LTS	NA
	5, 6A, 6B, 6C, 9	B		B	B
AQUA-76: Effects of water operations on spawning and egg incubation habitat for Chinook salmon (fall- and late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-77: Effects of water operations on rearing habitat for Chinook salmon (fall-/late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	7	S	AQUA-77a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to fall-/late fall–run Chinook salmon to determine feasibility of mitigation to reduce impacts to rearing habitat AQUA-77b: Conduct additional evaluation and modeling of impacts on fall-/late fall–run Chinook salmon rearing habitat following initial operations of CM1 AQUA-77c: Consult with NMFS, USFWS and CDFW to identify and implement potentially feasible means to minimize effects on fall-/late fall–run Chinook salmon rearing habitat consistent with CM1	SU	A

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-78: Effects of water operations on migration conditions for Chinook salmon (fall-/late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 6A, 6B, 6C, 8, 2D, 5A	S	AQUA-78a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to fall-/late fall–run Chinook salmon to determine feasibility of mitigation to reduce impacts to migration conditions AQUA-78b: Conduct additional evaluation and modeling of impacts on fall-/late fall–run Chinook salmon migration conditions following initial operations of CM1 AQUA-78c: Consult with NMFS, USFWS and CDFW to identify and implement potentially feasible means to minimize effects on fall-/late fall–run Chinook salmon migration conditions consistent with CM1	SU	A
	4A, 5, 7, 9	LTS		LTS	NA
AQUA-79: Effects of construction of restoration measures on Chinook salmon (fall-/late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 8, 9	LTS		LTS	NA/B[16]
	7, 2D, 4A, 5A	LTS		LTS	NA
AQUA-80: Effects of contaminants associated with restoration measures on Chinook salmon (fall-/late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-81: Effects of restored habitat conditions on Chinook salmon (fall-/late fall–run ESU)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	LTS		LTS	NA
AQUA-82: Effects of methylmercury management on Chinook salmon (fall-/late fall–run ESU) (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-83: Effects of invasive aquatic vegetation management on Chinook salmon (fall-/late fall–run ESU) (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-84: Effects of dissolved oxygen level management on Chinook salmon (fall-/late fall–run ESU) (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-85: Effects of localized reduction of predatory fish on Chinook salmon (fall-/late fall–run ESU) (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	LTS		LTS	NA
AQUA-86: Effects of nonphysical fish barriers on Chinook salmon (fall-/late fall–run ESU) (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-87: Effects of illegal harvest reduction on Chinook salmon (fall-/late fall–run ESU) (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI

[16] The effects of short-term restoration construction activities would be not adverse; the overall long-term effects of habitat restoration are expected to be beneficial to fall-/late fall-run ESU Chinook salmon and other covered species by providing additional or improved habitat.

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-88: Effects of conservation hatcheries on Chinook salmon (fall-/late fall–run ESU) (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-89: Effects of urban stormwater treatment on Chinook salmon (fall-/late fall–run ESU) (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-90: Effects of removal/relocation of nonproject diversions on Chinook salmon (fall-/late fall–run ESU) (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-91: Effects of construction of water conveyance facilities on steelhead	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-92: Effects of maintenance of water conveyance facilities on steelhead	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-93: Effects of water operations on entrainment of steelhead	1A, 1B, 1C, 9	B		B	B
	7, 8	B		B	NA
	2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C	LTS		LTS	B
AQUA-94: Effects of water operations on spawning and egg incubation habitat for steelhead	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-95: Effects of water operations on rearing habitat for steelhead	1A, 1B, 1C, 4, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
	2A, 2B, 2C, 3, 5, 8	S	AQUA-95a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to steelhead to determine feasibility of mitigation to reduce impacts to rearing habitat AQUA-95b: Conduct additional evaluation and modeling of impacts on steelhead rearing habitat following initial operations of CM1 AQUA-95c: Consult with NMFS, USFWS, and CDFW to identify and implement potentially feasible means to minimize effects on steelhead rearing habitat consistent with CM1	SU	A

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-96: Effects of water operations on migration conditions for steelhead	1A, 1B, 1C, 2A, 2B, 2C, 6A, 6B, 6C, 8, 2D	S	AQUA-96a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to steelhead to determine feasibility of mitigation to reduce impacts to migration conditions AQUA-96b: Conduct additional evaluation and modeling of impacts on steelhead migration conditions following initial operations of CM1 AQUA-96c: Consult with NMFS and CDFW to identify and implement potentially feasible means to minimize effects on steelhead migration conditions consistent with CM1	SU	A
	3, 4, 5, 7, 9, 4A, 5A	LTS		LTS	NA
AQUA-97: Effects of construction of restoration measures on steelhead	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 6A, 6B, 6C, 8, 9	LTS		LTS	B
	5, 7, 2D, 4A, 5A	LTS		LTS	NA
AQUA-98: Effects of contaminants associated with restoration measures on steelhead	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS/B[17]		LTS/B[17]	NA
	2D, 4A, 5A	LTS		LTS	NA
AQUA-99: Effects of restored habitat conditions on steelhead	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B[18]
	2D, 4A, 5A	LTS		LTS	NA
AQUA-100: Effects of methylmercury management on steelhead (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-101: Effects of invasive aquatic vegetation management on steelhead (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-102: Effects of dissolved oxygen level management on steelhead (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-103: Effects of localized reduction of predatory fish on steelhead (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
AQUA-104: Effects of nonphysical fish barriers on steelhead (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-105: Effects of illegal harvest reduction on steelhead (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI

[17] The impact of contaminants would be less than significant and with restoration and would be beneficial in the long term.
[18] The effect would be generally beneficial, but benefits would not be derived in all years, and an adaptive management plan would be needed to determine an operational protocol that optimizes benefits both locally and in adjacent habitats.

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-106: Effects of conservation hatcheries on steelhead (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-107: Effects of urban stormwater treatment on steelhead (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-108: Effects of removal/relocation of nonproject diversions on steelhead (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-109: Effects of construction of water conveyance facilities on Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-110: Effects of maintenance of water conveyance facilities on Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-111: Effects of water operations on entrainment of Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	4	B		B	NA
	9	B		B	B
AQUA-112: Effects of water operations on spawning and egg incubation habitat for Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-113: Effects of water operations on rearing habitat for Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	4, 2D, 4A, 5A	LTS		LTS	NA
AQUA-114: Effects of water operations on migration conditions for Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	5	B		B	B
AQUA-115: Effects of construction of restoration measures on Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-116: Effects of contaminants associated with restoration measures on Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-117: Effects of restored habitat conditions on Sacramento splittail	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9	B		B	B[18]
	8, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-118: Effects of methylmercury management on Sacramento splittail (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-119: Effects of invasive aquatic vegetation management on Sacramento splittail (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-120: Effects of dissolved oxygen level management on Sacramento splittail (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-121: Effects of localized reduction of predatory fish on Sacramento splittail (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-122: Effects of nonphysical fish barriers on Sacramento splittail (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-123: Effects of illegal harvest reduction on Sacramento splittail (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-124: Effects of conservation hatcheries on Sacramento splittail (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-125: Effects of urban stormwater treatment on Sacramento splittail (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-126: Effects of removal/relocation of nonproject diversions on Sacramento splittail (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-127: Effects of construction of water conveyance facilities on green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-128: Effects of maintenance of water conveyance facilities on green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-129: Effects of water operations on entrainment of green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 7, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C	LTS		LTS	B
	8	B		B	NA
	9	B		B	B

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-130: Effects of water operations on spawning and egg incubation habitat for green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-131: Effects of water operations on rearing habitat for green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-132: Effects of water operations on migration conditions for green sturgeon	1A, 1B, 1C, 3, 8	S	AQUA-132a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to green sturgeon to determine feasibility of mitigation to reduce impacts to migration conditions AQUA-132b: Conduct additional evaluation and modeling of impacts on green sturgeon migration conditions following initial operations of CM1 AQUA-132c: Consult with NMFS, USFWS and CDFW to identify and implement potentially feasible means to minimize effects on green sturgeon migration conditions consistent with CM1	SU	A
	2A, 2B, 2C, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-133: Effects of construction of restoration measures on green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-134: Effects of contaminants associated with restoration measures on green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-135: Effects of restored habitat conditions on green sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	LTS		LTS	NA
AQUA-136: Effects of methylmercury management on green sturgeon (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-137: Effects of invasive aquatic vegetation management on green sturgeon (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-138: Effects of dissolved oxygen level management on green sturgeon (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-139: Effects of localized reduction of predatory fish on green sturgeon (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-140: Effects of nonphysical fish barriers on green sturgeon (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
AQUA-141 Effects of illegal harvest reduction on green sturgeon (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-142: Effects of conservation hatcheries on green sturgeon (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-143: Effects of urban stormwater treatment on green sturgeon (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-144: Effects of removal/relocation of nonproject diversions on green sturgeon (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-145: Effects of construction of water conveyance facilities on white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-146: Effects of maintenance of water conveyance facilities on white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-147: Effects of water operations on entrainment of white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 7, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C	LTS		LTS	B
	8	B		B	NA
	9	B		B	B
AQUA-148: Effects of water operations on spawning and egg incubation habitat for white sturgeon	1A, 1B, 1C, 2A. 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-149: Effects of water operations on rearing habitat for white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-150: Effects of water operations on migration conditions for white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
	8	S	AQUA-150a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to shite sturgeon to determine feasibility of mitigation to reduce impacts to migration conditions AQUA-150b: Conduct additional evaluation and modeling of impacts on white sturgeon migration conditions following initial operations of CM1 AQUA-150c: Consult with NMFS, USFWS, and CDFW to identify and implement potentially feasible means to minimize effects on white sturgeon migration conditions consistent with CM1	SU	A
AQUA-151: Effects of construction of restoration measures on white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-152: Effects of contaminants associated with restoration measures on white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-153: Effects of restored habitat conditions on white sturgeon	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	B		B	B[16]
AQUA-154: Effects of methylmercury management on white sturgeon (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-155: Effects of invasive aquatic vegetation management on white sturgeon (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-156: Effects of dissolved oxygen level management on white sturgeon (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-157: Effects of localized reduction of predatory fish on white sturgeon (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-158: Effects of nonphysical fish barriers on white sturgeon (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 7, 6A, 6B, 6C, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-159: Effects of illegal harvest reduction on white sturgeon (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-160: Effects of conservation hatcheries on white sturgeon (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-161: Effects of urban stormwater treatment on white sturgeon (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-162: Effects of removal/relocation of nonproject diversions on white sturgeon (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 6A, 6B, 6C, 5, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-163: Effects of construction of water conveyance facilities on Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-164: Effects of maintenance of water conveyance facilities on Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-165: Effects of water operations on entrainment of Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	B		B	B
AQUA-166: Effects of water operations on spawning and egg incubation habitat for Pacific lamprey	2A, 2B, 2C, 4, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 3, 5, 8	S	AQUA-166a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to Pacific lamprey to determine feasibility of mitigation to reduce impacts to spawning habitat AQUA-166b: Conduct additional evaluation and modeling of impacts on Pacific lamprey spawning habitat following initial operations of CM1 AQUA-166c: Consult with USFWS and CDFW to identify and implement potentially feasible means to minimize effects on Pacific lamprey spawning habitat consistent with CM1	SU	A
AQUA-167: Effects of water operations on rearing habitat for Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
	8	S		SU	A
AQUA-168: Effects of water operations on migration conditions for Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-169: Effects of construction of restoration measures on Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-170: Effects of contaminants associated with restoration measures on Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-171: Effects of restored habitat conditions on Pacific lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).
S = significant.
LTS = less than significant.
NI = no impact.
B = beneficial.
ND = no determination.

NEPA

A = adverse.
NA = not adverse.
NE = no effect.
B = beneficial.
ND = no determination.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-172: Effects of methylmercury management on Pacific lamprey (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-173: Effects of invasive aquatic vegetation management on Pacific lamprey (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-174: Effects of dissolved oxygen level management on Pacific lamprey (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-175: Effects of localized reduction of predatory fish on Pacific lamprey (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	LTS		LTS	NA
AQUA-176: Effects of nonphysical fish barriers on Pacific lamprey (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-177: Effects of illegal harvest reduction on Pacific lamprey (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-178: Effects of conservation hatcheries on Pacific lamprey (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-179: Effects of urban stormwater treatment on Pacific lamprey (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-180: Effects of removal/relocation of nonproject diversions on Pacific lamprey (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-181: Effects of construction of water conveyance facilities on river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-182: Effects of maintenance of water conveyance facilities on river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-183: Effects of water operations on entrainment of river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	B		B	B

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-184: Effects of water operations on spawning and egg incubation habitat for river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
	8	S	AQUA-184a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to river lamprey to determine feasibility of mitigation to reduce impacts to spawning habitat AQUA-184b: Conduct additional evaluation and modeling of impacts on river lamprey spawning habitat following initial operations of CM1 AQUA-184c: Consult with USFWS and CDFW to identify and implement potentially feasible means to minimize effects on river lamprey spawning habitat consistent with CM1	SU	A
AQUA-185: Effects of water operations on rearing habitat for river lamprey	1A, 1B, 1C, 8	S	AQUA-185a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to river lamprey to determine feasibility of mitigation to reduce impacts to rearing habitat AQUA-185b: Conduct additional evaluation and modeling of impacts on river lamprey rearing habitat following initial operations of CM1 AQUA-185c: Consult with NMFS, USFWS, and CDFW to identify and implement potentially feasible means to minimize effects on river lamprey rearing habitat consistent with CM1	SU	A
	2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-186: Effects of water operations on migration conditions for river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 9, 2D, 4A, 5A	LTS		LTS	NA
	8	S	AQUA-186a: Following initial operations of CM1, conduct additional evaluation and modeling of impacts to river lamprey to determine feasibility of mitigation to reduce impacts to migration conditions AQUA-186b: Conduct additional evaluation and modeling of impacts on river lamprey migration conditions following initial operations of CM1 AQUA-186c: Consult with USFWS and CDFW to identify and implement potentially feasible means to minimize effects on river lamprey migration conditions consistent with CM1	SU	A
AQUA-187: Effects of construction of restoration measures on river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-188: Effects of contaminants associated with restoration measures on river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
AQUA-189: Effects of restored habitat conditions on river lamprey	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	LTS		LTS	NA
AQUA-190: Effects of methylmercury management on river lamprey (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

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NEPA

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NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-191: Effects of invasive aquatic vegetation management on river lamprey (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-192: Effects of dissolved oxygen level management on river lamprey (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-193: Effects of localized reduction of predatory fish on river lamprey (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	LTS		LTS	NA
AQUA-194: Effects of nonphysical fish barriers on river lamprey (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-195: Effects of illegal harvest reduction on river lamprey (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NI
AQUA-196: Effects of conservation hatcheries on river lamprey (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-197: Effects of urban stormwater treatment on river lamprey (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-198: Effects of removal/relocation of nonproject diversions on river lamprey (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-199: Effects of construction of water conveyance facilities on non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (noise associated with pile driving)	AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise. AQUA-1b: Monitor underwater noise and, if necessary, use an attenuation device to reduce effects of pile driving and other construction-related underwater noise	LTS	NA
AQUA-200: Effects of maintenance of water conveyance facilities on non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-201: Effects of water operations on entrainment of non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS S (striped bass, American shad)	No feasible mitigation to address this impact	LTS SU (striped bass, American shad)	NA A (striped bass, American shad)
	9	LTS NI (California bay shrimp)		LTS NI (California bay shrimp)	NA B (largemouth bass) NE (California bay shrimp)

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CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
AQUA-202: Effects of water operations on spawning and egg incubation habitat for non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 8, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C	LTS S (threadfin shad, largemouth bass, Sacramento-San Joaquin Roach)	No feasible mitigation to address this impact	LTS SU (threadfin shad, largemouth bass, Sacramento-San Joaquin Roach)	NA
	7	LTS S (Sacramento-San Joaquin roach, hardhead)		LTS SU (Sacramento-San Joaquin roach, hardhead)	NA
	9	LTS S (hardhead)		LTS SU (hardhead)	NA
AQUA-203: Effects of water operations on rearing habitat for non-covered aquatic species of primary management concern	1A, 1B, 1C, 2D	LTS S (hardhead)		LTS SU (hardhead)	NA
	4, 5, 2D, 4A, 5A	LTS		LTS	NA
	2A, 2B, 2C, 6A, 6B, 6C, 7, 9	LTS (striped bass, American shad, threadfin shad, California bay shrimp)		LTS (striped bass, American shad, threadfin shad, California bay shrimp)	NA
		S[18] (largemouth bass, Sacramento tule perch, Sacramento–San Joaquin roach, hardhead)	No feasible mitigation to address this impact	SU (largemouth bass, Sacramento tule perch, Sacramento–San Joaquin roach, hardhead)	NA
	3	LTS S (hardhead)	No feasible mitigation to address this impact	LTS SU (hardhead)	NA
	8	LTS (striped bass, American shad, threadfin shad, California bay shrimp)		LTS (striped bass, American shad, threadfin shad, California bay shrimp)	NA
		S (largemouth bass, Sacramento tule perch, Sacramento–San Joaquin roach, hardhead)	No feasible mitigation to address this impact	SU (largemouth bass, Sacramento tule perch, Sacramento-San Joaquin roach, hardhead)	

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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
AQUA-204: Effects of water operations on migration conditions for non-covered aquatic species of primary management concern	1A, 1B, 1C, 2B, 2C	LTS NI (threadfin shad, largemouth bass, Sacramento tule perch)		LTS NI (threadfin shad, largemouth bass, Sacramento tule perch)	NA NE (threadfin shad, largemouth bass, Sacramento tule perch)
	2A, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 5A	LTS NI (largemouth bass, Sacramento tule perch)		LTS NI (largemouth bass, Sacramento tule perch)	NA NE (threadfin shad, largemouth bass, Sacramento tule perch)
	4A	LTS		LTS	NA NE (threadfin shad, largemouth bass, Sacramento tule perch)
	9	LTS NI (largemouth bass, Sacramento tule perch)		LTS NI (largemouth bass, Sacramento tule perch)	NA NE (largemouth bass, Sacramento tule perch)
AQUA-205: Effects of construction of restoration measures on non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-206: Effects of contaminants associated with restoration measures on non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-207: Effects of restored habitat conditions on non-covered aquatic species of primary management concern	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B NI (largemouth bass, Sacramento San-Joaquin roach)		B NI (largemouth bass, Sacramento San-Joaquin roach)	B NE (largemouth bass, Sacramento San-Joaquin roach)
	2D, 4A, 5A	B		B	NA
AQUA-208: Effects of methylmercury management on non-covered aquatic species of primary management concern (CM12)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-209: Effects of invasive aquatic vegetation management on non-covered aquatic species of primary management concern (CM13)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS NI (California bay shrimp)		LTS NI (California bay shrimp)	NA NE (California bay shrimp)
	2D, 4A, 5A	NI		NI	NI
AQUA-210: Effects of dissolved oxygen level management on non-covered aquatic species of primary management concern (CM14)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B NI (California bay shrimp)		B NI (California bay shrimp)	B NE (California bay shrimp)
	2D, 4A, 5A	NI		NI	NI
AQUA-211: Effects of localized reduction of predatory fish on non-covered aquatic species of primary management concern (CM15)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS NI (California bay shrimp)		LTS NI (California bay shrimp)	NA NE (California bay shrimp)

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQUA-212: Effects of nonphysical fish barriers on non-covered aquatic species of primary management concern (CM16)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B. 6C, 7, 8, 9, 2D, 4A, 5A	LTS NI (California bay shrimp)		LTS NI (California bay shrimp)	NA NE (California bay shrimp)
AQUA-213: Effects of illegal harvest reduction on non-covered aquatic species of primary management concern (CM17)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS NI (California bay shrimp)		LTS NI (California bay shrimp)	NA NE (California bay shrimp)
	2D, 4A, 5A	NI		NI	NI
AQUA-214: Effects of conservation hatcheries on non-covered aquatic species of primary management concern (CM18)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	NI		NI	NE
	2D, 4A, 5A	NI		NI	NI
AQUA-215: Effects of urban stormwater treatment on non-covered aquatic species of primary management concern (CM19)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NI
AQUA-216: Effects of removal/relocation of nonproject diversions on non-covered aquatic species of primary management concern (CM21)	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS NI (California bay shrimp)		LTS NI (California bay shrimp)	NA NE (California bay shrimp)
	2D, 4A, 5A	NI		NI	NI
AQUA-217: Effects of water operations on reservoir coldwater fish habitat	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-218: Changes in sediment loading effects on downstream bays as a result of operations	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQUA-219: Effects of operations on contaminants on covered species	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S		SU	A
AQUA-220: Downstream sediment supply effects of Delta restoration measures	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
Terrestrial Biological Resources					
BIO-1: Changes in tidal perennial aquatic natural community as a result of implementing BDCP conservation measures	NAA (LLT), NAA (ELT), 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS (near-term) B (late long-term)		LTS (near-term) B (late long-term)	NA (near-term) B (late long-term)
BIO-2: Increased frequency, magnitude and duration of periodic inundation of tidal perennial aquatic natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-3: Modification of tidal perennial aquatic natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-4: Changes in tidal brackish emergent wetland natural community as a result of implementing BDCP Conservation Measures	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
	2D, 4A, 5A	NI		NI	NE
BIO-5: Modification of tidal brackish emergent wetland natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-6: Changes in tidal freshwater emergent wetland natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS (near-term) B (late long-term)		LTS (near-term) B (late long-term)	NA (near-term) B (late long-term)
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-7: Increased frequency, magnitude and duration of periodic inundation of tidal freshwater emergent wetland natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-8: Modification of tidal freshwater emergent wetland natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-9: Changes in valley/foothill riparian natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8	LTS (near-term) B (late long-term)		LTS (near-term) B (late long-term)	NA (near-term) B (late long-term)
	9	S (near-term) B (late long-term)	BIO-9a: Compensate for loss of valley/foothill riparian natural community	LTS (near-term) B (late long-term)	A (near-term) B (late long-term)
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-10: Increased frequency, magnitude and duration of periodic inundation of valley/foothill riparian natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-11: Modification of valley/foothill riparian natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-12: Changes in nontidal perennial aquatic natural community as a result of implementing BDCP conservation measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS (near-term) B (late long-term)		LTS (near-term) B (late long-term)	NA (near-term) B (late long-term)
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-13: Increased frequency, magnitude and duration of periodic inundation of nontidal perennial aquatic natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-14: Modification of nontidal perennial aquatic natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-15: Changes in nontidal freshwater perennial emergent wetland natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS (near-term) B (late long-term)		LTS (near-term) B (late long-term)	NA (near-term) B (late long-term)
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-16: Increased frequency, magnitude and duration of periodic inundation of nontidal freshwater perennial emergent wetland natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-17: Modification of nontidal freshwater perennial emergent wetland natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-18: Changes in alkali seasonal wetland complex natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-18: Compensate for loss of alkali seasonal wetland complex	LTS	A

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-19: Increased frequency, magnitude and duration of periodic inundation of alkali seasonal wetland complex natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-20: Modification of alkali seasonal wetland complex natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-18: Compensate for loss of alkali seasonal wetland complex	LTS	NA
BIO-21: Changes in vernal pool complex natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
	1C, 2C, 6C	LTS		LTS	NA
BIO-22: Increased frequency, magnitude and duration of periodic inundation of vernal pool complex natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-23: Modification of vernal pool complex natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-24: Changes in managed wetland natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-25: Increased frequency, magnitude and duration of periodic inundation of managed wetland natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-26: Modification of managed wetland natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-27: Modification of other natural seasonal wetland natural community as a result of implementing BDCP Conservation Measures	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-27: Compensate for loss of other natural seasonal wetland	LTS	NA

Level of Significance/Determination of Effects:

CEQA

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S = significant.
LTS = less than significant.
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ND = no determination.

NEPA

A = adverse.
NA = not adverse.
NE = no effect.
B = beneficial.
ND = no determination.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-28: Modification of other natural seasonal wetland natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-29: Changes in grassland natural community as a result of implementing BDCP Conservation Measures	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-30: Increased frequency, magnitude and duration of periodic inundation of grassland natural community	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-31: Modification of grassland natural community from ongoing operation, maintenance and management activities	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-32: Loss or conversion of habitat for and direct mortality of vernal pool crustaceans	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-32: Restore and protect vernal pool crustacean habitat	LTS	A
BIO-33: Indirect effects of Plan implementation on vernal pool crustaceans	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-34: Periodic effects of inundation of vernal pool crustacean habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-35: Loss of valley elderberry longhorn beetle habitat	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA

Level of Significance/Determination of Effects:

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-36: Indirect effects on valley elderberry longhorn beetle and its habitat	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-37: Periodic effects of inundation of valley elderberry longhorn beetle habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-38: Loss or conversion of habitat for and direct mortality of nonlisted vernal pool invertebrates	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-32: Restore and protect vernal pool crustacean habitat	LTS	A
BIO-39: Indirect effects of Plan implementation on nonlisted vernal pool invertebrates	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-40: Periodic effects of inundation of nonlisted vernal pool invertebrates' habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-41: Loss or conversion of habitat for and direct mortality of Sacramento and Antioch Dunes anthicid beetles	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-42: Loss or conversion of habitat for and direct mortality of delta green ground beetle	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-42: Avoid impacts on delta green ground beetle and its habitat	LTS	NA
BIO-43: Loss or conversion of habitat for and direct mortality of Callippe silverspot butterfly	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-43: Avoid and minimize loss of Callippe silverspot butterfly habitat	LTS	NA
BIO-44: Loss or conversion of habitat for and direct mortality of California red-legged frog	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-45: Indirect effects of Plan implementation on California red-legged frog	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-46: Loss or conversion of habitat for and direct mortality of California tiger salamander	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-47: Indirect effects of Plan implementation on California tiger salamander	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-48: Periodic effects of inundation of California tiger salamander habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-49: Loss or conversion of habitat for and direct mortality of giant garter snake	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-50: Indirect effects of Plan implementation on giant garter snake	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-50a: Loss of connectivity among giant garter snakes in the Coldani Marsh/White Slough subpopulation, Stone Lakes National Wildlife Refuge, and the Delta	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1C, 2A, 2C, 3, 4, 5, 6A, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1B, 2B, 6B	S	BIO-50a: Provide connectivity among Coldani Marsh/White Slough, Stone Lakes National Wildlife Refuge, and the Delta	LTS	NA
BIO-51: Periodic effects of inundation of giant garter snake habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-52: Loss or conversion of habitat for and direct mortality of western pond turtle	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-53: Indirect effects of Plan implementation on western pond turtle	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-54: Periodic effects of inundation of western pond turtle habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-55: Loss or conversion of habitat for and direct mortality of special-status reptiles	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-55: Conduct preconstruction surveys for noncovered special-status reptiles and implement applicable AMMs	LTS	NA
BIO-56: Indirect effects of Plan implementation on special-status reptile species	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-55: Conduct preconstruction surveys for noncovered special-status reptiles and implement applicable AMMs	LTS	NA
BIO-57: Loss or conversion of habitat for and direct mortality of California black rail	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-58: Effects on California black rail associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-59: Indirect effects of Plan implementation on California black rail	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-60: Fragmentation of California black rail habitat as a result of conservation component implementation	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-61: Periodic effects of inundation of California black rail habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-62: Loss or conversion of habitat for and direct mortality of California clapper rail	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-63: Indirect effects of Plan implementation on California clapper rail	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-64: Effects on California clapper rail associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-65: Fragmentation of California clapper rail habitat as a result of conservation component implementation	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-66: Loss or conversion of habitat for and direct mortality of California least tern	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	B		B	B
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-66: California least tern nesting colonies shall be avoided and indirect effects on colonies will be minimized	LTS	NA
BIO-67: Indirect effects of Plan implementation on California least tern	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-66: California least tern nesting colonies shall be avoided and indirect effects on colonies will be minimized	LTS	NA
BIO-68: Effects on California least tern associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-69: Loss or conversion of habitat for and direct mortality of greater sandhill crane	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1C, 2A, 2C, 3, 4, 5, 6A, 6C, 7, 8, 9	S	BIO-69a: Compensate for the loss of Medium to Very High-Value Greater Sandhill Crane Foraging Habitat	LTS	NA
	1B, 2B, 6B	S	BIO-69a: Compensate for the loss of Medium to Very High-Value Greater Sandhill Crane Foraging Habitat BIO-69b: BDCP-related construction will not result in a net decrease in crane use days on Bract Tract	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-70: Effects on greater sandhill crane associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-71: Indirect effects of Plan implementation on greater sandhill crane	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-72: Loss or conversion of habitat for and direct mortality of lesser sandhill crane	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1C, 2A, 2C, 3, 4, 5, 6A, 6C, 7, 8, 9	S	BIO-72: Compensate for the loss of medium- to very high-value lesser sandhill crane foraging habitat	LTS	NA
	1B, 2B, 6B	S	BIO-69b: BDCP-related construction will not result in a net decrease in crane use days on Bract Tract BIO-72: Compensate for the loss of medium- to very high-value lesser sandhill crane foraging habitat	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-73: Effects on lesser sandhill crane associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-74: Indirect effects of Plan implementation on lesser sandhill crane	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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CEQA			NEPA		
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
BIO-75: Loss or conversion of habitat for and direct mortality of least Bell's vireo and yellow warbler	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-76: Fragmentation of least Bell's vireo and yellow warbler habitat	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-77: Effects on least Bell's vireo and yellow warbler associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-78: Indirect effects of Plan implementation on least Bell's vireo and yellow warbler	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-79: Periodic effects of inundation of least Bell's vireo and yellow warbler habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	B		B	B
BIO-80: Loss or conversion of habitat for and direct mortality of Suisun song sparrow and saltmarsh common yellowthroat	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-81: Indirect effects of Plan implementation on Suisun song sparrow and saltmarsh common yellowthroat	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-82: Effects on Suisun song sparrow and saltmarsh common yellowthroat associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-83: Loss or conversion of habitat for and direct mortality of Swainson's hawk	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-84: Effects on Swainson's hawk associated with electrical transmission facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-85: Indirect effects of Plan implementation on Swainson's hawk	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-86: Periodic effects of inundation of Swainson's hawk nesting and foraging habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-87: Loss or conversion of habitat for and direct mortality of tricolored blackbird	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-88: Effects on tricolored blackbird associated with electrical transmission facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-89: Indirect effects of Plan implementation on tricolored blackbird	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-90: Periodic effects of inundation of tricolored blackbird habitat as a result of implementation of conservation components	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NE

Level of Significance/Determination of Effects:

CEQA

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-91: Loss or conversion of habitat for and direct mortality of western burrowing owl	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9	S	BIO-91: Compensate for near-term loss of high-value western burrowing owl habitat	LTS	NA
	1C, 2C, 6C	S	BIO-91: Compensate for near-term loss of high-value western burrowing owl habitat BIO-91a: Compensate for Permanent Loss of Low-Value Western Burrowing Owl Habitat	LTS	NA
	2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-92: Effects on western burrowing owl associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-93: Indirect effects of Plan implementation on western burrowing owl	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-94: Periodic effects of inundation on western burrowing owl habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-95: Loss or conversion of habitat for and direct mortality of western yellow-billed cuckoo	NAA(LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-96: Fragmentation of western yellow-billed cuckoo habitat as a result of constructing the water conveyance facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-97: Effects on western yellow-billed cuckoo associated with electrical transmission facilities	NAA (LLT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-98: Indirect effects of Plan implementation on western yellow-billed cuckoo	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-99: Periodic effects of inundation of western yellow-billed cuckoo habitat as a result of implementation of conservation components	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NI
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-100: Loss or conversion of habitat for and direct mortality of white-tailed kite	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-101: Effects on white-tailed kite associated with electrical transmission facilities	NAA (LLT)	LTS		LTS	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-102: Indirect effects of Plan implementation on white-tailed kite	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-103: Periodic effects of inundation of white-tailed kite habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-104: Loss or conversion of habitat for and direct mortality of yellow-breasted chat	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-105: Fragmentation of yellow-breasted chat habitat as a result of constructing the water conveyance facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-106: Effects on yellow-breasted chat associated with electrical transmission facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-107: Indirect effects of Plan implementation on yellow-breasted chat	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-108: Periodic effects of inundation of yellow-breasted chat habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-109: Loss or conversion of habitat for and direct mortality of Cooper's hawk and osprey	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-110: Effects on Cooper's hawk and osprey associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-111: Indirect effects of Plan implementation on Cooper's hawk and osprey	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-112: Periodic effects of inundation of Cooper's hawk and osprey nesting habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-113: Loss or conversion of habitat for and direct mortality of golden eagle and ferruginous hawk	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-113: Compensate for the near-term loss of golden eagle and ferruginous hawk foraging habitat	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-114: Effects on golden eagle and ferruginous hawk associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-115: Indirect effects of Plan implementation on golden eagle and ferruginous hawk	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-116: Periodic effects of inundation on golden eagle and ferruginous hawk habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-117: Loss or conversion of nesting habitat for and direct mortality of cormorants, herons and egrets	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds BIO-117: Avoid impacts on rookeries	LTS	NA
BIO-118: Effects associated with electrical transmission facilities on cormorants, herons and egrets	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-119: Indirect effects of Plan implementation on cormorants, herons and egrets	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds BIO-117: Avoid Impacts on Rookeries	LTS	NA
BIO-120: Periodic effects of inundation on cormorants, herons and egrets as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-121: Loss or conversion of habitat for short-eared owl and northern harrier	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 2A, 3, 4, 5, 6A, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
	1B, 1C, 2B, 2C, 6B, 6C	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds BIO-121: Compensate for loss of short-eared owl and northern harrier nesting habitat	LTS	NA
BIO-122: Effects on short-eared owl and northern harrier associated with electrical transmission facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-123: Indirect effects of Plan implementation on short-eared owl and northern harrier	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-124: Periodic effects of inundation on short-eared owl and northern harrier as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-125: Loss or conversion of habitat for and direct mortality of mountain plover	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-125: Compensate for the near-term loss of mountain plover wintering habitat	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-126: Effects on mountain plover associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-127: Indirect effects of Plan implementation on mountain plover	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-128: Periodic effects of inundation on mountain plover as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-129a: Loss or conversion of habitat for and direct mortality of black tern	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds BIO-129a: Compensate for loss of black tern nesting habitat	LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-129b: Indirect effects of Plan implementation on black tern	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-129c: Periodic effects of inundation on black tern nesting habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-130: Loss or conversion of habitat for and direct mortality of California horned lark and grasshopper sparrow	NAA (ELT)	LTS		LTS	NA
	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds BIO-130: Compensate for near-term loss of California horned lark and grasshopper sparrow habitat	LTS	NA
	2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-131: Effects on California horned lark and grasshopper sparrow and associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-132: Indirect effects of Plan implementation on grasshopper sparrow and California horned lark	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-133: Periodic effects of inundation on California horned lark and grasshopper sparrow as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-134: Loss or conversion of habitat for and direct mortality of least bittern and white-faced ibis	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-135: Effects on least bittern and white-faced ibis associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-136: Indirect effects of Plan implementation on least bittern and white-faced ibis	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-137: Periodic effects of inundation on least bittern and white-faced ibis as a result of implementation of conservation components	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
BIO-138: Loss or conversion of modeled habitat for and direct mortality of loggerhead shrike	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds BIO-138: Compensate for the near-term loss of high-value loggerhead shrike habitat	LTS	NA
	2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-139: Effects on loggerhead shrike associated with electrical transmission facilities	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-140: Indirect effects of Plan implementation on loggerhead shrike	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-141: Periodic effects of inundation on loggerhead shrike as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-142: Loss or conversion of habitat for and direct mortality of Modesto song sparrow	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-143: Effects on Modesto song sparrow associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-144: Indirect effects of Plan implementation on Modesto song sparrow	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-145: Periodic effects of inundation on Modesto song sparrow as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-146: Indirect effects of implementation of conservation components on bank swallow	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-146: Active bank swallow colonies shall be avoided and indirect effects on bank swallow will be minimized	LTS	NA
BIO-147: Effects of upstream reservoir and water conveyance facility operations on bank swallow	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-147: Monitor bank swallow colonies and evaluate winter and spring flows upstream of the study area	LTS	NA
BIO-148: Loss of habitat for and direct mortality of yellow-headed blackbird	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-149: Effects on yellow-headed blackbird associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-150: Indirect effects of Plan implementation on yellow-headed blackbird	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-151: Periodic effects of inundation of yellow-headed blackbird nesting habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-152: Loss or conversion of habitat for and direct mortality of riparian brush rabbit	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-153: Indirect effects of Plan implementation on riparian brush rabbit	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-154: Periodic effects of inundation of riparian brush rabbit habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-155: Loss or conversion of habitat for and direct mortality of riparian woodrat	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-156: Indirect effects of Plan implementation on riparian woodrat	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-157: Periodic effects of inundation of riparian woodrat habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-158: Loss or conversion of habitat for and direct mortality of salt marsh harvest mouse	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-159: Indirect effects of Plan implementation on salt marsh harvest mouse	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
BIO-160: Loss or conversion of habitat for and direct mortality of Suisun shrew	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NE
BIO-161: Indirect effects of Plan implementation on Suisun shrew	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-162: Loss or conversion of habitat for and direct mortality of San Joaquin kit fox and American badger	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-162: Conduct preconstruction survey for American badger	LTS	NA
BIO-163: Indirect effects of Plan implementation on San Joaquin kit fox and American badger	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-162: Conduct preconstruction survey for American badger	LTS	NA
BIO-164: Loss or conversion of habitat for and direct mortality of San Joaquin pocket mouse	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-165: Indirect effects of Plan implementation on San Joaquin pocket mouse	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-166: Loss or conversion of habitat for and direct mortality of special-status bats	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-166: Conduct preconstruction surveys for roosting bats and implement protective measures	LTS	NA
BIO-167: Indirect effects of Plan implementation on special-status bats	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-166: Conduct preconstruction surveys for roosting bats and implement protective measures	LTS	NA
BIO-168: Periodic effects of inundation of special-status bat habitat as a result of implementation of conservation components	NAA (LLT), NAA (ELT), 2D, 4A, 5A	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-166: Conduct preconstruction surveys for roosting bats and implement protective measures	LTS	NA
BIO-169: Effects on habitat and populations of vernal pool plants	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-32: Restore and protect vernal pool crustacean habitat BIO-170: Avoid, minimize, or compensate for impacts on noncovered special-status plant species	LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-170: Effects on habitat and populations of alkali seasonal wetland plants	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	BIO-170: Avoid, minimize, or compensate for impacts on noncovered special-status plant species	LTS	NA
	9, NAA (ELT)	LTS		LTS	NA
BIO-171: Effects on habitat and populations of grassland plant species	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	1C, 2C, 6C	S	BIO-170: Avoid, minimize, or compensate for impacts on noncovered special-status plant species	LTS	NA
	2D, 4A, 5A	NI		NI	NA
BIO-172: Effects on habitat and populations of valley/foothill riparian plants	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, NAA (ELT)	LTS		LTS	NA
	2D, 4A, 5A	NI		NI	NA
BIO-173: Effects on habitat and populations of tidal wetland plants	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-170: Avoid, minimize, or compensate for impacts on noncovered special-status plant species	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-174: Effects on habitat and populations of inland dune plants	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
BIO-175: Effects on habitat and populations of nontidal wetland plants	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-170: Avoid, minimize, or compensate for impacts on noncovered special-status plant species	LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-176: Effects of constructing water conveyance facilities (CM1) on wetlands and other waters of the United States	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-176: Compensatory Mitigation for Fill of Waters of the U.S.	LTS	NA
BIO-177: Effects of implementing other conservation measures (CM2–CM10) on wetlands and other waters of the United States	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-176: Compensatory Mitigation for Fill of Waters of the U.S.	LTS	NA
BIO-178: Loss or conversion of habitat for waterfowl and shorebirds as a result of water conveyance facilities construction	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-179: Loss or conversion of habitat for wintering waterfowl as a result of implementation of conservation components	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-179a: Conduct food studies and monitoring for wintering waterfowl in Suisun Marsh BIO-179b: Conduct food studies and monitoring to demonstrate food quality of palustrine tidal wetlands in the Yolo and Delta Basins	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-180: Loss or conversion of habitat for breeding waterfowl from implementation of conservation components	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	BIO-180: Conduct food and monitoring studies of breeding waterfowl in Suisun Marsh	LTS	NA
	2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-181: Loss or conversion of habitat for shorebirds from implementation of conservation components	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-182: Effects on shorebirds and waterfowl associated with electrical transmission facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
BIO-183: Indirect effects of Plan implementation on shorebirds and waterfowl	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds	LTS	NA
BIO-184: Effects on habitat and populations of common wildlife and plants	NAA (LLT)	LTS (near-term) S (late long-term)		LTS (near-term) S (late long-term)	NA (near-term) A (late long-term)
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A, NAA (ELT)	LTS		LTS	NA
BIO-185: Effect of BDCP Conservation Measures on wildlife corridors	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 2A, 3, 4, 5, 6A, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1B, 1C, 2B, 2C, 6B, 6C	S	No mitigation is available to address this impact	SU	A
BIO-186: Effects on natural communities resulting from the introduction and spread of invasive plant species	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
BIO-187: Compatibility of the proposed water conveyance facilities and other Conservation Measures with federal, state, or local laws, plans, policies, or executive orders addressing terrestrial biological resources in the study area	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
Land Use					
LU-1: Incompatibility with applicable land use designations, goals, and policies as a result of constructing the proposed water conveyance facility (CM1)	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
LU-2: Conflicts with existing land uses as a result of constructing the proposed water conveyance facility (CM1)	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	A
LU-3: Create physical structures adjacent to and through a portion of an existing community as a result of constructing the proposed water conveyance facility (CM1)	NAA (LLT), NAA (ELT), 3, 5	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 4, 6A, 6B, 6C, 7, 8, 9, 2D, 4A	S	TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments	SU	A
	5A	S	TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments	LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
LU-4: Incompatibility with applicable land use designations, goals and policies as a result of implementing the proposed Conservation Measures 2–21	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	ND		ND	ND
LU-5: Conflicts with existing land uses as a result of implementing the proposed Conservation Measures 2–21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	ND		ND	ND
LU-6: Create physical structures adjacent to and through a portion of an existing community as a result of implementing the proposed Conservation Measures 2–21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
Agricultural Resources					
AG-1: Temporary conversion, short-term conversion, and permanent conversion of Important Farmland or of farmland under Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyance facility.	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones AG-1a: Promote agricultural productivity of Important Farmland to the extent feasible AG-1b: Minimize impacts on land subject to Williamson Act contracts or in Farmland Security Zones AG-1c: Consideration of an Optional Agricultural Land Stewardship Approach or Conventional Mitigation Approach	SU	A
AG-2: Other effects on agriculture as a result of constructing and operating the proposed water conveyance facility	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 5A	S	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones GW-1: Maintain water supplies in areas affected by construction dewatering GW-5: Agricultural lands seepage minimization WQ-11: Avoid, minimize, or offset, as feasible, reduced water quality conditions	SU	A
	9	S	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones WQ-11: Avoid, minimize, or offset, as feasible, reduced water quality conditions	SU	A

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
	4A	S	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones GW-1: Maintain water supplies in areas affected by construction dewatering GW-5: Agricultural lands seepage minimization WQ-11: Avoid, minimize, or offset, as feasible, reduced water quality conditions WQ-11e: Adaptively Manage Diversions at the North and South Delta Intakes to Reduce or Eliminate Water Quality Degradation in Western Delta	SU	A
AG-3: Temporary conversion, short-term conversion, and permanent conversion of Important Farmland or of land subject to Williamson Act contracts or in Farmland Security Zones as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones	SU	A
AG-4: Other effects on agriculture as a result of implementing the proposed Conservation Measures 2–11, 13, 15, 16, 20, and 21	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones GW-5: Agricultural lands seepage minimization	SU	A
Recreation					
REC-1: Permanent displacement of existing well-established public use or private commercial recreation facility available for public access as a result of the location of the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	S	No mitigation available to address this impact	SU	A
REC-2: Result in long-term reduction of recreation opportunities and experiences as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 4A, 2D, 5A	S	REC-2: Provide alternative bank fishing access sites BIO-75: Conduct preconstruction nesting bird surveys and avoid disturbance of nesting birds AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan	SU/LTS[19]	A/NA[19]

[19] Impacts and effects on recreation from constructing the intakes would be LTS and NA, respectively, following mitigation.

Level of Significance/Determination of Effects:

CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
			AES-4a: Limit construction to daylight hours within 0.25 mile of residents AES-4b: Minimize fugitive light from portable sources used for construction AES-4c: Install visual barriers along access routes, where necessary, to prevent light spill from truck headlights toward residences TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments NOI-1a: Employ noise-reducing construction practices during construction NOI-1b: Prior to construction, initiate a complaint/response tracking program		
REC-3: Result in long-term reduction of recreational navigation opportunities as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-1a: Implement site-specific construction traffic management plan	SU	A
REC-4: Result in long-term reduction of recreational fishing opportunities as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 4A, 2D, 5A	S	REC-2: Provide alternative bank fishing access sites AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise AQUA-1b: Monitor Underwater Noise, and if Necessary, Use an attenuation device to reduce effects of pile driving and other construction-related underwater noise NOI-1a: Employ noise-reducing construction practices during construction NOI-1b: Prior to construction, initiate a complaint/response tracking program AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan	LTS	NA
REC-5: Result in long-term reduction of recreational fishing opportunities as a result of the operation of the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
REC-6: Cause a change in reservoir or lake elevations resulting in substantial reductions in water-based recreation opportunities and experiences at north- and south-of-Delta reservoirs	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	4, 2D, 4A, 5A	LTS (for north-and south-of-Delta reservoirs for all operational scenarios except for San Luis Reservoir) S (for Scenarios H2 and H4 for San Luis Reservoir)	REC-6: Provide a temporary alternative boat launch to ensure access to San Luis Reservoir	LTS (for Scenarios H2 and H4 for San Luis Reservoir)	NA
REC-7: Result in long-term reduction in water-based recreation opportunities as a result of maintenance of the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
REC-8: Result in long-term reduction in land-based recreation opportunities as a result of maintenance of the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 2C, 3	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
REC-9: Result in long-term reduction in fishing opportunities as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan AES-4b: Minimize fugitive light from portable sources used for construction AES-4c: Install visual barriers along access routes, where necessary, to prevent light spill from truck headlights toward residences TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments NOI-1a: Employ noise-reducing construction practices during construction NOI-1b: Prior to construction, initiate a complaint/response tracking program	LTS	NA

Level of Significance/Determination of Effects:

CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
			AQUA-1a: Minimize the use of impact pile driving to address effects of pile driving and other construction-related underwater noise AQUA-1b: Use an attenuation device to reduce effects of pile driving and other construction-related underwater noise		
REC-10: Result in long-term reduction in boating-related recreation opportunities as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan AES-4b: Minimize fugitive light from portable sources used for construction AES-4c: Install visual barriers along access routes, where necessary, to prevent light spill from truck headlights toward residences TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments NOI-1a: Employ noise-reducing construction practices during construction NOI-1b: Prior to construction, initiate a complaint/response tracking program	LTS	NA
REC-11: Result in long-term reduction in upland recreational opportunities as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
REC-12: Compatibility of the proposed water conveyance facilities and other conservation measures with federal, state, or local plans, policies, or regulations addressing recreation resources	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE

Level of Significance/Determination of Effects:

CEQA

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S = significant.
LTS = less than significant.
NI = no impact.
B = beneficial.
ND = no determination.

NEPA

A = adverse.
NA = not adverse.
NE = no effect.
B = beneficial.
ND = no determination.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
Socioeconomics[20]					
ECON-1: Temporary effects on regional economics and employment in the Delta region during construction of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones	NI	NA
ECON-2: Effects on population and housing in the Delta region during construction of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA
ECON-3: Changes in community character as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	Various mitigation measures introduced in the following chapters: Chapter 14, *Agricultural* Resources; Chapter 15, *Recreation*; Chapter 17*, Aesthetics and Visual Resources*; Chapter 19. *Transportation*; and Chapter 23, *Noise*.	NI	A/B[21]
ECON-4: Changes in local government fiscal conditions as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA
ECON-5: Effects on recreational economics as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	Various mitigation measures introduced in the following chapters: Chapter 12, *Terrestrial Biological Resources;* Chapter 15, *Recreation*; Chapter 17*, Aesthetics and Visual Resources*; Chapter 19, *Transportation*; and Chapter 23, *Noise*.	NI	A
ECON-6: Effects on agricultural economics in the Delta region during construction of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones	NI	A
ECON-7: Permanent regional economic and employment effects in the Delta region during operation and maintenance of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones	NI	A
ECON-8: Permanent effects on population and housing in the Delta region during operation and maintenance of the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA

[20] Socioeconomic effects are not considered environmental impacts for the purposes of CEQA, but related physical impacts that could stem from such socioeconomic changes are addressed and evaluated throughout the BDCP EIR/EIS. As such, "NI" is indicated for each CEQA conclusion for this resource.

[21] While water conveyance construction could result in beneficial effects relating to the economic welfare of a community through additional regional employment and income, adverse social effects could also arise as a result of declining economic stability in communities closest to construction effects and in those most heavily influenced by agricultural and recreational activities.

Level of Significance/Determination of Effects:

CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
ECON-9: Changes in community character during operation and maintenance of the proposed water conveyance facilities	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	Various mitigation measures introduced in the following chapters: Chapter 23, *Noise*; Chapter 17, *Aesthetics and Visual Resources*; Chapter 19, *Transportation*; Chapter 14, *Agricultural Resources*; Chapter 15, *Recreation*, and Chapter 30, *Growth Inducement and Other Indirect Effects.*	NI	NA
ECON-10: Changes in local government fiscal conditions during operation and maintenance of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	A/B[22]
ECON-11: Effects on recreational economics during operation and maintenance of the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA
ECON-12: Permanent effects on agricultural economics in the Delta region during operation and maintenance of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones	NI	A
ECON-13: Effects on the Delta region's economy and employment due to the implementation of the proposed CM2-CM21	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones MIN-5: Design Conservation Measures 4, 5, and 10 to avoid displacement of active natural gas wells to the extent feasible	NI	NA
ECON-14: Effects on population and housing in the Delta region as a result of implementing the proposed CM2-CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA
ECON-15: Changes in community character as a result of implementing the proposed CM2-CM21	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	Various mitigation measures introduced in the following chapters: Chapter 14, *Agricultural Resources*; Chapter 15, Recreation; Chapter 17, *Aesthetics and Visual Resources*; Chapter 19, *Transportation*; and Chapter 23, *Noise.*	NI	NA
ECON-16: Changes in local government fiscal conditions as a result of implementing the proposed CM2-CM21	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA

[22] A decrease in revenue as a result property tax and assessment revenue forgone as a result of the proposed water conveyance facilities could result in the loss of a substantial share of some agencies' tax bases, which would be considered an adverse effect. However, the BDCP proponents would make arrangements to compensate local governments for the loss of property tax or assessment revenue for land used for constructing, locating, operating, or mitigating for new Delta water conveyance facilities. Additionally, operation and maintenance of the water conveyance facilities would be anticipated to result in a net increase of income and employment in the Delta region. This would also create an indirect beneficial effect through increased sales tax revenue for local government entities that rely on sales taxes.

Level of Significance/Determination of Effects:

CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
ECON-17: Effects on recreational economics as a result of implementing the proposed CM2-CM21	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	A/B[23]
ECON-18: Effects on agricultural economics in the Delta region as a result of implementing the proposed CM2-CM21	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	AG-1: Develop an Agricultural Lands Stewardship Plan (ALSP) to maintain agricultural productivity and mitigate for loss of Important Farmland and land subject to Williamson Act contracts or in Farmland Security Zones	NI	NA
ECON-19: Socioeconomic effects in the south-of-Delta hydrologic regions	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	NI		NI	A/B[24]
	6A, 6B, 6C, 7, 8, 9	NI		NI	A/B[25]
Aesthetics and Visual Resources					
AES-1: Substantial alteration in existing visual quality or character during construction of conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan	SU	A

[23] Adverse effects would be primarily limited to areas close to restoration areas and during site preparation and earthwork phases. These effects could result in a decline in visits to the Delta and reduction in recreation-related spending, creating an adverse economic effect throughout the Delta. Beneficial recreational effects would generally result during later stages of the BDCP permit period as CM2–CM21 are implemented and environmental conditions supporting recreational activities are enhanced. These effects could improve the quality of recreational experiences, leading to increased economic activities related to recreation, particularly in areas where conservation measure implementation would create new recreational opportunities.

[24] In hydrologic regions where water deliveries are predicted to increase when compared with the No Action Alternative, more stable agricultural activities could support employment and economic production associated with agriculture. Where M&I deliveries increase, population growth could lead to general economic growth and support water-intensive industries. Such changes could also lead to shifts in the character of communities in the hydrologic regions with resultant beneficial or adverse effects. Likewise, growth associated with deliveries could require additional expenditures for local governments while also supporting increases in revenue.

[25] If operation of water conveyance facilities under Alternative 6A reduced M&I deliveries to the extent that it would, in the long run, constrain population growth, its implementation could reinforce a socioeconomic status quo or limit potential economic and employment growth in hydrologic regions. Such changes to agricultural production and population growth with its associated economic activity could also lead to shifts in the character of communities in the hydrologic regions with resultant beneficial or adverse effects. Likewise, limited growth associated with reduced deliveries could require lower expenditures for local governments while also leading to reduced revenue.

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
	9	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible	SU	A
AES-2: Permanent effects on a scenic vista from presence of conveyance facilities.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1e: Apply aesthetic design treatments to all structures to the extent feasible	SU	A
AES-3: Permanent damage to scenic resources along a state scenic highway from construction of conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1e: Apply aesthetic design treatments to all structures to the extent feasible	SU	A
	9	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-3: Design and implement an overlook with interpretative signage at the operable barrier on Threemile Slough Near Brannan Island State Recreation Area	SU	A
AES-4: Creation of a new source of light or glare that would adversely affect views in the area as a result of construction and operation of conveyance facilities.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AES-4a: Limit construction to daylight hours within 0.5 mile of residents AES-4b: Minimize fugitive light from portable sources used for construction AES-4c: Install visual barriers along access routes, where necessary, to prevent light spill from truck headlights toward residences AES-4d: Avoid the Use of Blue Rich White Light LED Lighting	SU	A
AES-5: Substantial alteration in existing visual quality or character during operation.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AES-6: Substantial alteration in existing visual quality or character during construction of CM2–CM21.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan AES-4a: Limit construction to daylight hours within 0.5 mile of residents AES-4b: Minimize fugitive light from portable sources used for construction AES-4c: Install visual barriers along access routes, where necessary, to prevent light spill from truck headlights toward residences AES-4d: Avoid the Use of Blue Rich White Light LED Lighting AES-6a: Underground new or relocated utility lines where feasible AES-6b: Develop and implement an afterhours low-intensity and lights off policy AES-6c: Implement a comprehensive visual resources management plan for the Delta and study area	SU	A
	2D, 4A, 5A	S	AES-1a: Locate new transmission lines and access routes to minimize the removal of trees and shrubs and pruning needed to accommodate new transmission lines and underground transmission lines where feasible AES-1b: Install visual barriers between construction work areas and sensitive receptors AES-1c: Develop and implement a spoil/borrow and reusable tunnel material area management plan AES-1d: Restore barge unloading facility sites once decommissioned AES-1e: Apply aesthetic design treatments to all structures to the extent feasible AES-1f: Locate concrete batch plants and fuel stations away from sensitive visual resources and receptors and restore sites upon removal of facilities AES-1g: Implement best management practices to implement project landscaping plan AES-4a: Limit construction to daylight hours within 0.5 mile of residents AES-4b: Minimize fugitive light from portable sources used for construction AES-4c: Install visual barriers along access routes, where necessary, to prevent light spill from truck headlights toward residences AES-4d: Avoid the Use of Blue Rich White Light LED Lighting	SU	A
AES-7: Compatibility of the proposed water conveyance facilities and other conservation measures with federal, state, or local plans, policies, or regulations addressing aesthetics and visual resources	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
Cultural Resources					
CUL-1: Effects on identified archaeological sites resulting from construction of conveyance facilities	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-1: Prepare a data recovery plan and perform data recovery excavations on the affected portion of the deposits of identified and significant archaeological sites	SU	A
CUL-2: Effects on archaeological sites to be identified through future inventory efforts	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-2: Conduct inventory, evaluation, and treatment of archaeological resources	SU	A
CUL-3: Effects on archaeological sites that may not be identified through inventory efforts	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-3: Implement an archaeological resources discovery plan, perform training of construction workers, and conduct construction monitoring	SU	A
CUL-4: Effects on buried human remains damaged during construction	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-4: Follow state and federal law governing human remains if such resources are discovered during construction	SU	A
CUL-5: Direct and indirect effects on eligible and potentially eligible historic architectural/built-environment resources resulting from construction activities	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-5: Consult with relevant parties, prepare and implement a built environment treatment plan	SU	A
CUL-6: Direct and indirect effects on unidentified and unevaluated historic architectural/built-environment resources resulting from construction activities	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-6: Conduct a survey of inaccessible properties to assess eligibility, determine if these properties will be adversely impacted by the project, and develop treatment to resolve or mitigate adverse impacts	SU	A
CUL-7: Effects of other Conservation Measures on cultural resources	NAA (LLT), NAA (ELT)	S		SU	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	CUL-7: Conduct cultural resource studies and adopt cultural resource mitigation measures for cultural resource impacts associated with implementation of CM2-CM21	SU	A
CUL-8: Compatibility of the proposed water conveyance facilities and other Conservation Measures with plans and policies	NAA (LLT), NAA (ELT)	NI		NI	NE
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
Transportation					
TRANS-1: Increased construction vehicle trips resulting in unacceptable level of service conditions	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments	SU[26]	A[27]
TRANS-2: Increased construction vehicle trips exacerbating unacceptable pavement conditions	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-2a: Prohibit construction activity on physically deficient roadway segments TRANS-2b: Limit construction activity on physically deficient roadway segments TRANS-2c: Improve physical condition of affected roadway segments as stipulated in mitigation agreements or encroachment permits	SU[27]	A[28]
TRANS-3: Increase in safety hazards, including interference with emergency routes during construction	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments	SU[28]	A[29]
TRANS-4: Disruption of marine traffic during construction	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	S	TRANS-1a: Implement site-specific construction traffic management plan	LTS	NA
TRANS-5: Disruption of rail traffic during construction.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-1a: Implement site-specific construction traffic management plan	LTS	NA

[26] Although Mitigation Measures TRANS-1a through TRANS-1c would reduce the severity of this effect, the project proponents are not solely responsible for the timing, nature, or complete funding of required improvements. If an improvement that is identified in any mitigation agreement(s) contemplated by Mitigation Measure TRANS-1c is not fully funded and constructed before the project's contribution to the impact/effect is made, a significant impact/adverse effect in the form of unacceptable LOS would occur. Therefore, this impact/effect would be significant and unavoidable/adverse, respectively. If, however, all improvements required to avoid significant impacts/adverse effects prove to be feasible and any necessary agreements are completed before the project's contribution to the effect is made, impacts/effects would be less than significant/not adverse, respectively.

[27] Mitigation Measures TRANS-2a through TRANS-2c are available to reduce the severity of this impact/effect, but not necessarily to a level of less-than-significant/not adverse, as the project proponents cannot ensure that the agreements or encroachment permits will be obtained from the relevant transportation agencies. If an agreement or encroachment permit is not obtained, a significant impact/adverse effect in the form of deficient pavement conditions would occur. Accordingly, this impact/effect could remain significant and unavoidable/adverse, respectively. If, however, mitigation agreement(s) or encroachment permit(s) providing for the improvement or replacement of pavement are obtained and any other necessary agreements are completed, impacts/effects would be reduced to less than significant/not adverse, respectively.

[28] Mitigation Measure TRANS-1c will reduce the severity of this impact/effect, but not to less-than-significant/not adverse levels. Project proponents are not solely responsible for the timing, nature, or complete funding of required improvements and cannot ensure that the improvements will be fully funded or constructed prior to the project's contribution to the impact/effect. If an improvement identified in the mitigation agreement(s) is not fully funded and constructed before the project's contribution to the impact/effect is made, a significant impact/adverse effect in the form of increased safety hazards would occur. Accordingly, this impact/effect would be significant and unavoidable/adverse, respectively. If, however, all improvements required to avoid significant impacts/adverse effects prove to be feasible and any necessary agreements are completed before the project's contribution to the impact/effect is made, impacts/effects would be less than significant/not adverse, respectively.

Level of Significance/Determination of Effects:

CEQA

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NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
TRANS-6: Disruption of transit service during construction.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments	SU	A
	9	LTS	TRANS-1a: Implement site-specific construction traffic management plan	LTS	NA
TRANS-7: Interference with bicycle routes during construction.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-1a: Implement site-specific construction traffic management plan	LTS	NA
TRANS-8: Increased traffic volumes and delays during operations and maintenance.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
TRANS-9: Permanent alteration of transportation patterns during operations and maintenance.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
TRANS-10: Increased traffic volumes during implementation of CM2–CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	TRANS-1a: Implement site-specific construction traffic management plan TRANS-1b: Limit hours or amount of construction activity on congested roadway segments TRANS-1c: Make good faith efforts to enter into mitigation agreements to enhance capacity of congested roadway segments	SU[29]	A[30]
TRANS-11: Compatibility of the proposed water conveyance facilities and other conservation measures with plans and policies	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
TRANS-12: Potential Effects on Navigation from Changes in Surface Water Elevations Caused by Construction of Water Conveyance Facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA
TRANS-13: Potential Effects on Navigation from Changes in Surface Elevations Caused by Operation of Intakes	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA

[29] Mitigation Measures TRANS-1a through TRANS-1c would reduce the severity of this impact/effect, but not to less than significant/not adverse levels. The BDCP proponents cannot ensure that the improvements will be fully funded or constructed prior to the project's contribution to the impact. If an improvement identified in the mitigation agreement(s) is not fully funded and constructed before the project's contribution to the impact/effect is made, a significant impact/adverse effect would occur. Therefore, the project's impacts/effects to roadway segment LOS would be conservatively significant and unavoidable/adverse, respectively. If, however, all improvements required to avoid significant impacts/adverse effects prove to be feasible and any necessary agreements are completed before the project's contribution to the impact/effect is made, impacts/effects would be less than significant/not adverse, respectively.

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CEQA			NEPA		
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
TRANS-14: Potential Effects on Navigation Caused by Sedimentation from Construction of Intakes	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	SW-4: Implement Measures to Reduce Runoff and Sedimentation	NI	NA
TRANS-15: Potential Effects on Navigation Caused by Sedimentation from Construction of Barge Facilities	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	SW-4: Implement Measures to Reduce Runoff and Sedimentation	NI	NA
TRANS-16: Potential Effects on Navigation Caused by Sedimentation from Construction of Clifton Court Forebay	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
TRANS-17: Potential Effects on Navigation Caused by Sedimentation from Operation of Intakes	NAA (LLT), NAA (ELT)	NI		NI	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI	SW-4: Implement Measures to Reduce Runoff and Sedimentation	NI	NA
TRANS-18: Potential Effects on Navigation from Construction and Operations of Head of Old River Barrier	NAA (LLT), NAA (ELT), 2A, 2B, 2C, 4, 9, 2D, 4A	NI		NI	NA
	1A, 1B, 1C, 3, 5, 6A, 6B, 6C, 7, 8, 5A	NI		NI	NE
TRANS-19: Potential Cumulative Effects on Navigation from Construction and Operations of Water Conveyance Facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NA
Public Services and Utilities					
UT-1: Increased demand on law enforcement, fire protection, and emergency response services from new workers in the Plan Area as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
UT-2: Displacement of public service facilities as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1C, 2C, 3, 4, 5, 6C, 9, 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 2A, 2B, 6A, 6B, 7, 8	S	UT-2: Ensure the continuation of fire protection services by the Courtland Fire Protection District	SU[30]	A[33]

[30] Implementation of these alternatives would conflict with the Courtland Fire Protection District's Hood Fire Station and could require relocation of Hood Fire Station, resulting in environmental impacts and effects. Mitigation Measure UT-2 would be available to lessen the severity of those impacts and effects. However, it would require the construction of a replacement facility, which could result in significant impacts and adverse effects. If coordination were successful, environmental commitments and mitigation measures would be adopted by the Courtland Fire District and Sacramento County, and the impact would be less than significant, and the effect would not be adverse.

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
UT-3: Effects on public schools as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
UT-4: Effects on water or wastewater treatment services and facilities as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
UT-5: Effects on landfills as a result of solid waste disposal needs during construction of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
UT-6: Effects on regional or local utilities as a result of constructing the proposed water conveyance facilities.	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	UT-6a: Verify locations of utility infrastructure UT-6b: Relocate utility infrastructure in a way that avoids or minimizes any effect on operational reliability UT-6c: Relocate utility infrastructure in a way that avoids or minimizes any effect on worker and public health and safety	SU[31]	A[34]
UT-7: Effects on public services and utilities as a result of operation and maintenance of the proposed water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	S		SU	A
UT-8: Effects on public services and utilities as a result of implementing the proposed CM2–CM11 and CM20	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	UT-6a: Verify locations of utility infrastructure UT-6b: Relocate utility infrastructure in a way that avoids or minimizes any effect on operational reliability UT-6c: Relocate utility infrastructure in a way that avoids or minimizes any effect on worker and public health and safety	SU	A

[31] If coordination with all appropriate utility providers and local agencies to integrate with other construction projects and minimize disturbance to communities were successful under Mitigation Measure UT-6b, the impact would be less than significant (CEQA) and there would be no adverse effect (NEPA).

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
Energy					
ENG-1: Wasteful or inefficient energy use for temporary construction activities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
ENG-2: Wasteful or inefficient energy use for pumping and conveyance	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
ENG-3: Compatibility of the proposed water conveyance facilities and CM2–CM21 with plans and policies	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
Air Quality and Greenhouse Gases					
AQ-1: Generation of criteria pollutants in excess of the SMAQMD regional thresholds during construction of the proposed water conveyance facility.	NAA (LLT), NAA (ELT)	S		S/LTS	A/NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (NO_x)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	LTS (NO_x)	NA (NO_x)
AQ-2: Generation of criteria pollutants in excess of the YSAQMD regional thresholds during construction of the proposed water conveyance facility.	NAA (LLT), NAA (ELT)	S		S/LTS	A/NA
	1A, 1B, 2A, 2B, 6A, 6B, 7, 8	S (NO_x, PM10)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	LTS (NO_x, PM10)	NA (NO_x, PM10)
	1C, 2C, 6C	S (ROG, NO_x, PM10)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	LTS (ROG, NO_x, PM10)	NA (ROG, NO_x, PM10)

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
	3	S (PM10)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	LTS (PM10)	NA (PM10)
	4, 5, 4A, 5A	LTS		LTS	NA
	9	NI		NI	NE
	2D, 4A	S (NO_x)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants	LTS (NO_x)	NA (NO_x)
AQ-3: Generation of criteria pollutants in excess of the BAAQMD regional thresholds during construction of the proposed water conveyance facility.	NAA (LLT), NAA (ELT)	S		S/LTS	A/NA
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A	S (ROG, NO_x)	AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants	LTS (ROG, NO_x)	NA (ROG, NO_x)
	1C, 2C, 6C	S (ROG, NO_x)	AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants	SU (ROG, NO_x)	A (ROG, NO_x)

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQ-4: Generation of criteria pollutants in excess of the SJVAPCD regional thresholds during construction of the proposed water conveyance facility.	NAA (LLT), NAA (ELT)	S		S/LTS	A/NA
	1A, 2A, 3, 4, 5, 6A, 7, 8, 2D, 4A, 5A	S (ROG, NO_x, PM10)	AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	LTS (ROG, NO_x, PM10)	NA (ROG, NO_x, PM10)
	1B, 2B, 6B	S (ROG, NO_x, PM10, PM2.5)	AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	LTS (ROG, NO_x, PM10, PM2.5)	NA (ROG, NO_x, PM10, PM2.5)
	1C, 6C	NI		NI	NE
	2C	LTS		LTS	NA
	9	S (NO_x, PM10)	AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	LTS (NO_x, PM10)	NA (NO_x, PM10)
AQ-5: Generation of criteria pollutants in excess of the SMAQMD regional thresholds from operation and maintenance of the proposed water conveyance facility.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	NI		NI	NE
AQ-6: Generation of criteria pollutants in excess of the YSAQMD regional thresholds from operation and maintenance of the proposed water conveyance facility.	NAA (LLT), NAA (ELT), 1C, 2C, 6C	LTS		LTS	NA
	1A, 1B, 2A, 2B, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
AQ-7: Generation of criteria pollutants in excess of the BAAQMD regional thresholds from operation and maintenance of the proposed water conveyance facility.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	NI		NI	NE

Level of Significance/Determination of Effects:

CEQA

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S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQ-8: Generation of criteria pollutants in excess of the SJVAPCD regional thresholds from operation and maintenance of the proposed water conveyance facility.	NAA (LLT), NAA (ELT), 1A, 1B, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1C, 6C	NI		NI	NE
AQ-9: Exposure of sensitive receptors to health hazards from localized particulate matter in excess of SMAQMD's health-based concentration thresholds	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S (PM10)	AQ-9: Implement Measures to Reduce Re-Entrained Road Dust and Receptor Exposure to PM2.5 and PM10	LTS (PM10)	NA (PM10)
AQ-10: Exposure of sensitive receptors to health hazards from localized particulate matter in excess of YSAQMD's health-based concentration thresholds	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	NI		NI	NE
AQ-11: Exposure of sensitive receptors to health hazards from localized particulate matter in excess of BAAQMD's health-based concentration thresholds	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQ-12: Exposure of sensitive receptors to health hazards from localized particulate matter in excess of SJVAPCD's health-based concentration thresholds	NAA (LLT), NAA (ELT), 2C, 4, 2D, 4A, 5A	LTS		LTS	NA
	1A, 2A, 3, 5, 6A, 7, 8	S (PM10)	AQ-9: Implement Measures to Reduce Re-Entrained Road Dust and Receptor Exposure to PM2.5 and PM10	LTS (PM10)	NA (PM10)
	1B, 2B, 6B, 9	S (PM10, PM2.5)	AQ-9: Implement Measures to Reduce Re-Entrained Road Dust and Receptor Exposure to PM2.5 and PM10	LTS (PM10, PM2.5)	NA (PM10, PM2.5)
	1C, 6C	NI		NI	NE
AQ-13: Exposure of sensitive receptors to health hazards from localized carbon monoxide	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQ-14: Exposure of sensitive receptors to health hazards from diesel particulate matter in excess of SMAQMD's chronic non-cancer and cancer risk thresholds	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS[32]	NA[35]
	9	S	AQ-16: Relocate Sensitive Receptors to Avoid Excess Cancer Risk	SU/LTS	A/NA
AQ-15: Exposure of sensitive receptors to health hazards from diesel particulate matter in excess of YSAQMD's chronic non-cancer and cancer risk thresholds	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	NI		NI	NE

[32] Although Mitigation Measure AQ-16 would reduce the severity of this effect, the BDCP proponents are not solely responsible for implementation of the measure. If a landowner chooses not to accept DWR's offer of relocation assistance, an significant impact/adverse effect in the form excess cancer risk above air district thresholds would occur. Therefore, this impact/effect would be significant and unavoidable/adverse, respectively. If, however, all landowners accept DWR's offer of relocation assistance, impacts/effects would not be less than significant/adverse, respectively.

Level of Significance/Determination of Effects:

CEQA

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S = significant.
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B = beneficial.
ND = no determination.

NEPA

A = adverse.
NA = not adverse.
NE = no effect.
B = beneficial.
ND = no determination.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQ-16: Exposure of sensitive receptors to health hazards from diesel particulate matter in excess of BAAQMD's chronic non-cancer and cancer risk thresholds	NAA (LLT), NAA (ELT), 1B, 2B, 4, 6B, 9, 2D, 4A, 5A	LTS		LTS	NA
	1A, 1C, 2A, 2C, 3, 5, 6A, 6C, 7, 8	S	AQ-16: Relocate Sensitive Receptors to Avoid Excess Cancer Risk	SU/LTS[35]	A/NA[35]
AQ-17: Exposure of sensitive receptors to health hazards from diesel particulate matter in excess of SJVAPCD's chronic non-cancer and cancer risk thresholds	NAA (LLT), NAA (ELT), 1A, 2A, 2C, 3, 4, 5, 6A, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
	1B, 2B, 6B	S	AQ-16: Relocate Sensitive Receptors to Avoid Excess Cancer Risk	SU/LTS[35]	A/NA[35]
	1C, 6C	NI		NI	NE
AQ-18: Exposure of sensitive receptors to *Coccidioides immitis* (Valley Fever)	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQ-19: Creation of potential odors affecting a substantial number of people during construction or operation of the proposed water conveyance facility	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQ-20: Generation of criteria pollutants in the excess of federal *de minimis* thresholds from construction and operation and maintenance of the proposed water conveyance facility	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 2A, 6A	S – SFNA (ROG, NO_x, PM10) S – SJVAB (ROG, NO_x) LTS – SFBAAB	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	SU – SFNA (ROG, NO_x, PM10) LTS – SJVAB (ROG, NO_x) LTS – SFBAAB	A – SFNA (ROG, NO_x, PM10) NA – SJVAB (ROG, NO_x) NA – SFBAAB

Level of Significance/Determination of Effects:

CEQA			NEPA		
SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).	LTS = less than significant.	B = beneficial.	A = adverse.	NE = no effect.	ND = no determination.
S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
	1B, 2B, 6B	S – SFNA (ROG, NO_x, PM10) S – SJVAAB (ROG, NO_x, PM10) LTS – SFBAAB	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	SU – SFNA (ROG, NO_x, PM10) LTS – SJVAAB (ROG, NO_x, PM10) LTS – SFBAAB	A – SFNA (ROG, NO_x, PM10) NA – SJVAAB (ROG, NO_x, PM10) NA – SFBAAB
	1C, 2C, 6C	S – SFNA (ROG, NO_x) S – SFBAAB (NO_x) LTS – SJVAB	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants	LTS – SFNA (ROG, NO_x) SU – SFBAAB (NO_x) LTS – SJVAB	NA – SFNA (ROG, NO_x) A – SFBAAB (NO_x) NA – SJVAB

Level of Significance/Determination of Effects:

CEQA

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NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
	3, 7, 8	S – SFNA (ROG, NO_x) S – SJVAB (ROG, NO_x) LTS – SFBAAB	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	SU – SFNA (ROG, NO_x) LTS – SJVAB (ROG, NO_x) LTS – SFBAAB	A – SFNA (ROG, NO_x) NA – SJVAB (ROG, NO_x) NA – SFBAAB
	4, 4A	S – SFNA (NO_x) S – SFBAAB (NO_x) S – SJVAB (ROG, NO_x)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	LTS – SFNA (NO_x) LTS – SFBAAB (NO_x) LTS – SJVAB (ROG, NO_x)	NA – SFNA (NO_x) NA – SFBAAB (NO_x) NA – SJVAB (ROG, NO_x)

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
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NEPA

A = adverse. NE = no effect. ND = no determination.
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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
	5	S – SFNA (NO_x) S – SJVAB (ROG, NO_x) LTS – SFBAAB	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	SU – SFNA (NO_x) LTS – SJVAB (ROG, NO_x) LTS – SFBAAB	A – SFNA (NO_x) NA – SJVAB (ROG, NO_x) NA – SFBAAB
	9	S – SFNA (ROG, NO_x, PM10) S – SJVAB (NO_x) LTS – SFBAAB	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	SU – SFNA (ROG, NO_x, PM10) LTS – SJVAB (NO_x) LTS – SFBAAB	A – SFNA (ROG, NO_x, PM10) NA – SJVAB (NO_x) NA – SFBAAB
	2D	S – SFNA (ROG, NO_x, PM10) S – SJVAB (ROG, NO_x) S – SFBAAB (NO_x)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants	SU – SFNA (ROG, NO_x, PM10) LTS – SJVAB (ROG, NO_x) LTS – SFBAAB (NO_x)	A – SFNA (ROG, NO_x, PM10) NA – SJVAB (ROG, NO_x) NA – SFBAAB (NO_x)

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
			AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants		
	5A	S – SFNA (NO_x) S – SJVAB (ROG, NO_x) S – SFBAAB (NO_x)	AQ-1a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-1b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SFNA to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable CEQA Thresholds for Other Pollutants AQ-3a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-3b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the BAAQMD/SFBAAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable BAAQMD CEQA Thresholds for Other Pollutants AQ-4a: Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants AQ-4b: Develop an Alternative or Complementary Offsite Mitigation Program to Mitigate and Offset Construction-Generated Criteria Pollutant Emissions within the SJVAPCD/SJVAB to Net Zero (0) for Emissions in Excess of General Conformity *De Minimis* Thresholds (Where Applicable) and to Quantities below Applicable SJVAPCD CEQA Thresholds for Other Pollutants	LTS – SFNA (NO_x) LTS – SJVAB (ROG, NO_x) LTS – SFBAAB (NO_x)	NA – SFNA (NO_x) NA – SJVAB (ROG, NO_x) NA – SFBAAB (NO_x)
AQ-21: Generation of cumulative greenhouse gas emissions during construction of the proposed water conveyance facility	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AQ-21: Develop and Implement a GHG Mitigation Program to Reduce Construction Related GHG Emissions to Net Zero (0)	LTS	NA
AQ-22: Generation of cumulative greenhouse gas emissions from operation and maintenance of the proposed water conveyance facility and increased pumping	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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CEQA			NEPA		
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S = significant.	NI = no impact.	ND = no determination.	NA = not adverse.	B = beneficial.	

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
AQ-23: Generation of cumulative greenhouse gas emissions from increased CVP pumping as a result of implementation of CM1	NAA (LLT), NAA (ELT), 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 2D, 4A, 5A	S	No feasible mitigation to address this impact	SU	A
AQ-24: Generation of regional criteria pollutants from implementation of CM2–CM11	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AQ-24: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities	SU	A
AQ-25: Exposure of sensitive receptors to health hazards from localized particulate matter, carbon monoxide, and diesel particulate matter from implementation of CM2-CM11	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AQ-24: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities AQ-25: Prepare a Project-Level Health Risk Assessment to Reduce Potential Health Risks from Exposure to Localized DPM and PM Concentrations	LTS	NA
AQ-26: Creation of potential odors affecting a substantial number of people from implementation of CM2-CM11	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
AQ-27: Generation of cumulative greenhouse gas emissions from implementation of CM2–CM11	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	AQ-24: Develop an Air Quality Mitigation Plan (AQMP) to Ensure Air District Regulations and Recommended Mitigation are Incorporated into Future Conservation Measures and Associated Project Activities AQ-27: Prepare a Land Use Sequestration Analysis to Quantify and Mitigate (as Needed) GHG Flux Associated with Conservation Measures and Associated Project Activities	SU	A
Noise					
NOI-1: Exposure of noise-sensitive land uses to noise from construction of water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	NOI-1a: Employ noise-reducing construction practices during construction, NOI-1b: Prior to construction, initiate a complaint/response tracking program	SU	A
NOI-2: Exposure of sensitive receptors to vibration or groundborne noise from construction of water conveyance facilities	NAA (LLT), NAA (ELT), 9	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	NOI-2: Employ vibration-reducing construction practices during construction of water conveyance facilities	SU	A
NOI-3: Exposure of noise-sensitive land uses to noise from operation of water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	NOI-3: Design and construct intake facilities and other pump facilities such that operational noise does not exceed 50 dBA (one-hour L_{eq}) during daytime hours (7:00 a.m. to 10:00 p.m.) or 45 dBA (one-hour L_{eq}) during nighttime hours (10:00 p.m. to 7:00 a.m.) or the applicable local noise standard (whichever is less) at nearby noise sensitive land uses	LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
NOI-4: Exposure of noise-sensitive land uses to noise from implementation of proposed Conservation Measures 2–10	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	NOI-1a: Employ noise-reducing construction practices during construction NOI-1b: Prior to construction, initiate a complaint/response tracking program	SU	A
Hazards and Hazardous Materials					
HAZ-1: Create a substantial hazard to the public or the environment through the release of hazardous materials or by other means during construction of the water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	HAZ-1a: Perform preconstruction surveys, including soil and groundwater testing, at known or suspected contaminated areas within the construction footprint, and remediate and/or contain contamination HAZ-1b: Perform pre-demolition surveys for structures to be demolished within the construction footprint, characterize hazardous materials and dispose of them in accordance with applicable regulations UT-6a: Verify locations of utility infrastructure UT-6c: Relocate utility infrastructure in a way that avoids or minimizes any effect on worker and public health and safety TRANS-1a: Implement site-specific construction traffic management plan	LTS	NA
HAZ-2: Expose sensitive receptors located within 0.25 mile of a construction site to hazardous materials, substances, or waste during construction of the water conveyance facilities	NAA (LLT), NAA (ELT), 1B, 1C, 2B, 2C, 6B, 6C, 9	LTS		LTS	NA
	1A, 2A, 3, 4, 5, 6A, 7, 8, 2D, 4A, 5A	NI		NI	NE
HAZ-3: Potential to conflict with a known hazardous materials site and, as a result, create a significant hazard to the public or the environment	NAA (LLT), NAA (ELT), 1C, 2C, 6C	LTS		LTS	NA
	1A, 2A, 3, 4, 5, 6A, 7, 8, 2D, 4A, 5A	NI		NI	NE
	1B, 2B, 6B, 9	S	HAZ-1a: Perform preconstruction surveys, including soil and groundwater testing, at known or suspected contaminated areas within the construction footprint, and remediate and/or contain contamination	LTS	NA
HAZ-4: Result in a safety hazard associated with an airport or private airstrip within 2 miles of the water conveyance facilities footprint for people residing or working in the study area during construction of the water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
HAZ-5: Expose people or structures to a substantial risk of property loss, personal injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands, as a result of construction, and operation and maintenance of the water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
HAZ-6: Create a substantial hazard to the public or the environment through the release of hazardous materials or by other means during operation and maintenance of the water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	HAZ-6: Test dewatered solids from solids lagoons prior to reuse and/or disposal	LTS	NA
	9	LTS		LTS	NA
HAZ-7: Create a substantial hazard to the public or the environment through the release of hazardous materials or by other means as a result of implementing CM2–CM11, CM13, CM14, CM16, CM18 and CM19	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	HAZ-1a: Perform preconstruction surveys, including soil and groundwater testing, at known or suspected contaminated areas within the construction footprint, and remediate and/or contain contamination HAZ-1b: Perform pre-demolition surveys for structures to be demolished within the construction footprint, characterize hazardous materials and dispose of them in accordance with applicable federal, state and local regulations UT-6a: Verify locations of utility infrastructure UT-6c: Relocate utility infrastructure in a way that avoids or minimizes any effect on worker and public health and safety TRANS-1a: Implement site-specific construction traffic management plan	LTS	NA
HAZ-8: Increased risk of bird–aircraft strikes during implementation of conservation measures that create or improve wildlife habitat	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	HAZ-8: Consult with individual airports and USFWS, and relevant regulatory agencies	SU	A
Public Health					
PH-1: Increase in vector-borne diseases as a result of construction and operation of the water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
PH-2: Exceedances of water quality criteria for constituents of concern such that there is an adverse effect on public health as a result of operation of the water conveyance facilities.	NAA (LLT), NAA (ELT), 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5	S	WQ-5: Avoid, minimize, or offset, as feasible, adverse water quality conditions; Site and design restoration sites to reduce bromide increases in Barker Slough	SU[33]	A[36]
	6A, 6B, 6C, 7, 8, 9	S	WQ-5: Avoid, minimize, or offset, as feasible, adverse water quality conditions; Site and design restoration sites to reduce bromide increases in Barker Slough WQ-17: Consult with Delta water purveyors to identify means to avoid, minimize, or offset increases in long-term average DOC concentrations	SU[36]	A[36]
PH-3: Substantial mobilization or increase in constituents known to bioaccumulate as a result of construction, operation or maintenance of the water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A	LTS		LTS	NA
	6A, 6B, 6C, 7, 8, 9	S		SU	A

[33] This impact/effect would be less than significant/not adverse if all financial contributions, technical contributions, or partnerships required to avoid significant impacts prove feasible and any necessary agreements are completed before the project's contribution to the effect.

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Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
PH-4: Expose substantially more people to transmission lines generating new sources of EMFs as a result of the operation of the water conveyance facilities.	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A, 6A, 6B, 6C, 7, 8	LTS		LTS	NA
	9	NI		NI	NE
PH-5: Increase in vector-borne diseases as a result of implementing CM2–CM7, CM10, and CM11	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
PH-6: Substantial increase in recreationists' exposure to pathogens as a result of implementing the restoration conservation measures	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
PH-7: Substantial mobilization of or increase in constituents known to bioaccumulate as a result of implementing CM2, CM4, CM5, and CM10	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 2D, 3, 4, 4A, 5, 5A, 6A, 6B, 6C, 7, 8, 9	LTS		LTS	NA
PH-8: Increase in *Microcystis* bloom formation as a result of operations of the water conveyance facilities	NAA (LLT), NAA (ELT)	S		S	A
	2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-32a: Design restoration sites to reduce potential for increased *Microcystis* blooms WQ-32b: Investigate and implement operational measures to manage water residence time	SU	A
Impact PH-9: Increase in *Microcystis* Bloom Formation as a Result of Implementing CM2 and CM4.	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9	S	WQ-32a: Design restoration sites to reduce potential for increased *Microcystis* blooms WQ-32b: Investigate and implement operational measures to manage water residence time	SU	A
	2D, 4A, 5A	LTS		LTS	NA
Mineral Resources					
MIN-1: Loss of availability of locally important natural gas wells as a result of constructing the water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8	LTS		LTS	NA
	4, 4A	NI		NI	NA
	9, 2D, 5A	NI		NI	NE
MIN-2: Loss of availability of extraction potential from natural gas fields as a result of constructing the water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	LTS		LTS	NA
	9	NI		NI	NA
MIN-3: Loss of availability of locally important natural gas wells as a result of operation and maintenance of the water conveyance facilities	NAA (LLT), NAA (ELT), 1B, 2B, 6B, 4A, 5A	LTS		LTS	NA
	1A, 1C, 2A, 2C, 3, 4, 5, 6A, 6C, 7, 2D	NI		NI	NA
	8, 9	NI		NI	NE

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant).
S = significant.
LTS = less than significant.
NI = no impact.
B = beneficial.
ND = no determination.

NEPA

A = adverse.
NA = not adverse.
NE = no effect.
B = beneficial.
ND = no determination.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation	
		CEQA		CEQA	NEPA
MIN-4: Loss of availability of natural gas fields as a result of operation and maintenance of the water conveyance facilities	NAA (LLT), NAA (ELT), 2D, 4A, 5A	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8	NI		NI	NA
	9	NI		NI	NE
MIN-5: Loss of availability of locally important natural gas wells as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	MIN-5: Design CM4, CM5, AND CM10 to avoid displacement of active natural gas wells to the extent feasible	SU	A
MIN-6: Loss of availability of extraction potential from natural gas fields as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	MIN-6: Design CM4, CM5, AND CM10 to maintain drilling access to natural gas fields to the extent feasible	SU	A
MIN-7: Loss of availability of locally important aggregate resource sites (mines and MRZs) as a result of constructing the water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	NI		NI	NE
MIN-8: Loss of availability of known aggregate resources as a result of constructing the proposed water conveyance facilities	NAA (LLT), NAA (ELT). 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA
MIN-9: Loss of availability of locally important aggregate resource sites (mines and MRZs) as a result of operation and maintenance of the water conveyance facilities	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 4A	NI		NI	NE
	2D, 5A	LTS		LTS	NE
MIN-10: Loss of availability of known aggregate resources as a result of operation and maintenance of the water conveyance facilities	NAA (LLT), NAA (ELT), 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 4A	LTS		LTS	NA
	2D, 5A	LTS		LTS	NE
MIN-11: Loss of availability of locally important aggregate resource sites (mines and MRZs) as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	MIN-11: Purchase affected aggregate materials for use in BDCP construction	LTS	NA
MIN-12: Loss of availability of known aggregate resources as a result of implementing CM2-CM21	NAA (LLT), NAA (ELT)	LTS		LTS	NA
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	LTS		LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
NA = not adverse. B = beneficial.

Potential Impact	Alternatives	Impact Conclusions Before Mitigation CEQA	Proposed Mitigation (CEQA and NEPA)	Impact Conclusion After Mitigation CEQA	Impact Conclusion After Mitigation NEPA
Paleontological Resources					
PALEO-1: Destruction of unique or significant paleontological resources as a result of construction of water conveyance facilities.	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 2D, 4A, 5A	S	PALEO-1a: Prepare a monitoring and mitigation plan for paleontological resources PALEO-1b: Review 90% design submittal and develop specific language identifying how the mitigation measures will be implemented along the alignment PALEO-1c: Educate construction personnel in recognizing fossil material PALEO-1d: Collect and preserve substantial potentially unique or significant fossil remains when encountered	SU	A
	9	S	PALEO-1a: Prepare a monitoring and mitigation plan for paleontological resources PALEO-1b: Review 90% design submittal and develop specific language identifying how the mitigation measures will be implemented along the alignment PALEO-1c: Educate construction personnel in recognizing fossil material PALEO-1d: Collect and preserve substantial potentially unique or significant fossil remains when encountered	LTS	NA
PALEO-2: Destruction of unique or significant paleontological resources associated with the implementation of CM2-CM21	NAA (LLT), NAA (ELT)	S		S	A
	1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9, 2D, 4A, 5A	S	PALEO-1a: Prepare a monitoring and mitigation plan for paleontological resources PALEO-1b: Review 90% design submittal and develop specific language identifying how the mitigation measures will be implemented along the alignment PALEO-1c: Educate construction personnel in recognizing fossil material PALEO-1d: Collect and preserve substantial potentially unique or significant fossil remains when encountered	LTS	NA

Level of Significance/Determination of Effects:

CEQA

SU = significant and unavoidable (any mitigation not sufficient to render impact less than significant). LTS = less than significant. B = beneficial.
S = significant. NI = no impact. ND = no determination.

NEPA

A = adverse. NE = no effect. ND = no determination.
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Chapter 1
Introduction

1.1 About the BDCP/California WaterFix

The California Department of Water Resources (DWR), in coordination with the U.S. Bureau of Reclamation (Reclamation), and several state and federal water contractors, started planning efforts to implement a comprehensive strategy for restoring ecological functions of the Delta and improving water supply reliability in the State of California. The initial approach focused on the development of a conservation plan, referred to as the Bay Delta Conservation Plan (BDCP), which would include modifications to the State Water Project (SWP) to add intakes in the north Delta and would preserve and restore very substantial amounts of land in the Delta for the protection of various endangered and threatened species, as well as other "special status species." In 2015, DWR and Reclamation introduced California WaterFix[1] (Alternative 4A), which was developed in response to public and agency input and which is the California Environmental Quality Act (CEQA) preferred alternative, replacing Alternative 4 (the proposed BDCP). Alternative 4A is also the National Environmental Policy Act (NEPA) proposed action and preferred alternative, a designation that was not attached to any of the alternatives presented in the Draft EIR/EIS.

In December 2013, DWR, acting as lead agency for compliance with CEQA, and Reclamation, USFWS, and NMFS, acting as lead agencies for compliance with NEPA, released a joint draft environmental impact report/environmental impact statement (Draft EIR/EIS) to analyze and disclose the potential environmental effects associated with the proposed BDCP and other action alternatives, all of which are intended to achieve the goals of restoring the ecological functions of the Delta and improving water supply reliability. The Draft EIR/EIS also identified potentially feasible ways to avoid, minimize, or mitigate adverse effects.

The BDCP would achieve compliance with the federal Endangered Species Act (ESA) through application for approval of a habitat conservation plan (HCP) from the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) under Section 10 of the ESA, and would achieve compliance with the California Natural Community Conservation Planning Act (NCCPA) (and California Endangered Species Act (CESA) through request for approval of a Natural Community Conservation Plan (NCCP) from the California Department of Fish and Wildlife (CDFW).

The proposed BDCP, which is incorporated herein by reference,[2] would be a unique undertaking by the BDCP lead agencies; Reclamation; CDFW, USFWS, NMFS, environmental organizations, and other federal, state, and local agencies and organizations that desire a plan for the long-term sustainability of the Delta. The BDCP, along with this EIR/EIS and other supporting documentation, would provide the basis for decisions concerning the applications for issuance of endangered species take permits for restoration activities and facility and operational changes in the SWP and authorizations related to operational changes in the federal Central Valley Project (CVP). The BDCP sets out a

[1] Hereafter in this document and in associated documents, California WaterFix will often be referred to as Alternative 4A.

[2] The Final EIR/EIS includes the 2013 Draft EIR/EIS, BDCP, 2015 RDEIR/SDEIS, and all associated appendices with these documents; as well as revisions to these documents as contained in this Final EIR/EIS, and the Biological Assessment for the California WaterFix (July 2016).

comprehensive, long-term conservation strategy for the Delta designed to restore and protect ecosystem health, water supply, and water quality within a stable regulatory framework. The BDCP reflects the outcome of a multiyear collaboration between DWR, Reclamation, state and federal fish and wildlife agencies, state and federal water contractors, nongovernmental organizations, agricultural interests, and the general public.

The original Draft BDCP and Draft EIR/EIS were released together for public review on December 13, 2013, for what was initially intended to be a 120-day public review period. In response to requests for additional time, however, the lead agencies extended the review period in April 2014 for an additional 60 days. In June 2014, the lead agencies decided to further extend the review period to July 29, 2014, for a total review period of approximately 7½ months (228 days). During the latter portion of the extended public review period, the lead agencies issued a draft Implementation Agreement for a 60-day public review period to coincide with the last 60 days of the Draft EIR/EIS review period.

Public comment received on the draft documents comprised a total of 12,204 comment letters—1,518 unique letters from individual members of the public and 432 letters from agencies, organizations, and stakeholder groups. The balance of comments consisted of form letters sent by individuals and organized by various organizations. A total of 18,532 separate comments on the draft documents were received during the public review period. All the comments were considered in the decision to recirculate the environmental review documents.

In July 2015, the lead agencies issued the Bay Delta Conservation Plan/California WaterFix Partially Recirculated Draft EIR/Supplemental Draft EIS (RDEIR/SDEIS). The primary purposes of the RDEIR/SDEIS were to provide the public and interested agencies with updated environmental analysis to address certain revisions to the previously issued documents related to the BDCP and Draft EIR/EIS, to introduce new alternatives (Alternatives 4A, 2D, and 5A), and to address certain issues raised in comments received on the Draft EIR/EIS.

The RDEIR/SDEIS considered project revisions that were developed in response to input from the Draft EIR/EIS comment period (see Section 1.7, *Public Scoping and Issues of Known Controversy*) as well as from agencies' comments regarding the challenges with meeting the standards required to issue long-term assurances associated with compliance with Section 10 of the ESA and the NCCPA. These challenges related to the difficulties in assessing species status and issuing assurances over a 50-year period, in light of climate change, and accurately factoring in the benefits of long term conservation in contributing to the recovery of the species. There were also questions raised as to the ability to implement large-scale habitat restoration and an interest in exploring multiple regulatory approaches that could facilitate expeditious progress on Delta solutions. To address these concerns, and due to the desire to explore alternative regulatory approaches that could facilitate expeditious progress on Delta solutions, the lead agencies revised the proposed project to allow for an alternative implementation strategy for the new alternatives in the RDEIR/SDEIS. The alternative implementation strategy relates to achieving the project goals and objectives, focusing on the conveyance facility improvements necessary for the SWP to address more immediate water supply reliability needs in conjunction with related ecosystem improvements, such as significantly reducing reverse flows and direct fish species impacts associated with the existing south Delta intakes. The alternative implementation strategy allows for other state and federal programs to address the long-term conservation efforts for species recovery in programs separate from the proposed project.

The alternative implementation strategy added three new alternatives to the RDEIR/SDEIS analysis (Alternatives 2D, 4A,[3] and 5A). The alternatives in the Draft EIR/EIS are retained for the original conservation plan implementation strategy. If the lead agencies ultimately choose the alternative implementation strategy and select an alternative introduced in the RDEIR/SDEIS after completing the CEQA and NEPA processes, elements of the conservation plan contained in the alternatives in the Draft EIR/EIS may be utilized by other programs for implementation of the long-term conservation efforts.

Subsequent to the commencement of the BDCP and Draft EIR/EIS review period, DWR also decided that certain portions of the proposed conservation strategy, including *Conservation Measure (CM) 1 Water Facilities and Operation*, should be revised and modified to reduce environmental impacts, to increase the effectiveness of the proposed conservation strategy, and to improve the feasibility of conveyance facilities. The lead agencies determined that, in light of these changes and the importance of other substantive modifications made to the Draft EIR/EIS, members of the public and other interested agencies and entities should have a formal opportunity to review and comment on these revisions to the Draft EIR/EIS. Those modifications were included in the RDEIR/SDEIS and are reflected in this Final EIR/EIS.

The RDEIR/SDEIS was circulated for an additional public review period to disclose impacts and mitigation measures of the new alternatives and other changes. The duration of the overall public review period reflected the lead agencies' desire to ensure that agencies, members of the public, and other entities had sufficient time in which to provide meaningful comments on all the draft documents, many of which were lengthy, reflecting the complexity of the issues involved. The RDEIR/SDEIS was circulated for public review on July 10, 2015 for a 112-day comment period that closed on October 30, 2015.

Public comment received on the RDEIR/SDEIS comprised more than 21,700 comment letters—5,920 unique letters from individual members of the public, 36 from elected officials, 117 letters from governments or public agencies, and 464 from non-governmental organizations and stakeholder groups. The balance of comments consisted of form letters sent by individuals and organized by various organizations. A total of 12,492 separate comments on the recirculated documents were received during the public review period. Formal responses to the comments received on the Draft BDCP, the Draft EIR/EIS, and the RDEIR/SDEIS are included in this Final EIR/EIS.

This chapter introduces the EIR/EIS and provides context for the reader and decision makers to understand the history and complexity of issues that have led to the development of the proposed BDCP and application for the incidental take permits (ITPs) and an NCCP, and development of the California WaterFix. This chapter also provides an overview and definition of the project area, summarizes the statutory basis and intended uses of the EIR/EIS, describes the various agencies' roles and responsibilities, discusses the approval process, identifies issues of known controversy and unresolved issues, and describes the organization of the EIR/EIS.

[3] The California WaterFix.

1.2 Background

The Sacramento–San Joaquin Delta (Delta), shown in Figure 1-1, is a vitally important ecosystem that is home to hundreds of aquatic and terrestrial species, many of which are endemic to the area and a number of which are threatened or endangered, as identified by the California Endangered Species Act (CESA) and ESA. The watersheds of the Sacramento and San Joaquin Rivers are at the core of California's water system, which conveys water to millions of Californians throughout the San Francisco Bay Area (Bay Area), the Central Valley, and southern California. Water conveyed through the Delta supports farms and ranches from the north Delta to the Mexican border that are a source of financial stability for the state and that produce roughly half the nation's domestically grown fresh produce. These watersheds capture runoff from approximately 40% of the land in California (California Department of Water Resources 2009). That water is used in the Delta, the Sacramento River watershed, the San Joaquin River watershed, the San Francisco Bay Area, the central coast region, and Southern California.

The Delta region is a key recreational destination. Its waterways and managed wetlands support many activities including fishing, boating, and hunting. It sustains distinctive geographical and cultural characteristics and supports extensive infrastructure of statewide importance, such as aqueducts, natural gas pipelines, and electricity transmission lines; railroads, commercial navigation (ports and shipping channels), and recreational navigation (marinas, docks, launch ramps); agricultural production and distribution; wildlife refuges; public and private levee systems; and highways. The Delta contains the largest natural gas production field in California, as well as California's largest natural gas storage facility (below McDonald Island in the central Delta), producing 20% of California's natural gas–powered electricity. Major electricity transmission lines in the Delta interconnect California with the Pacific Northwest and carry roughly 10% of the state's summer electricity load. Gasoline and aviation fuel pipelines crossing the Delta supply large portions of northern California and Nevada. The ports of Stockton and Sacramento are focal points of regional economic development and rely on through-Delta shipping channels. State Route (SR) 12, SR 4, and through-Delta railways are also important links in the Delta transportation system (Delta Protection Commission 2011).

Regarding long-standing conflicts over how best to use and conserve its water and biological resources, the Delta remains a center of controversy. Several fish species, including delta smelt (*Hypomesus transpacificus*) and winter-run Chinook salmon (*Oncorhynchus tshawytscha*), are listed under the ESA and CESA and have recently experienced the lowest population numbers in their recorded history; levees and the Delta infrastructure they protect are at risk from earthquake damage, continuing land subsidence, and rising sea level. The biological opinions (BiOps) that USFWS and NMFS have issued in recent years have significantly changed the manner in which the CVP and SWP operate, influencing the amounts of water conveyed through the south Delta. USFWS issued the current Biological Opinion on the Coordinated Long Term Operation of the CVP and SWP on December 15, 2008. NMFS issued its BiOp on Long-Term Operation of the Central Valley Project and State Water Project on June 4, 2009. The BiOps[4] called for changes in water pumping operations to avoid jeopardizing the continued existence of delta smelt (issued by USFWS) and winter and

[4] On August 2, 2016, Reclamation and DWR jointly requested reinitiation of ESA Section 7 consultation with USFWS and NMFS on the Coordinated Long-term Operation of the CVP and SWP, based on new information related to multiple years of drought and recent data on Delta smelt and winter-run Chinook salmon population levels, and new information available and expected to become available as a result of ongoing work through collaborative science processes.

spring-run Chinook salmon, Central Valley steelhead (*Oncorhynchus mykiss*), the southern population of North American green sturgeon (*Acipenser medirostris*), and southern resident killer whales (*Orcinus orca*) (issued by NMFS), and to avoid adverse modification or destruction of designated critical habitat. Operational changes are tied to water year type, and exceptions are provided for drought and health and safety issues.

The proposed BDCP and other alternatives that contain an HCP/NCCP (Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9; referred to as "BDCP alternatives") were developed in response to these ecological and water supply issues and to meet the stated objectives and purpose of, and need for, the proposed project (see Chapter 2, *Project Objectives and Purpose and Need*). The BDCP alternatives were originally presented in the Draft EIR/EIS. Three additional alternatives (Alternatives 4A, 2D, and 5A) were developed in response to these same issues and to meet the objectives and purpose and need. Alternatives 4A, 2D, and 5A would utilize an alternative implementation strategy for compliance with the ESA and CESA. The three alternatives were originally presented in the RDEIR/SDEIS.

1.2.1 BDCP Alternatives

The alternatives in this EIR/EIS that would function as HCPs/NCCPs comprise combinations of the following: conservation measures identified in the BDCP conservation strategy that include a proposal for water conveyance facilities (CM1) with a primary focus on improving the routing, timing, and amount of flow through the Delta while establishing an interconnected system of conservation lands across the BDCP Plan Area (CM1–CM3); measures to protect, restore, enhance, and manage physical habitat to expand the extent and quality of intertidal, floodplain, and other habitats across defined conservation zones[5] and restoration opportunity areas[6] (CM2–CM11); and measures to reduce the effect of various stressors on covered species, such as toxic contaminants, nonnative predators, illegal harvest, and nonproject water diversions, many of which are unrelated to operation and conveyance of water by Delta SWP/CVP facilities (CM12–CM21).

CM1–CM21 are common to all the BDCP alternatives, with varying designs, locations, and operational scenarios for water conveyance facilities proposed under CM1 and varying amounts of habitat restoration and enhancement for CM2–CM11. Additionally, USFWS and NMFS would determine whether to issue 50-year ITPs under ESA Section 10(a)(1)(B) for the incidental take of BDCP covered species from the construction, operation, and maintenance associated with water conveyance, ecosystem restoration, and other activities as described in the BDCP. Detailed descriptions of the BDCP alternatives, including the specific components of CM1–CM21 and their timing and implementation, are provided in Chapter 3, *Description of Alternatives*, as well as throughout this EIR/EIS and the BDCP. In addition, Section 3.8 of Chapter 3, *Description of Alternatives,* describes options for funding the conservation measures through charges under existing provisions of the SWP long-term water supply contracts, amending the SWP long-term water supply contracts, and/or entering into BDCP funding agreements with participating water agencies. Any of these options could be used, possibly in combination, to fund costs of future facilities that could result from the BDCP. Under any alternative, the SWP water supply contracts

[5] The Plan Area is subdivided into 11 conservation zones [CZs] within which conservation targets for natural communities and BDCP covered species' habitats have been established.

[6] Restoration opportunity areas, which encompass those locations in the Plan Area considered most appropriate for the restoration of tidal habitats and within which restoration goals for tidal and associated upland natural communities will be achieved.

could be amended to define the obligations for funding and the allocation of benefits of a new Delta conveyance for specific SWP water agencies. The potential that such an amendment to the SWP contracts would reallocate and redistribute SWP water, such as from agricultural to municipal uses, is discussed in Chapter 30, *Growth Inducement and Other Indirect Effects*. Chapter 4, *Approach to the Environmental Analysis,* describes the approach to the analysis, including the rationale for the project-level and program-level analyses.

1.2.2 Addition of Alternatives 4A, 2D, and 5A

As noted in Section 1.1, *About the BDCP/California WaterFix*, in response to public and agency comment, the lead agencies have decided to consider an alternative implementation strategy. Alternatives 4A, 2D and 5A are presented in this Final EIR/EIS due to the desire to explore alternative regulatory approaches that could facilitate expeditious progress on Delta solutions. Chapter 3, *Description of Alternatives*, provides a description of the new alternatives, and subsequent chapters present analysis of their potential environmental effects.

The three alternatives introduced in the RDEIR/SDEIS, Alternatives 4A, 2D, and 5A, are considered "sub-alternatives" to Draft EIR/EIS Alternatives 4, 2A, and 5 because the new alternatives generally adopt the same conveyance facility features as the original Draft EIR/EIS alternatives but with different operational characteristics. The new alternatives, however, are not presented as HCPs/NCCPs according to ESA Section 10 and the NCCPA; therefore, Alternatives 4A, 2D, and 5A are referred to as *non-HCP alternatives*. The proposed BDCP habitat restoration and stressor reduction measures (i.e., CM2–CM21) that were presented in the Draft BDCP are not carried forward fully for Alternatives 4A, 2D, and 5A, except where elements of the former conservation measures are retained to mitigate the potential impacts of the proposed project in compliance with CEQA, NEPA, and other environmental regulatory permitting requirements. Many of these original BDCP conservation measures may, however, be implemented through the separate and independent California EcoRestore (EcoRestore) program.[7] Alternatives 4A, 2D, and 5A would achieve federal and state endangered species act compliance through the Section 7 process under the ESA, and the Section 2081 process under CESA.

As the CEQA and NEPA preferred alternative, Alternative 4A entails the construction and operation of north Delta intakes and associated tunnel conveyance facilities as a dual conveyance facility consistent with the updated Alternative 4 described in the RDEIR/SDEIS. Alternatives 2D and 5A entail conveyance facilities similar to those proposed under Alternatives 2A and 5 but with alignment and other improvements proposed under Alternatives 4 and 4A. Proposed facility operations and other actions reflect that revised approach: Alternatives 4A, 2D, and 5A do not include CM2–CM21 as they are described for the BDCP alternatives. However, the non-HCP alternatives do include some of the same restoration activities, but at a smaller magnitude, as Environmental Commitments. Compliance with the ESA would be achieved by Reclamation as the federal lead action agency under Section 7 of that act. Pursuant to the Coordinated Operations Agreement (COA), by which DWR and Reclamation coordinate their operations of the SWP and CVP, Reclamation, and DWR as the project applicant, would consult with both the USFWS and NMFS. This consultation also is intended to cover the U.S. Army Corps of Engineer's (USACE's) issuance of permits under the Clean Water Act (CWA) and Rivers and Harbors Act for the construction of the necessary diversion and conveyance facilities. Under the BDCP alternatives, in contrast, DWR would

[7] https://s3.amazonaws.com/californiawater/pdfs/ECO_FS_Overview.pdf

submit an HCP in a request for a 50-year incidental take permit and appropriate assurances from USFWS and NMFS under ESA Section 10, while Reclamation would separately consult with USFWS and NMFS under Section 7. Compliance with state endangered species laws under Alternatives 4A, 2D, or 5A would be achieved through a request for authorization of the incidental take of species listed under the CESA in the form of an incidental take permit issued by CDFW under Section 2081(b) of the CESA. Under the original conservation plan implementation strategy represented by the BDCP alternatives, in contrast, DWR would submit an NCCP for a 50-year plan term under the NCCPA for approval by CDFW.

Because Alternative 4A now represents the preferred alternative (and proposed action) being pursued by DWR and Reclamation, those two agencies remain lead agencies. Because USFWS and NMFS would not have a permitting role under Alternative 4A, those two agencies have assumed roles as cooperating agencies for purposes of NEPA review of the RDEIR/SDEIS and this Final EIR/EIS. The consultation and application processes with USFWS, NMFS, and CDFW, respectively, will utilize, to the extent possible, analyses developed to date for the purposes of the BDCP, as updated, modified, and augmented to address attributes unique to the non-HCP alternatives. New information to address the potential change in the implementation strategy will also be incorporated.

This Final EIR/EIS sufficiently describes and discloses, for purposes of CEQA and NEPA, the effects of implementing the BDCP alternatives and Alternatives 4A, 2D, and 5A. Any new information developed for the proposed BDCP since the December 2013 public draft that is needed to adequately disclose environmental effects is included in Appendix 11F, *Substantive BDCP Revisions*. However, the entire BDCP has not been further revised, nor will it be re-released to the public at this time. Should DWR and Reclamation choose not to pursue the preferred alternative (Alternative 4A), but instead choose the original conservation plan implementation strategy and a corresponding action alternative (e.g., Alternative 4) that includes an HCP and NCCP, the current BDCP documents would be updated as necessary. Despite the change in the preferred alternative, the conservation plan alternatives analyzed in this Final EIR/EIS remain potentially feasible. The lead agencies will consider those conservation plan alternatives, in addition to the three non-HCP alternatives presented in this Final EIR/EIS, when completing the project approval process.

Section 1.3, *Water Supply Development and Management*, and Section 1.4, *Historical Context*, provide a brief overview of the Delta and the watershed of the Sacramento/San Joaquin Rivers, the SWP and CVP, regulatory and other measures that affect operations of the SWP and CVP, and the relationship of the BDCP/California WaterFix to other long-term planning efforts such as CALFED and the Delta Plan. Appendix 1A, *Primer on California Water Delivery Systems and the Delta*, includes a more detailed presentation of these topics.

1.3 Water Supply Development and Management

The development and management of California's surface water resources is a process that has spanned many decades, and to which private companies and local, state, and federal agencies have contributed. Early on, California's two major population centers, the Los Angeles and San Francisco Bay areas, recognized the need to augment local water supplies, and cities in these areas were the first to develop distant water sources. As California's growth continued, existing water projects became insufficient to meet demands. As a result, two major water projects in California—the CVP and SWP—were initiated in 1937 and 1957, respectively, and subsequently developed to serve agricultural, environmental, and municipal water users throughout California.

The SWP and CVP water infrastructure are operated in a coordinated manner. Joint points of diversion allow the use of one project's diversion facility by the other under certain conditions. In part, both the SWP and CVP water delivery systems rely on runoff and reservoir releases in areas upstream of the Delta to deliver contracted water via the Sacramento and San Joaquin Rivers to Delta export pumps in the south Delta. DWR exports water from the Delta into the SWP system at the Harvey O. Banks Pumping Plant (Banks pumping plant) (which supplies the California Aqueduct). Reclamation exports water into the CVP system at the C. W. "Bill" Jones Pumping Plant (Jones pumping plant) (which supplies the Delta-Mendota Canal). Figure 1-2 shows the major components of the SWP and CVP, and Figure 1-3 shows the extent of the CVP and SWP service areas and export service areas (i.e., those areas that receive Delta water delivered from the Banks and Jones pumping plants).

In addition to the CVP and SWP, other resources, facilities, and practices—such as groundwater storage, conservation, water use efficiencies, hydropower, project and system re-operation, desalination, recycling, and reuse—are being used to help meet growing water demands for urban, agricultural, and environmental uses. While these elements may be physically independent of the proposed project, they may affect or be affected by, or otherwise benefit from the proposed project. Moreover, they are collectively vital and relevant to understanding water supply development and management in California. (Appendix 1B, *Water Storage*, provides an overview of the potential for additional water storage in California. Appendix 1C, *Demand Management Measures*, provides an overview of water demand management relating to Delta waters. Appendix 1E, *Water Transfers in California: Types, Recent History, and General Regulatory Setting*, provides an overview of water transfers).

1.3.1 State Water Project

The SWP is a complex system comprising 20 pumping plants, 5 hydroelectric power plants, 33 storage facilities with combined storage capacity of approximately 5.8 million acre-feet (MAF), and approximately 700 miles of pipelines and canals. It is the largest state-built water storage and conveyance project in the United States. DWR operates and maintains the SWP, which delivers water to 29 agricultural and municipal and industrial (M&I) contractors in northern California, the San Joaquin Valley, the Bay Area, the Central Coast, and southern California. SWP deliveries provide water to 25 million Californians and about 750,000 acres of irrigated farmland (California Department of Water Resources 2010). Other project functions include flood management, water quality maintenance, power generation, recreation, and fish and wildlife enhancement. Major components of the SWP system are shown in Figure 1-2.

The SWP operates under long-term contracts with water contractors throughout California from counties north of the Delta to Bay Area counties, through the San Joaquin Valley and coastal counties, and finally to southern California. These water contractors in turn deliver water to wholesalers or retailers or deliver it directly to agricultural and M&I water users (Bureau of Reclamation and California Department of Water Resources 2005). Of the contracted water supply, approximately 75% goes to M&I users and 25% to agricultural users.

More detail on the SWP facilities and service areas is provided in Chapter 5, *Water Supply*, Section 5.1.2.2.

1.3.2 Central Valley Project

The CVP comprises some 18 reservoirs with a combined storage capacity of more than 11 MAF, 11 power plants, and more than 500 miles of major canals and aqueducts. Major components of the CVP system are shown in Figure 1-2. Reclamation operates and maintains the CVP, which is generally operated as an integrated project, and coordinates operations with the SWP. Authorized project purposes include flood management; navigation; provision of water for irrigation and domestic uses; fish and wildlife protection, restoration, enhancement, and creation; and power generation. However, not all facilities are operated to meet each of these purposes. Reclamation has entered into approximately 250 long-term contracts with water districts, irrigation districts, and others for delivery of CVP water. Currently, there are eight divisions of the project and ten corresponding units. Of the contracted water supply, approximately 70% goes to agricultural users, almost 20% is dedicated to fish and wildlife habitat, and nearly 10% goes to M&I water users (Bureau of Reclamation 2011).

More detail on the CVP facilities and service areas is provided in Chapter 5, *Water Supply*, Section 5.1.2.1.

1.4 Historical Context

Beginning in the 1850s, the construction of a network of levees facilitated the reclamation of the Delta for agriculture, human habitation, and other human uses. Combined with the straightening, widening, and dredging of channels, levee construction increased shipping access to the Central Valley and improved downstream water conveyance for flood control. Since then, the combined effects of continued land subsidence, sea level rise, increasing seismic risk, and worsening winter floods all increase the vulnerability of the extensive levee system. Besides degradation of water quality, levee failure could also result in flooding of Delta communities, farmland, and habitat; exposure of adjacent islands to increased seepage and wave action; and impacts on water supply, communication, and energy distribution systems. For more historical context, see Appendix 1A, *Primer on California Water Delivery Systems and the Delta.*

Because of heightened regulation of the CVP and SWP in response to species decline, many water users recognized the need to change their delivery strategy. DWR, Reclamation, certain CVP and SWP contractors, USFWS, NMFS, the California Bay-Delta Authority, and CDFW responded to the anticipated and continued uncertainty regarding water supply and ecosystem protection, the growing sentiment that a new approach to the Delta was needed, and a relatively new water delivery strategy, in part, by executing a Memorandum of Agreement (MOA) on July 28, 2006. That MOA was intended to further the development of what has evolved from BDCP and has now become the proposed project. Roughly 2 months after the MOA was signed, those same entities were joined by other water users and nongovernmental organizations in execution of the Planning Agreement Regarding the Bay Delta Conservation Plan (BDCP Planning Agreement dated October 2006). The BDCP Planning Agreement established the Planning Goals for the BDCP that are incorporated in the Project Objective and Purpose and Need Statements presented in Chapter 2, *Project Objectives and Purpose and Need*. For a detailed discussion of the development of project alternatives, please see Chapter 3, *Description of Alternatives,* Section 3.2.

1.4.1 Delta Environmental Protection

The SWP and CVP were planned and constructed with an emphasis on delivering water to develop California's agricultural economy and urban growth, before environmental laws and regulatory practices emerged to protect endangered species, and when much less was known about the Bay-Delta ecosystem and the potential ecosystem impacts of water development. Since about 1968, however, emerging laws, regulations, and policies were enacted to protect, conserve, and restore environmental resources, shaping the way that DWR and Reclamation manage and operate the SWP and CVP facilities. Reservoir releases and Delta exports must be coordinated to ensure that both projects operate within agreed-upon procedures and in a manner consistent with terms and conditions imposed in their water rights permits and licenses. State Water Resources Control Board (State Water Board) decisions and orders, the BiOps under the ESA, the State's CESA, and other permits, statutes and regulations largely determine Delta regulatory requirements for water quality, flow, and operations. The State Water Board's Water Quality Control Plan (WQCP) and applicable water rights decisions, as well as other regulatory processes, are also important in understanding the operations of both the SWP and CVP. Some of the major state and federal regulatory actions that influence operations of the SWP and CVP are listed below. For additional discussion on the state and federal actions affecting California's water system, please refer to Appendix 1A, *Primer on California Water Delivery Systems and the Delta*.

- **Coordinated Operations Agreement (COA) (1986).** The purpose of the COA is to establish rules by which DWR and Reclamation coordinate operations of the SWP and the CVP such that each obtains its share of water flowing into the Delta and bears its share of obligations to protect the other beneficial uses of water in the Delta and Sacramento Valley as defined by regulatory requirements. Coordinated operation under agreed-on criteria is intended to improve the efficiency of both the SWP and CVP.

- **Central Valley Project Improvement Act (CVPIA) (1992).** The CVPIA mandated changes in management of the CVP and, among other requirements, provided for the protection, restoration, and enhancement of fish and wildlife, including dedication of certain quantities of CVP water for that purpose.

- **Water Right Decision 1641 (D-1641).** The State Water Board's D-1641 (adopted in 1999, revised in 2000) implemented water quality objectives for flow and salinity in the Delta.

- **CALFED Bay Delta Program Record of Decision (ROD 2000).** In 2000, several state and federal agencies including Reclamation, DWR, USFWS, DFG, and NMFS released the CALFED Bay Delta Programmatic Record of Decision (ROD) and EIR/EIS. These documents outlined a 30-year plan to improve the Delta's ecosystem, water supply reliability, water quality, and levee stability. The CALFED ROD remains in effect and, although many of the state, federal, and local projects begun under CALFED continue, future direction, administration, and implementation of such projects will be coordinated through the Delta Stewardship Council. The California Supreme Court upheld the adequacy of the EIR component of the EIR/EIS for the CALFED ROD. (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143.)

- **USFWS Biological Opinion (2008).** USFWS issued a BiOp concluding that the effects of the proposed long-term operation of the SWP and CVP are likely to jeopardize the continued existence of delta smelt. Under ESA Section 7 (50 Code of Federal Regulations [CFR] 402.02), USFWS developed a five-part reasonable and prudent alternative (RPA) that would likely avoid jeopardy to delta smelt and adverse modification of its critical habitat. On December 14, 2011, USFWS provided to Reclamation a first draft of a revised BiOp to assist Reclamation with the development of an updated biological assessment and associated NEPA analysis.

- **NMFS Biological Opinion (2009).** NMFS issued a BiOp concluding that the effects of the proposed long-term operation of the CVP and SWP are likely to jeopardize the continued existence of the following species: Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, the southern Distinct Population Segment (DPS) of North American green sturgeon, and southern resident killer whale. NMFS further concluded that operation of the SWP and CVP is not likely to jeopardize the continued existence of central California coast steelhead. NMFS developed an RPA composed of numerous elements for each of the various project divisions and associated stressors and determined that the RPA must be implemented in its entirety in order to avoid jeopardy and adverse modification of critical habitat.

These and other past actions have been implemented to attempt to establish a balance between consumptive and other beneficial uses of Sacramento and San Joaquin Rivers and Delta surface water resources and to address the current altered condition of the Delta ecosystem. In addition to the effect of water supply diversions and Delta export, it is acknowledged that other Delta conditions related to the factors listed below may have contributed to the degradation of the Delta ecosystem, including a reduction in the amount, complexity, and diversity of aquatic and terrestrial habitat in the Delta.

- Presence of invasive nonnative fish, wildlife, and plant species.
- Barriers to fish migration.
- Changes in Delta water quality constituents, turbidity, and toxicity from natural and human-made sources.
- Effects of unscreened power plant and agricultural diversions.
- Changes in Delta water salinity, largely due to reduced Delta outflow and increased agricultural runoff.
- Predation and illegal harvest of native fish.
- Hatchery management practices.

The proposed project's approach to addressing the Delta's challenges attempts to balance contributions to the protection of species in a way that is feasible in view of the variety of important uses in the Delta—especially flood protection, agriculture, and recreation (California Natural Resources Agency 2010).

1.4.2 CALFED and Delta Vision

The CALFED Program was evaluated in a Program EIS/EIR completed in 2000 under CEQA and NEPA (CALFED Bay-Delta Program Final Programmatic Environmental Impact Statement/Environmental Impact Report). One of the components of the CALFED Program was a comprehensive Ecosystem Restoration Program to improve aquatic and terrestrial habitats; the program included a number of steps and mitigation measures to reduce the environmental effects of ecosystem restoration, particularly on farmland.

The Ecosystem Restoration Program was initially envisioned as an integral component of a two-tiered system of regulatory compliance for Delta water operations and other covered activities under CESA, ESA, and the California Natural Community Conservation Planning Act, as described in the CALFED Program Multi-Species Conservation Strategy.

In April 2006, the CALFED Program issued a 10-Year Action Plan to evaluate financing and governance issues and refocus the Program based on evolving science and changing conditions in the Delta. The 10-Year Action Plan noted that, in addition to changes in governance, a new direction for the CALFED Program is needed to respond to new scientific information becoming available and significant changes occurring in the Delta, including new concerns about seismic stability and the Pelagic Organism Decline. The 10-Year Action Plan contemplates the CALFED Program answering the question: "Should the screened Sacramento River diversion be built or should alternatives to the Through-Delta conveyance approach be reconsidered?" A major priority element of the 10-Year Action Plan is the development of a voluntary planning agreement and HCP/NCCP(s) for Delta and anadromous species. The Action Plan notes that "several Bay-Delta system users … are working cooperatively to explore preparation of one or more Habitat Conservation Plans…" (CALFED Bay-Delta Program 2006:52) and notes the first step is negotiation of a Planning Agreement (CALFED Bay-Delta Program 2006:53).

Delta Vision was created by Executive Order of Governor Schwarzenegger on September 17, 2006, to "develop a durable vision for sustainable management of the Delta" so it can support environmental and economic functions important to the people of the State (Delta Vision Blue Ribbon Task Force 2007:68–69). The Executive Order called for creation of an independent Blue Ribbon Task Force charged with completing a "vision" report by January 1, 2008, and a "strategic plan" by October 31, 2008. (Delta Vision Blue Ribbon Task Force 2007:70.) The Executive Order specifically directed that the Delta Vision process "inform and be informed by current and future Delta planning decisions such as those pertaining to the CALFED Bay Delta Program, Bay Delta Conservation Plan" and others. (Delta Vision Blue Ribbon Task Force 2007:69.) The Task Force issued its Delta Vision report, "Our Vision for the California Delta," in November 2007, which restated as a primary recommendation the restoration of the Delta's ecosystem function as an integral part of a healthy estuary, including expanded areas of seasonal and tidal wetlands (Delta Vision Blue Ribbon Task Force 2007:9). The Task Force identified twelve integrated and linked recommendations that were at the heart of its vision (Delta Vision Final Report 2007:1–2). Those recommendations included the three listed below.

- The Delta ecosystem and a reliable water supply for California are the primary, coequal goals for sustainable management of the Delta.
- The Delta ecosystem must function as an integral part of a healthy estuary.
- New facilities for conveyance and storage, and better linkage between the two, are needed to better manage California's water resources for both the estuary and exports.

In October 2008, the Blue Ribbon Task Force issued the Delta Vision Strategic Plan, which contains specific recommendations for implementing the Delta Vision to "sustain the Delta in future decades while ensuring a reliable water supply for the two-thirds of California's population who depend in whole or in part on water from the Delta" (Delta Vision Blue Ribbon Task Force 2008:v).

The Strategic Plan contains recommended strategies and actions including restoration of tidal and riparian habitats and increased frequency of floodplain inundation, improving migratory corridors, addressing invasive species, relocating export diversions and implementing conveyance improvements, revising flow standards and operating criteria, and improving water quality (Delta Vision Blue Ribbon Task Force 2008:ix–x). The cover letter for the Strategic Plan explained the Task Force's perspective that to achieve a healthy Delta and a more reliable water system, policy makers must undertake the challenges listed below.

- Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California.
- Restore the Delta ecosystem as the heart of a healthy estuary.
- Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals.

Many of the concepts presented in the Strategic Plan are being pursued through the California WaterFix.

The heart of the California WaterFix is a proposed project that sets forth some of the actions needed for a healthy Delta, building upon the framework set forth through the CALFED Program and Delta Vision processes. In February 2008, Governor Schwarzenegger directed DWR to proceed with the NEPA/CEQA analysis of four alternatives for Delta conveyance (consistent with the alternatives analyzed in the EIR/EIS; see Chapter 3, *Description of Alternatives*).

1.4.3 Relationship to the Delta Reform Act and Delta Plan

The Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) established in state law and policy a scheme to achieve comprehensive management of the Delta in support of the coequal goals of water supply reliability and ecosystem restoration in a manner that acknowledges the evolving nature of the Delta as a place for people and communities. The Delta Reform Act created the Delta Stewardship Council (DSC) and empowered it to develop a comprehensive management plan (Delta Plan). State and local agencies proposing certain kinds of actions or projects in the Delta need to certify for the DSC that those efforts are consistent with the Delta Plan. For a more detailed discussion of the interplay between the BDCP/California WaterFix and the Delta Reform Act and the Delta Plan, please see Appendix 3A, Section 3A.3.3, "Application of the Sacramento-San Joaquin Delta Reform Act," Appendix 3I, *BDCP Compliance with the 2009 Delta Reform Act*, and Appendix 3J, *Alternative 4A (Proposed Project) Compliance with the 2009 Delta Reform Act*.

In the Delta Reform Act, the Legislature, in part, found and declared:

> The Sacramento–San Joaquin Delta watershed and California's water infrastructure are in crisis and existing Delta policies are not sustainable. Resolving the crisis requires fundamental reorganization of the state's management of Delta watershed resources (Water Code Section 85001[a]).
>
> The economies of major regions of the state depend on the ability to use water within the Delta watershed or to import water from the Delta watershed. More than two-thirds of the residents of the state and more than two million acres of highly productive farmland receive water exported from the Delta watershed (Water Code Section 85004[a]).
>
> Providing a more reliable water supply for the state involves implementation of water use efficiency and conservation projects, wastewater reclamation projects, desalination, and new and improved infrastructure, including water storage and Delta conveyance facilities. (Water Code Section 85004[b]).

The BDCP alternatives, as set forth in the Draft EIR/EIS, are intended to be able to be incorporated directly into the Delta Plan pursuant to Water Code Section 85320. That statute requires such direct incorporation, provided that certain conditions are met. The Delta Reform Act provides that following completion of the BDCP, the BDCP shall be incorporated into the Delta Plan by operation of law if the California Department of Fish and Game (now CDFW) determines that the BDCP meets the requirements of Water Code sections 85320 and 85321. Among the conditions, Section 85320 requires that the BDCP must have been approved by CDFW as an NCCP and by USFWS as an HCP, and the CEQA analysis must include a comprehensive review and analysis of all of the following components.

- A reasonable range of flow criteria, rates of diversion, and other operational criteria required to satisfy the criteria for approval of a natural community conservation plan as provided in subdivision (a) of Section 2820 of the Fish and Game Code, and other operational requirements and flows necessary for recovering the Delta ecosystem and restoring fisheries under a reasonable range of hydrologic conditions, which will identify the remaining water available for export and other beneficial uses.
- A reasonable range of Delta conveyance alternatives, including through-Delta, dual conveyance, and isolated conveyance alternatives and including further capacity and design options of a lined canal, an unlined canal, and pipelines.
- The potential effects of climate change, possible sea level rise up to 55 inches, and possible changes in total precipitation and runoff patterns on the conveyance alternatives and habitat restoration activities considered in the environmental impact report.
- The potential effects on migratory fish and aquatic resources.
- The potential effects on Sacramento River and San Joaquin River flood management.
- The resilience and recovery of Delta conveyance alternatives in the event of catastrophic loss caused by earthquake, flood, or other natural disaster.
- The potential effects of each Delta conveyance alternative on Delta water quality.

Under California Water Code Section 85320, subdivision (c), DWR is required to consult with the DSC and the Delta Independent Science Board during development of the BDCP, and the DSC functions as a responsible agency in the development of the environmental impact report. Under Water Code Section 85320, subdivision (e), the DSC must incorporate the BDCP into the Delta Plan if (i) CDFW approves the BDCP as an NCCP pursuant to California Fish and Game Code Sections 2800 et seq., (ii) CDFW concludes that the BDCP EIR complies with CEQA and comprehensively reviews and analyzes the topics set forth above, and (iii) the BDCP has been approved as an HCP under the provisions of ESA Section 10(a)(1)(B). The DSC also has a potential administrative appellate role to play under the Delta Reform Act because the CDFW determination that the BDCP met the requirements for an NCCP may be appealed to the DSC.

These requirements do not apply to Alternatives 2D, 4A, and 5A, as described in the RDEIR/SDEIS, because Water Code Section 85320 does not apply to alternatives that are not formulated as HCPs/NCCPs. For these alternatives, which would involve construction and operation of water intakes in the north Delta and associated conveyance facilities, Delta Reform Act compliance would be achieved through either the Delta Plan Consistency certification process (see Water Code Section 85225 et seq.) or through a possible future amendment to the Delta Plan.

For further description regarding the proposed project's compliance with the Delta Reform Act, see Appendix 3I, *BDCP Compliance with the 2009 Delta Reform Act.* For more information on the Delta Plan see Chapter 13, *Land Use*, Section 13.2.2.2, and Appendix 3J, *Alternative 4A (Proposed Project)*

Compliance with the 2009 Delta Reform Act. See also Section 1.6.2.6, *Delta Stewardship Council*, for a discussion of the Stewardship Council's authority over the proposed project.

1.5 EIR/EIS Project Area

The project area for the actions evaluated in this EIR/EIS is larger than the proposed project Plan Area because some of the effects of implementing the project would extend beyond the boundaries of this region. The project area consists of the following three geographic regions, as shown in Figure 1-4.

- Upstream of the Delta region.
- Delta Region (referred to hereinafter as the Plan Area, and distinct from the larger Delta region considered for some areas, which consists generally of the statutory Delta, the Yolo Bypass north of the statutory Delta, and Suisun Marsh, as well as the Areas of Additional Analysis,[8] which apply to several EIR/EIS alternatives).
- SWP and CVP Export Service Areas.

Study areas have been more specifically defined for each resource (refer to Chapters 5–30 for definitions of the study area particular to each resource topic).

1.5.1 Upstream of the Delta Region

The Upstream of the Delta region is shown in Figures 1-5 through 1-8. This region comprises those areas in the SWP and CVP system upstream of the Delta.

1.5.2 Delta Region (Plan Area)

The Plan Area includes the aquatic and terrestrial ecosystems and natural communities and adjacent riparian and floodplain natural communities within the statutory Delta (as defined in Water Code Section 12220), as well as the Suisun Marsh and the Yolo Bypass north of the statutory Delta. The statutory Delta includes parts of Yolo, Solano, Contra Costa, San Joaquin, and Sacramento Counties. The implementation of conservation measures for all BDCP alternatives, or actions under the Environmental Commitments for non-HCP alternatives, would most likely entail actions within and outside the statutory Delta, including in the Suisun Marsh, Suisun Bay, and the Yolo Bypass. Any conservation actions outside the statutory Delta would be implemented pursuant to cooperative agreements or similar mechanisms with local agencies, interested nongovernmental organizations, landowners, and others.

For the purposes of this EIR/EIS, the Delta Region—or Plan Area and Areas of Additional Analysis—encompass the statutory Delta, as well as the areas where CM1–CM21 would be implemented outside the statutory Delta (Figure 1-9). All the water conveyance features that would be constructed, including new intake facilities, would be located within the Delta region.

[8] The Areas of Additional Analysis are two areas outside the defined Plan Area that encompass power transmission corridors. One area lies west of the Plan Area and is considered in analysis of proposed BDCP alternatives that include the west alignment (Alternatives 1C, 2C, and 6C). The other area lies east of the Plan Area and represents the proposed transmission line alignment for the modified pipeline/tunnel alignment (Alternatives 4, 4A, 2D and 5A).

1.5.3 SWP and CVP Service Areas

The SWP and CVP Service Areas region includes water supply delivery infrastructure that may be affected by implementation of the project under all the action alternatives. DWR has long-term water supply contracts with 29 agencies and districts to provide water from the SWP, and Reclamation has long-term contracts with approximately 250 water districts, irrigation districts, and others for delivery of CVP water. The effects of project implementation in these delivery areas are primarily addressed in Chapter 30, *Growth Inducement and Other Indirect Effects*.

1.6 Intended Uses of this EIR/EIS and Agency Roles and Responsibilities

This document is a joint EIR/EIS prepared in compliance with the requirements of CEQA and NEPA. Before the selection and approval of one of the action alternatives considered in this EIR/EIS, the lead agencies must comply with the necessary state and federal environmental review requirements. This document is intended to provide sufficient CEQA and NEPA support for approval of the proposed project and to inform permit decisions for the issuance of the required clearances under federal and state endangered species laws. The EIR/EIS is thus intended to provide complete project-level analysis for such actions. For the BDCP alternatives addressed in the Draft EIR/EIS, such actions would be taken by USFWS and NMFS, which would permit the BDCP under the ESA, and by CDFW, which would approve the BDCP as an NCCP under the NCCPA. For the non-HCP alternatives described in the RDEIR/SDEIS, compliance with the ESA would be achieved by Reclamation as the federal lead action agency through compliance with Section 7 of that act. Pursuant to the COA, by which DWR and Reclamation coordinate their operations of the SWP and CVP, Reclamation, and DWR as the project applicant, would consult with both the USFWS and NMFS., DWR would comply with CESA by applying to CDFW for their issuance of an incidental take permit under Section 2081 of the California Fish and Game Code.

With respect to particular components of the BDCP alternatives that must be implemented separately through individualized permit actions or other discretionary decisions, the EIR/EIS provides a mixture of project- and program-level components. Specifically, for such alternatives, the EIR/EIS is intended to provide project-level assessment of the potential effects of modified and/or new conveyance facilities (CM1), including project-specific mitigation, and SWP water supply contract amendments and/or funding agreements (described further in Chapter 3, *Description of Alternatives,* Section 3.8). In assessing environmental effects associated with the water conveyance facilities, the EIR/EIS also refers to Environmental Commitments, BDCP conservation measures, and avoidance and minimization measures (AMMs) that are intended to reduce, avoid, or minimize these effects. For CM2–CM21 evaluated in the BDCP alternatives, in contrast, the EIR/EIS provides program-level or programmatic review. Thus, additional site-specific environmental compliance documents will likely be required for implementation of some conservation measures associated with the BDCP alternatives (including, for example, wetland permitting actions by the USACE). Additional information and/or documentation may be necessary during consideration of related permit application and decision-making processes. This EIR/EIS is intended to provide CEQA and NEPA support for approval of any of the BDCP alternatives or non-HCP alternatives, and to inform decisions for the issuance of related permits. The EIR/EIS is thus intended to provide complete project-level analysis for actions presented in all the alternatives.

CEQA (Public Resources Code 21000 et seq.) requires preparation of an EIR when there is substantial evidence in light of the whole record that an agency action, such as approval and implementation of the proposed project, may have a significant impact on the environment. An EIR is a document disclosing and analyzing the potential environmental impacts of a project and discussing ways to mitigate or avoid the significant effects. Pursuant to Section 15126.6(a) of the State CEQA Guidelines, an EIR must describe a range of reasonable alternatives that would feasibly attain all or most of the basic project objectives but would avoid or substantially lessen any of the significant impacts of the project, and it must evaluate the comparative merits of the alternatives. Under CEQA, a *program EIR* may be prepared on a series of actions that can be characterized as one large project, such as for an NCCP (State CEQA Guidelines Section 15168). A program EIR generally establishes a framework for subsequent *tiered* or project-level environmental documents that are prepared in accordance with a program. It is meant to provide a basis for evaluating environmental effects and supporting a reasoned choice among alternatives when site-specific data may not yet be available. The degree of specificity in a program EIR's impact analysis need only be as detailed as the description of the elements in the program (State CEQA Guidelines Section 15146). A *project EIR*, in contrast, "examines the environmental impacts of a specific development project," so that, once the EIR is certified, no further CEQA analysis is required prior to construction. Nothing in CEQA prohibits a single EIR from containing both program and project elements. In fact, documents taking such an approach are common in California.

Similarly, under NEPA (42 U.S. Code (USC) 4321) and the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR 1500-1508), federal agencies are required to prepare an EIS for major federal actions significantly affecting the quality of the human environment. The EIS must rigorously explore and objectively evaluate the environmental effects of an action, including a range of reasonable alternatives, and identify mitigation measures to minimize adverse effects for the range of impacts of the proposal when they propose to carry out, approve, or fund a project that may have a significant effect on the environment. To ensure environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented must also be discussed and the EIS and Record of Decision should indicate the likelihood that such measures will be adopted or enforced, and when they might be available (40 CFR 1502.16[h] and 1505.2; see also Council on Environmental Quality 1981). A *programmatic EIS* under CEQ regulations for implementing NEPA (40 CFR 1500.4(i), 1502.4(b) and (c), 1502.20) may be prepared to analyze broad-scope actions that are similar in terms of timing, geography, or other characteristics. Subsequent analysis of more specific proposals is generally required under NEPA, and information from a programmatic EIS can be referenced (tiered) in the subsequent NEPA document to reduce redundancy. Like EIRs, however, a single EIS can contain both programmatic and site-specific (project-level) elements.

Under both CEQA and NEPA, a combined joint document may be prepared to meet the requirements of both CEQA and NEPA. As explained above, the joint EIR/EIS intends to provide a combination of project-level and program-level analyses for individual elements of the BDCP alternatives and project-level analyses for the non-HCP alternatives. This document is intended to provide a sufficient level of detail to comply with NEPA and, with the Biological Assessment, allow USFWS and NMFS to make an informed decision under the ESA. Similarly this document is intended to provide sufficient level of detail to comply with CEQA and, with the Section 2081(b) application, allow for approvals needed by CDFW.

Design information for the water conveyance facilities and existing facility operational changes, is available at a project level; accordingly, this EIR/EIS analyzes the potential environmental effects of these elements (CM1 under the BDCP alternatives) at the project level of detail, and is meant to provide the CEQA and NEPA Lead Agencies with sufficient information to make a decision on whether to permit and/or carry out the water supply conveyance and operational changes to move fresh water through and/or around the Delta after the EIR/EIS has been completed (and subject to the approval of related permits). Although the EIR/EIS is intended to provide sufficient NEPA coverage for Reclamation and ESA compliance by the USFWS and NMFS, the USACE, in considering whether to grant permits under the Clean Water Act and Rivers and Harbors Act, may require additional analyses for NEPA and other permitting necessary for the component pieces of the water conveyance facilities that affect federally protected wetlands and other waters of the U.S. No such additional analysis would be required by CEQA, which treats the fill of wetlands as mitigation activities that need not be addressed at the same level of detail as other project components. (State CEQA Guidelines Section 15126.4[a][1][D] ["[i]f a mitigation measure would cause one or more significant effects in addition to those that would be caused by the project as proposed, the effects of the mitigation measure shall be discussed but in less detail than the significant effects of the project as proposed"]; *California Native Plant Society v. City of Rancho Cordova* (2009) 172 Cal.App.4th 603, 621-623 [upholds mitigation measure requiring off-site wetland mitigation despite the fact that the challenged EIR did not identify the off-site location(s) at which such mitigation would occur].) It is expected that no additional analysis would be required for CDFW to issue an approval under the Lake and Streambed Alternation Program.

Because of the sheer size of the land area affected by the water conveyance facilities, the lead agencies have used a mix of different methods to ensure adequate project-level analysis for those facilities. For example, in addition to narrative text describing both existing environmental conditions and the extent of anticipated environmental effects, graphics in Mapbooks accompanying this EIR/EIS visually depict the footprints of proposed physical facilities and disturbance areas. These footprint areas are sometimes oversized to some degree in order to conservatively depict probable areas of impact. Readers should assume that, unless otherwise stated, the full areas beneath the depicted footprints will be subject to surface impacts, even though the real physical impacts, if and when they occur, may sometimes be more limited. Within the footprint areas associated with future physical facilities and the areas that will be disturbed during construction, temporary physical structures such as concrete batch plants, tunnel segment storage areas, and staging areas could be located, depending on the sensitivity of surrounding areas. The potential impacts of such temporary structures and uses on such potentially sensitive adjoining areas would be minimized or eliminated through the use of avoidance and minimization measures, environmental commitments, or mitigation measures. These means of reducing effects are described throughout this document.

Design information for CM2–CM21 of the proposed BDCP alternatives, which include restoration and conservation strategies for aquatic and terrestrial habitat and other stressor reduction measures, is currently at a conceptual level. Accordingly, although this EIR/EIS is intended to provide the full CEQA and NEPA analysis needed for the issuance of take permits for the BDCP alternatives, this EIR/EIS provides only programmatic level analysis of these conservation measures, describing what environmental effects may occur in this future phase of BDCP alternative implementation. Consequently, if one of the BDCP alternatives is chosen, USFWS, NMFS, and CDFW may approve and issue permits under the BDCP based on this EIR/EIS, but other authorizations by agencies subject to NEPA and CEQA necessary to implement CM2–CM21 may not be obtained until a later date, when more detailed design information is available. At this later time, it will be determined whether more focused, project-level environmental review is required. Additionally, the

USFWS and NMFS would determine whether to issue 50-year ITPs under ESA Section 10(a)(1)(B) for the incidental take of species covered under the BDCP related to the construction, operation, and maintenance associated with water conveyance, ecosystem restoration, and other activities as described in the BDCP.

The lead agencies intend for this document to provide the NEPA/CEQA compliance necessary for approval of any of the alternatives that may be chosen, subject to other pertinent laws and policies, and related permit approval processes. The following sections describe the relevant review, approval, and consultation requirements necessary to implement the proposed project.

1.6.1 Overview of Approval Process

1.6.1.1 BDCP Alternatives

The alternatives in this EIR/EIS that would function as HCPs are being proposed by DWR in collaboration with the SWP and CVP water contractors, including those listed below, who are collectively, with DWR, referred to as project proponents.

- Alameda County Flood Control and Water Conservation District, Zone 7
- The Metropolitan Water District of Southern California
- The Kern County Water Agency
- The San Luis and Delta-Mendota Water Authority
- The Santa Clara Valley Water District
- The Westlands Water District

Additional water contractors may become project proponents in the future through the project's process if a BDCP alternative is chosen.

For BDCP Alternatives (and non-HCP Alternatives), DWR has the responsibility to operate and maintain the SWP and would be involved in all aspects of construction and operation of the water conveyance facilities, related to the SWP, as well as any discretionary actions related to coordination with Reclamation or its contractors. For the BDCP Alternatives (and non-HCP Alternatives), the SWP contractors may be involved, among other actions, in decisions related to contract amendments to fund construction of conveyance facilities for a selected action alternative. In addition, the Delta Reform Act (codified in Water Code Section 85089(a)) requires that, *a new Delta conveyance facility shall not be initiated until the persons or entities that contract to receive water from the State Water Project and the federal Central Valley Project or a joint powers authority representing those entities have made arrangements or entered into contracts to pay for both of the following: (a) The costs of the environmental review, planning, design, construction, and mitigation, including mitigation required pursuant to [CEQA], required for the construction, operation, and maintenance of any new Delta water conveyance facility. (b) Full mitigation of property tax or assessments levied by local governments or special districts for land used in the construction, location, mitigation, or operation of new Delta conveyance facilities*.

As previously stated, the BDCP Alternatives would achieve compliance with the ESA through application for approval of a HCP from USFWS and NMFS under Section 10 of the ESA, and would achieve compliance with the NCCPA (and CESA) through request for approval of a NCCP from CDFW. Should DWR and Reclamation choose to implement a BDCP Alternative (e.g., Alternative 4) that includes an HCP and NCCP, the current BDCP documents would be updated as necessary and both USFWS and NMFS would again act as permitting agencies and be required to make appropriate findings as directed by NEPA.

1.6.1.2 Alternatives 4A (California WaterFix), 2D, and 5A

Alternatives 2D, 4A, and 5A are being proposed by DWR. Reclamation would retain its authority to coordinate CVP operations with the SWP, including the additional diversion facilities associated with the non-HCP Alternatives. As stated above, the SWP and CVP contractors will have a role in funding the alternatives. Compliance with the ESA would be achieved by Reclamation as the federal lead action agency under Section 7 of that act. Pursuant to the interagency consultation requirements of Section 7 of the ESA of 1972, as amended, a Biological Assessment has been prepared for Alternative 4A (California WaterFix) to assess the effects of the proposed action on species listed, or designated critical habitat under the ESA. Compliance with state endangered species laws under Alternatives 4A, 2D, or 5A would be through a request for authorization of the incidental take of species listed under the CESA in the form of an incidental take permit issued by CDFW under Section 2081(b) of the CESA.

1.6.1.3 Lead Agencies

Before the selection and approval of one of the alternatives considered through the CEQA and NEPA process, the Lead Agencies must comply with the necessary state and federal environmental review requirements. This Final EIR/EIS is intended to provide sufficient CEQA and NEPA support for project approval and to inform permit decisions for the issuance of various project permits and authorizations. DWR is lead agency for CEQA compliance purposes and Reclamation is lead agency for NEPA compliance purposes. As mentioned previously, USFWS and NMFS were originally participating as lead agencies for the Draft EIR/EIS, but because USFWS and NMFS would not have a permitting role under Alternative 4A, these two agencies have assumed roles as cooperating agencies for purposes of NEPA review of the RDEIR/SDEIS and this Final EIR/EIS.

DWR has the responsibility to operate and maintain the SWP and would be responsible for all construction activities associated with the proposed project and alternatives, including new intakes and associated conveyance facilities. DWR would operate and maintain any new SWP facilities and may also partake in discretionary actions related to coordination with Reclamation or its contractors. DWR may also have other actions related to contract amendments to fund the selected action.

While DWR would be responsible for construction of all water conveyance facilities, Reclamation would operate the relevant CVP Delta facilities in coordination with the SWP, including new intake and conveyance facilities, through the COA.[9] SWP operation of new conveyance facilities and/or flow patterns proposed under the proposed project or alternatives would require changes in existing CVP operations specific to the Delta that provide for diversion, storage, and conveyance of CVP water consistent with applicable law and contractual obligations. Reclamation's action in relation to the proposed project or alternatives would be to adjust CVP operations in the Delta to accommodate new conveyance facility operations and/or flow requirements, in coordination with SWP operations.

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[9] COA was entered into at the direction of Congress by the United States of America and the State of California in November 1986.

At this time it is anticipated that CVP upstream operations will not change to accommodate construction and operation of new water conveyance facilities as may be proposed.

1.6.2 Use of this EIR/EIS by Other Entities

This document is a joint Final EIR/EIS prepared in compliance with the requirements of CEQA and NEPA. Before the selection and approval of an alternative considered, the Lead Agencies must comply with the necessary state and federal environmental review requirements. This Final EIR/EIS is intended to provide sufficient CEQA and NEPA support for approval of the proposed project or any of the action alternatives for either compliance strategy. As implementation of the proposed project or any of the action alternatives will require permits and approvals from public agencies other than the Lead Agencies, the CEQA and NEPA documents are prepared to support the various public agency permit approvals and other discretionary decisions. These other public agencies are referred to as responsible agencies and trustee agencies under State CEQA Guidelines Sections 15381 and 15386 (e.g., CDFW and the State Water Board) and cooperating agencies under NEPA (e.g., USFWS, NFMS, USACE, and the U.S. Environmental Protection Agency [EPA]). The key agencies roles and responsibilities are summarized below.

Responsible agencies are state or local public agencies other than the CEQA lead agency that have discretionary approval over aspects of the project. In most circumstances, CEQA requires a responsible agency to use the lead agency's CEQA document to support its own decision-making process (State CEQA Guidelines Section 15096). Trustee agencies are state agencies that have jurisdiction by law over natural resources affected by a project that are held in trust for the people of California (State CEQA Guidelines Section 15386). As described in CEQ's NEPA regulations (40 CFR 1501.6), federal agencies other than the NEPA lead agency that have jurisdiction by law or special expertise with respect to the environmental effects anticipated from the project can be included as cooperating agencies. Federal agencies may use the lead agency's NEPA document to support their own decision-making process, if appropriate. A cooperating agency participates in the NEPA process and may provide input (i.e., expertise) during preparation of the NEPA document. Federal agencies may designate and encourage nonfederal public agencies, such as state, local, and tribal agencies that meet the same criteria as federal cooperating agencies, to participate in the NEPA process as cooperating agencies (40 CFR 1508.5).

Additionally, other federal and state agencies may contribute to and rely on information prepared as part of the environmental compliance process, including this Final EIR/EIS and supporting materials. A listing of the agencies and respective potential review/approval responsibilities, in addition to those under CEQA and NEPA, is provided in Table 1-1.

1.6.2.1 U.S. Fish and Wildlife Service and National Marine Fisheries Service

The United States Congress passed the ESA in 1973 to provide a means for conserving endangered and threatened species and the ecosystems on which they depend. The ESA has three major components relevant to the action alternatives, including the California WaterFix.

- Section 7 requires that federal agencies, in consultation with the federal fish and wildlife agencies, ensure that their actions are not likely to jeopardize the continued existence of listed species or result in adverse modification or destruction of critical habitat.
- Section 9 and regulations promulgated under Section 4(d) prohibit the taking of listed species.

- Section 10 allows permits to be issued that authorize the incidental take of threatened and endangered species.

Section 7 of the ESA provides that each federal agency must ensure, in consultation with the Secretary of the Interior or Commerce, that any actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of areas determined to be critical habitat (16 United States Code [USC] 1536(a)(2)). Section 7 requires federal agencies to engage in formal consultation with USFWS and/or NMFS for any proposed actions that are likely to adversely affect listed species. A BiOp is issued by USFWS or NMFS at the completion of formal consultation. The BiOp can conclude that the project as proposed is either likely or not likely to jeopardize the continued existence of the species or destroy or adversely modify designated critical habitat. If the BiOp concludes no jeopardy, the action can proceed as proposed consistent with the incidental take statement, which specifies the impact (i.e., the amount or extent) of incidental taking of the species. The incidental take statement contains “reasonable and prudent measures” that are designed to minimize the level of incidental take, and terms and conditions that must be complied with to implement the reasonable and prudent measures. Any taking that is in compliance with the terms and conditions of the incidental take statement is not a prohibited taking under the ESA, and no other authorization or permit under the ESA is required (50 CFR 402.14(i)(5)). If the BiOp concludes jeopardy, USFWS or NMFS will identify “reasonable and prudent alternatives” to the proposed action that would avoid jeopardizing the species.

Section 9(a)(1)(B) of the ESA prohibits the take by any person of any endangered fish or wildlife species; take of threatened fish or wildlife species is prohibited by regulation. The ESA prohibits the take of any listed threatened fish or wildlife species in violation of any regulation promulgated by USFWS or NMFS. Take under ESA is defined broadly to mean harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct (16 USC 1532 [1988]). Harm is defined by regulation to mean an act that actually kills or injures wildlife, including those activities that cause significant habitat modification or degradation resulting in the killing or injuring of fish or wildlife by significantly impairing essential behavior patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 17.3, 50 CFR 222.102). The take prohibitions of the ESA apply except as specifically provided under Section 7 or Section 10 of the ESA. The protections for listed plant species under the ESA are more limited than for fish and wildlife.

Section 10 of the ESA provides the basis for nonfederal entities to obtain authorization for the take of listed species. For those actions for which no federal nexus exists, private individuals, corporations, state and local government agencies, and other nonfederal entities that wish to conduct otherwise lawful activities that may incidentally result in the take of a listed species must first obtain a Section 10 permit from USFWS and/or NMFS. The nonfederal entity is required to develop an HCP as part of the permit application process.

Under Section 10(a)(1)(B) of the ESA, USFWS and NMFS may permit the incidental take of listed species that may occur as a result of an otherwise lawful activity. For an applicant to obtain a Section 10(a)(1)(B) permit, USFWS or NMFS must find that the permit application and HCP meet the following five issuance criteria.

- The taking will be incidental to an otherwise lawful activity.
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking.

- The applicant will ensure that adequate funding for the Plan will be provided.
- The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.
- Other measures, if any, which USFWS and NMFS require as being necessary or appropriate for purposes of the Plan will be met (16 USC 1539(a)(2)(A)).

The proposed action and action alternatives will require ESA compliance, including the requirement to obtain incidental take authorization. The following discussion presents the alternative compliance strategies, depending on the particular alternative.

Section 7 of the Endangered Species Act

Where the alternative does not include preparation of an HCP (i.e., Alternatives 2D, 4A, and 5A), ESA compliance for construction and operation of water intakes in the north Delta and associated conveyance facilities would be achieved solely through Section 7. For these alternatives, USFWS and NMFS would not issue a permit. Where Section 7 is the ESA compliance strategy, USFWS and NMFS will assume roles as cooperating agencies, rather than as lead agencies, for purposes of the NEPA review.

Reclamation would be the lead federal action agency for Section 7 compliance where a non-HCP alternative is selected. Reclamation's Section 7 compliance would be expected to also address the Section 7 compliance needs for the USACE permit actions. In cooperation with DWR, Reclamation would prepare a biological assessment (BA) for submission to USFWS and NMFS requesting formal consultation under ESA Section 7. It is expected that USFWS and NMFS would ultimately prepare a BiOp including an incidental take statement for federally listed species.

Section 10 of the Endangered Species Act

Where the alternative involves preparation of an HCP (i.e., the BDCP alternatives), ESA compliance will occur primarily through Section 10. Under this alternative compliance strategy, DWR and certain federal and state water contractors[10] would submit permit applications to USFWS and NMFS for authorization, over a 50-year permit term, to take endangered or threatened species and non-listed "covered species" related to a broad range of conservation measures, including construction and operation of water intakes in the north Delta and associated conveyance facilities, and would also request certain assurances over the 50 year permit term related to the proposed covered species. The compliance process under Section 10 is separate from Section 7 consultations but under this approach, USFWS, NMFS and Reclamation would all require compliance with Section 7, though much of the same information developed during the Section 10 process would be utilized for the Section 7 consultations.

Magnuson-Stevens Fisheries Conservation and Management Act

Section 305(b) of the Magnuson-Stevens Fisheries Conservation and Management Act as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), requires federal agencies to consult with NMFS on activities that may adversely affect essential fish habitat (EFH) for species that are managed under federal fishery management plans in United States waters. The statutory definition

[10] Kern County Water Agency; Metropolitan Water District of Southern California; San Luis & Delta-Mendota Water Authority; Santa Clara Valley Water District; State and Federal Contractors Water Agency; Westlands Water District; and Alameda County Flood Control and Water Conservation District (Zone 7 Water Agency).

of EFH includes *those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity*, which encompasses all physical, chemical, and biological habitat features necessary to support the entire life cycle of the species in question. Waters potentially affected by either alternative compliance strategy include EFH for Pacific salmon, groundfish, and coastal pelagic fishes, and it is expected that compliance with the Magnuson-Stevens Act for the proposed project or any of the action alternatives will be integrated with consultation under Section 7 of the ESA.

1.6.2.2 U.S. Army Corps of Engineers[11]

USACE has regulatory authority over activities within certain waters within the project area. Depending on the activity and the location of that activity in relation to particular resources, USACE may be required to issue an authorization for that activity under:

- Section 404 of the CWA (discharge of dredged or fill material into waters of the United States).
- Section 10 of the Rivers and Harbors Act (activities in, under, or over navigable waters of the United States).
- Section 14 of the Rivers and Harbors Act (activities that have the potential to affect USACE civil works projects, including project levees).

Section 404 of the Clean Water Act

Activities that would result in the discharge of dredged or fill materials into "waters of the U.S." must obtain authorization from USACE pursuant to Section 404 of the CWA (33 USC 1251 et seq.). A permit issued under Section 404 can take the form of either a General Permit or an Individual Permit. Individual Permits are designed for activities that have the potential to have more than a minimal effect on jurisdictional waters or that otherwise do not qualify to proceed under a General Permit. The discharge activities that would occur in connection with either alternative compliance strategy, including that of the proposed project, or any action alternatives, would require an Individual Permit.

Section 10 of the Rivers and Harbors Act

Activities that would involve the construction of any structure in or over any navigable water of the United States must obtain authorization from USACE pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 USC Section403 et seq.; 33 CFR Sections 322 et seq.). Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if "the structure or work affects the course, location, or condition of the water body" (33 CFR Section 322.3(a)). The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures, from the smallest floating dock to the largest commercial undertaking (33 CFR Section 322.2(b)).

Where the activities overlap, the process for obtaining a permit under Section 10 of the Rivers and Harbors Act is combined with the process for obtaining a permit under Section 404 of the CWA and compliance with the 404 permitting criteria will cover the substantive requirements of the Rivers and Harbors Act permitting process. The activities related to navigable waters would occur in connection with either alternative compliance strategy, including that of the proposed project, or

[11] See Appendix 1F for more detailed discussion of the USACE permit process and the specific informational needs of USACE under its various regulatory authorities.

any action alternatives, and would require a permit under Section 10 of the Rivers and Harbors Act. DWR would apply to USACE for issuance of one permit consistent with both Section 10 of the Rivers and Harbors Act and Section 404 of the CWA.

Section 14 of the Rivers and Harbors Act

Section 14 of the Rivers and Harbors Act (33 USC Section 408) requires permission from the Secretary of the Army, acting through USACE to alter an existing USACE civil works project. To grant permission under Section 408, USACE must determine that the proposed alteration does not impair the usefulness of the USACE project, and would not be injurious to the public interest. This is generally referred to as "Section 408 permission." Section 408 permission would be required for alteration and/or modification of federally constructed levees associated with either alternative compliance strategy, including that of the proposed project, or any action alternatives. The informational requirements under the Section 408 process necessarily includes a detailed level of engineering design, as well as a detailed level of analysis related to effects to the USACE civil works projects and indirect hydraulic effects. The information contained in the current NEPA documents may not fully meet this level of detail and additional informational submittals and analysis may be necessary. As a result of these submittals, prior to issuance of final 408 permission, additional NEPA compliance by USACE may be required.

For USACE engagement in the permit and authorization activities described above, NEPA compliance will be necessary. USACE will be acting as a Cooperating Agency within the current NEPA process for the proposed project and all action alternatives. In addition, USACE has designated Reclamation as the lead federal action agency for purposes of compliance with Section 7 of the ESA.

1.6.2.3 Environmental Protection Agency

CWA Section 404

USACE is solely responsible for making final Section 404 (and Rivers and Harbors Act) permit decisions, including final determinations of compliance with USACE permit regulations, and the Section 404(b)(1) Guidelines (33 USC Section 1344; 40 CFR 230.11; Clean Water Act Section 404(q) Memorandum of Agreement Between The Environmental Protection Agency and The Department of the Army to "Minimize, to the Maximum Extent Practicable, Duplication, Needless Paperwork and Delays in the Issuance of Permits" (August 11, 1992)) (404(q) MOA). However, in conjunction with USACE, EPA promulgates guidelines (and guidance on those guidelines) that USACE applies to the Section 404 permit process, and EPA may provide USACE with comments during the permitting process (33 USC Section 1344(b)(1); 40 CFR 230, 40 CFR 230.2(c)). The EPA may elevate an Individual Permit (in relation to Section 404) in the event that the EPA Regional Administrator believes that the issuance of the permit would result in substantial and unacceptable impacts to "aquatic resources of national importance" pursuant to Section 404(q) (33 USC Section 1344(q)) and the 404(q) MOA. Under Section 404(c) of the CWA, if the EPA determines, after notice and opportunity for public hearings, that the permitted activity would have unacceptable adverse impacts on an aquatic or wetland ecosystem which is likely to result in significant degradation of municipal water supplies or on fishing, wildlife or recreation areas (33 USC 1344(c); 40 CFR 231.2(e), 231.3, 231.4), the EPA may "veto" the Individual Permit (in relation to Section 404). Specifically, EPA may 1) prohibit the specification (including the withdrawal of specification) of any defined areas as a disposal site and 2) deny or restrict the use of any defined area for specification (including the withdrawal of specification as a disposal site) (33 USC Section 1344(c)).

NEPA Review

Section 309 of the Clean Air Act (codified at 42 USC Section 7609) requires EPA to review and publicly comment on the environmental impacts of major Federal actions. EPA interprets Section 309 as requiring it to review and comment on all draft EISs. EPA's *Policy and Procedures for the Review of Federal Actions Impacting the Environment* published in 1984 establishes rating system criteria for EISs that establishes two separate determinations. The first basis of review is the environmental impacts of the action and results in one of the following ratings: LO (Lack of Objections), EC (Environmental Concerns), EO (Environmental Objections), and EU (Environmentally Unsatisfactory). The second area of review rates the adequacy of the draft EIS and results in one of the following ratings: 1 (adequate), 2 (Insufficient Information), or 3 (Inadequate).

Section 309 requires that when EPA determines that a proposed action "is unsatisfactory from the standpoint of public health or welfare or environmental quality, the matter shall be referred to the Council on Environmental Quality (CEQ)." CEQ has issued rules establishing a process for handling referrals from EPA. The rules encourage agencies to make concerted efforts to resolve their NEPA disputes informally and limit the CEQ to resolving referrals only for those interagency disputes that rise to the level of national importance (42 USC Section 7609; 40 CFR 1504).

Water Quality Control Plans

In California, the State Water Board has the authority to adopt water quality control plans. Under the CWA, new or revised water quality standards must be approved by EPA. Therefore, EPA's Section 309 review of a federal agency's EIS will necessarily encompass its authority under the CWA.

1.6.2.4 California Department of Fish and Wildlife

The CESA prohibits the take of wildlife or plant species designated as threatened or endangered by the California Fish and Game Commission (Fish and Game Code Section 2080). Take under the CESA is defined as any action or attempt "to hunt, pursue, catch, capture, or kill" (Fish and Game Section Code 86). Like the ESA, the CESA allows for exceptions to the take prohibitions for otherwise lawful activities. The requirements of an application for incidental take under the CESA are described in Section 2081 of the Fish and Game Code. Incidental take of endangered, threatened, or candidate species may be authorized if an applicant demonstrates, among other things, that the effects of the proposed take will be minimized and fully mitigated (Fish and Game Code Section 2081(b)(2)). The NCCPA provides a mechanism for compliance with state endangered species regulatory requirements through the development of comprehensive, broad-scale NCCPs that focus on the needs of natural communities and the range of species that inhabit them (Fish and Game Code Section 2800 et seq.). Take of species listed under the CESA and covered by the NCCP may be authorized by CDFW (Fish and Game Code Section 2835).

California Fish and Game Code Section 2081 (b)

Where the alternative does not include preparation of an HCP, CESA compliance for construction and operation of water intakes in the north Delta and associated conveyance facilities would be achieved through Fish and Game Code Section 2081(b). The CESA allows CDFW to issue an incidental take permit for a State-listed threatened and endangered species only if specific criteria are met. For this alternative compliance strategy, CDFW would be a Responsible Agency, as well as a Trustee Agency (State CEQA Guidelines, 15386, subdivision (a)), for CEQA compliance purposes.

These criteria are reiterated in Title 14 of California Code of Regulations (CCR), Sections 783.4(a) and (b), which are paraphrased below:

- The authorized take is incidental to an otherwise lawful activity;
- The effects of the authorized take are minimized and fully mitigated;
- The measures required to minimize and fully mitigate the effects of the authorized take:
  - Are roughly proportional in extent to the effect of the taking on the species;
  - Maintain the applicant's objectives to the greatest extent possible; and
  - Are capable of successful implementation;
- Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and
- Issuance of the permit will not jeopardize the continued existence of a state-listed species.

An adaptive management and monitoring program would be implemented to use new information and insight gained during the course of construction and operation of water conveyance facilities to ensure that the proposed project continues to meet CESA Section 2081(b) standards.

Natural Community Conservation Planning Act

Where the alternative includes preparation of an HCP, compliance with the Fish and Game Code Section 86 take prohibition for construction and operation of water intakes in the north Delta and associated conveyance facilities would be achieved through NCCPA. The NCPPA requires preparation of an NCCP that identifies and provides for the regional or area wide protection of covered plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

Under this alternative compliance strategy, DWR and certain federal and state water contractors would request NCCP approval from CDFW for authorization, over a 50-year permit term, to take endangered or threatened species and non-listed "covered species" related to a broad range of conservation measures, including construction and operation of water intakes in the north Delta and associated conveyance facilities, and would also request certain assurances over the 50 year permit term related to the proposed covered species. For this alternative compliance strategy, CDFW would be a Responsible Agency, and Trustee Agency, for CEQA compliance purposes.

California Fish and Game Code Section 1600 *et seq.*

California has adopted regulations to address impacts to many of the resources subject to Section 404 of the CWA. Although not entirely overlapping, these programs intersect frequently. Project proponents are required to obtain separate authorizations from USACE and CDFW.

Section 1602 of the Fish and Game Code requires any person, state, or local government agency to provide advance written notification to CDFW prior to initiating any activity that would cause the following actions.

- Divert or obstruct the natural flow of, or substantially change or remove material from the bed, channel, or bank of any river, stream, or lake.
- Result in the disposal or deposition of debris, waste, or other material into any river, stream, or lake (Fish and Game Code Section 1602).

Certain actions that will be implemented under the proposed project or any of the action alternatives under either compliance strategy will require a Lake and Streambed Alteration Agreement under Section 1602. As part of that process, CDFW will review notifications of actions to determine if the proposed action would substantially adversely affect existing fish and wildlife resources that are directly dependent on a lake, river, or stream. If CDFW determines that the proposed activity would not substantially adversely affect an existing fish and wildlife resource, it will notify DWR that no Lake and Streambed Alteration Agreement is required and the project may proceed (Fish and Game Code Section 1602(a)(4)(A)(i)). If CDFW determines that the project may substantially adversely affect an existing fish and wildlife resource, it will require, as part of a Lake and Streambed Alteration Agreement, reasonable measures necessary to protect the fish and wildlife resource (Fish and Game Code Section 1603(a)). As the issuance of a Lake and Streambed Alteration Agreement is subject to CEQA, CDFW would be a Responsible Agency, and Trustee Agency, for CEQA compliance purposes.

1.6.2.5 State Water Resources Control Board

Change Point of Diversion

DWR and Reclamation hold appropriative water rights permits, issued by the State Water Board, to divert water for the SWP and CVP, respectively. The water right permits identify specific points where water may be diverted from the stream system. The locations of the north Delta intake facilities that would be constructed as a part of the proposed project or any of the action alternatives are not currently identified as points of diversion in DWR's and Reclamation's water right permits. Thus, DWR and Reclamation must file petitions with the State Water Board, seeking State Water Board approval to add to the points of diversion in the relevant water right permits.

The change petition process is described in Chapter 10 of Division 2, Part 2 of the California Water Code (Sections 1700–1707) and Title 23 of the California Code of Regulations Article 15 (Sections 791–799). On August 25, 2015,[12] DWR and Reclamation provided notice of the proposed changes as the State Water Board requires, including written notice to CDFW. On October 30, 2015, the SWRCB issued a Notice of Petition and Notice of Public Hearing and Pre-Hearing Conference to Consider the Petition. A pre-hearing conference was held by the SWRCB on January 28, 2016. The SWRCB's hearing on the change petition started on July 26, 2016 and is scheduled to continue into 2017. Other water right holders and the public have been participating in this hearing to provide comment and for some parties to object to the proposed changes by filing a protest with the State Water Board. At the end of the hearing process and based on their administrative record, the State Water Board must find that there is a reasonable likelihood the proposed changes will not injure any legal user of the water and reasonably protect fish and wildlife, as identified in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan (Bay-Delta WQCP) if they are to approve DWR and Reclamation's change petition request.

In addition, the Delta Reform Act states that an order by the State Water Board approving the change petitions shall include appropriate Delta flow criteria and shall be informed by the analysis conducted pursuant to Section 85086 of the Water Code:

> Any order approving a change in the point of diversion of the State Water Project or the federal Central Valley Project from the southern Delta to a point on the Sacramento River shall include appropriate Delta flow criteria and shall be informed by the analysis conducted pursuant to this

[12] DWR and Reclamation filed an addendum and errata to the Change Petition notice on September 16, 2015.

> section. The flow criteria shall be subject to modification over time based and monitoring results, including the contribution of habitat and other conservation measures, into ongoing Delta water management. (Water Code Section 85086[c][2]).

Many of the existing State Water Board requirements for operation of the SWP and CVP are contained within Water Rights Decision 1641 (D-1641). This decision places the responsibility upon the SWP and CVP to provide water to meet current Delta flow standards. Under the flow requirements to be established pursuant to the Delta Reform Act; however, it is anticipated that many parties, including the SWP and CVP, will share in the requirement to meet Delta flow standards. Thus, appropriate flow standards, as required through the process described in Section 85086 of the California Water Code, would likely contribute only a portion of the total flow standards adopted by the State Water Board consistent with the Bay-Delta WQCP update.

The State Water Board is in the process of developing and implementing updates to the Bay-Delta WQCP that protect beneficial uses in the Bay-Delta watershed. The Bay-Delta WQCP ultimately sets the Delta flow standards for all water users in the Delta. This update is broken into four phases, some of which are proceeding concurrently. Phase 1 of this work, currently in progress, involves updating San Joaquin River flow and southern Delta water quality requirements for inclusion in the Bay-Delta WQCP. Phase 2 will involve comprehensive changes to the Bay-Delta WQCP to protect beneficial uses not addressed in Phase 1, focusing on Sacramento River driven standards. Phase 3 will involve implementation of Phases 1 and 2 through changes to water rights and other measures; this phase requires a hearing to determine the appropriate allocation of responsibility between water rights holders within the scope of the Phase 1 and Phase 2 plans. It is expected that in setting appropriate allocation of flow responsibilities in Phase 3, the State Water Board will consider the flow standards set in the SWP/CVP change petition process, as required in Section 85086 of the California Water Code. Phase 4 will involve developing and implementing flow objectives for priority Delta tributaries outside of the Bay-Delta Plan updates.

Section 401 of the Clean Water Act – Water Quality Certification

Pursuant to Section 401, states can certify or deny federal permits or licenses that might result in a discharge to state waters, including wetlands (33 USC 1341). Section 404 permit applicants must obtain a "water quality certification" from the state water quality agency indicating that the proposed activity complies with all applicable state water quality standards, limitations, and restrictions. In California, typically the Regional Water Quality Control Boards (Regional Water Boards) issue water quality certifications within their jurisdictions. Appeals to the decisions of the Regional Water Boards are heard by the State Water Board. The State Water Board will issue the Section 401 certification, however, in certain cases, for example where projects cross multiple Regional Water Boards' jurisdiction or where issuance of water right authorization is required.

Because the proposed project and any of the action alternatives in either compliance strategy will require a permit under Section 404, they will necessarily require obtaining a water quality certification under Section 401 from the State Water Board. On September 25, 2015, DWR submitted a request for water quality certification for the project to the State Water Board at the same time it submitted an application for a permit under Section 404. As part of this request to the State Water Board, DWR provided a completed application form, a plan that describes how unavoidable effects to waters of the State will be minimized or mitigated, copies of CWA Section 404 permit application materials that are pertinent to the CWA Section 401 certification, and the appropriate permit fee. The State Water Board accepted the application as complete on October 23,2015 and has set a schedule to issue certification consistent with the change petition process described above. The

State's 401 water quality certification is subject to CEQA, and the State Water Board is a Responsible Agency under CEQA compliance purposes.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code 13000 et seq.) sets out a comprehensive regulatory, planning, and management program to protect water quality and beneficial uses of the State's water. The act established the State Water Board's authority to preserve and enhance the quality of California's water resources, and to ensure proper allocation and efficient use of water.

Under the Porter-Cologne Water Quality Control Act (Porter-Cologne), the State Water Board is required to prepare a water quality control plan for the Bay-Delta. Although the Regional Water Boards have primary responsibility for formulating and adopting water quality control plans for their respective regions, the State Water Board also is authorized to develop and adopt water quality control plans. In such instances, the water quality control plan adopted by the State Water Board supersedes regional plans developed for the same waters, to the extent that they conflict.

Beneficial uses include uses such as domestic, agricultural, and industrial supply; power generation; recreation and aesthetic use; navigation; and preservation and enhancement of fish, aquatic, and wildlife resources. Water quality objectives or standards reflect the levels of water quality constituents that have been determined to be necessary to protect beneficial uses. Implementation plans describe actions to be taken to achieve the objectives and set out programs for monitoring, management, and enforcement.

The State Water Board is vested with primary regulatory authority over flows, water quality, and other water rights issues outlined in the Bay-Delta WQCP. As stated above, the actions described in the proposed project or any of the action alternatives include modifications to the water conveyance system and will require the approval of the State Water Board, consistent with its authority under Porter-Cologne.

These discharges to waters of the State must meet the State's water quality requirements as prescribed in the WQCPs under Porter-Cologne. As described above, DWR has submitted a request for water quality certification for the project to the State Water Board and requested authorization for discharges to state waters under Porter-Cologne are included within this request.

1.6.2.6 Delta Stewardship Council

The Delta Reform Act gave the Delta Stewardship Council (Council) direction and authority to serve two primary governance roles: 1) set a comprehensive, legally enforceable direction for how the State manages important water and environmental resources in the Delta through the adoption of a Delta Plan,[13] and 2) ensure coherent and integrated implementation of that direction through

[13] The Delta Plan is currently the subject of litigation. The ongoing litigation could affect the legal requirements and/or implementation of the Delta Plan and/or interpretation of the Delta Reform Act. On June 24, 2016, Sacramento Superior Court Judge Michael P. Kenny invalidated the Delta Plan (*Delta Stewardship Council Cases*, JCCP 4758), pending the Council's remedying certain deficiencies identified in his ruling. Subsequently, the Delta Stewardship Council filed notices of appeal in the four coordinated cases where petitioners prevailed, in part. Those notices automatically stay the effect of Judge Kenny's ruling, thus leaving the Delta Plan in place pending the outcome of the appeals in the coordinated cases.

coordination and oversight of State and local agencies proposing to fund, carry out, and approve Delta-related activities.

Delta Plan Covered Action Requirements

The Delta Reform Act requires state and local actions determined to be covered actions within the meaning of the Delta Reform Act to be consistent with the policies and requirements included in the Delta Plan. In contrast to how many other governmental plans are implemented, the Council does not exercise direct review and approval authority over covered actions to determine their consistency with the regulatory policies in the Delta Plan. Instead, State or local agencies self-certify Delta Plan consistency, and the Council serves as an appellate body for those determinations.

For a state or local agency to determine whether its proposed plans, programs, or projects are covered actions under the Delta Plan and, therefore, subject to the regulatory provisions in the plan, it must start with the Delta Reform Act, which defines a covered action as (Water Code Section 85057.5(a)):

> …a plan, program, or project as defined pursuant to Section 21065 of the Public Resources Code that meets all of the following conditions:
>
> - Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh;
> - Will be carried out, approved, or funded by the state or a local public agency;
> - Is covered by one or more provisions of the Delta Plan;
> - Will have a significant impact on the achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and state interests in the Delta.

A State or local agency that proposes to carry out, approve, or fund a plan, program, or project is the entity that must determine whether that plan, program, or project is a covered action. That determination must be reasonable, made in good faith, and consistent with the Delta Reform Act and relevant provisions of the Delta Plan. If requested, Council staff will meet with an agency's staff during early consultation to review consistency with the Delta Plan and to offer advice as to whether the proposed plan, program, or project appears to be a covered action, provided that the ultimate determination in this regard must be made by the agency.

Once a state or local agency has determined that its plan, program, or project is a covered action under the Delta Plan, it is required to submit a written certification to the Council, with detailed findings, demonstrating that the covered action is consistent with the Delta Plan (Water Code Sections 85225 et seq.). The Council has developed a discretionary checklist that agencies may use to facilitate the process, as well as certification forms and related materials, available on the Council website.

If an agency determines that a proposed plan, program, or project is not a covered action that determination is not subject to Council review, but is subject to judicial review. Any person who claims that a proposed covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, the action will have a significant adverse impact on the achievement of one or both of the coequal goals or implementation of government-sponsored flood control programs to reduce risks to people and property in the Delta, may file an administrative appeal with regard to a certification of consistency submitted to the Council.

Delta Plan Appeals Process

The process for an appeal to the Delta Stewardship Council includes submittal of an appeal that clearly and specifically sets forth the basis for the claim, including specific factual allegations, that the covered action is inconsistent with the Delta Plan. The appeal must be filed no later than 30 days after the submission of the certification of consistency and if no person appeals the certification of consistency, the state or local public agency may proceed to implement the covered action.

The appeal must be heard by the Council within 60 days of the date of the filing of the appeal, unless the Council, or by delegation the executive officer, determines that the issue raised on appeal is not within the Council's jurisdiction or does not raise an appealable issue. The Council shall make its decision on the appeal within 60 days of hearing the appeal. The Council, or by delegation the executive officer, may also dismiss the appeal for failure of the appellant to provide information requested by the Council within the period provided, if the information requested is in the possession or under the control of the appellant.

After a hearing on an appealed action, the Council must make specific written findings either denying the appeal or remanding the matter to the state or local public agency for reconsideration of the covered action based on the finding that the certification of consistency is not supported by substantial evidence in the record. Upon remand, the state or local agency may determine whether to proceed with the covered action. If the agency decides to proceed with the action or with the action as modified, the agency must file a revised certification of consistency that addresses each of the Council's findings prior to proceeding with the action.

Delta Plan BDCP Requirements

Where the alternative involves preparation of an HCP, such as the BDCP, Delta Reform Act compliance for all elements of the conservation plan would likely be achieved through the process set forth in Water Code Section 85320, which sets out the conditions under which the Council is required to incorporate the BDCP directly into the Delta Plan. To be considered for inclusion in the Delta Plan, the BDCP must have been approved as an HCP under Section 10 of ESA, and CDFW must find that the BDCP complies with specified requirements, including compliance with NCCPA and CEQA, and review and analysis of certain flow scenarios and EIR alternatives. Upon CDFW's findings and approval of the BDCP as an NCCP (and as an HCP under the ESA), the Council is required to incorporate the BDCP into the Delta Plan. However, the determination by the CDFW that the BDCP meets the requirements of the Delta Reform Act may be appealed to the Council.

If the Council decides that CDFW incorrectly determined that the BDCP meets all of the requirements of Water Code Section 85320 for inclusion in the Delta Plan, and the Council consequently grants the appeal, CDFW's determination may be revised to address the issues raised by the Council, or CDFW may respond in detail to the Council's findings, setting forth reasons why the BDCP meets all of the requirements of Section 85320 for inclusion in the Delta Plan. Unless the Council on appeal decides that the BDCP meets all of the requirements of Section 85320 for inclusion in the Delta Plan, the BDCP shall not be incorporated in the Delta Plan and the public benefits associated with the BDCP shall not be eligible for State funding.

Table 1-1. Summary of Agencies and Review, Approval, or Other Responsibilities, in Addition to Those under CEQA and NEPA

Agency	Permit, Decision, Approval, or Other Action[a]
Federal	
Bureau of Reclamation (NEPA lead agency)	<u>Permits or Consultations</u> ESA Section 7 consultation Section 106 of the National Historic Preservation Act <u>Other considerations</u> Fish and Wildlife Coordination Act, 16 USC 661-667e (applies to restoration activities and not water operations) Archaeological Resource Protection Act Indian Trust Assets Central Valley Project Improvement Act Federal Water Project Recreation Act (16 USC 460[L] 12-21)
U.S. Fish and Wildlife Service (NEPA lead or cooperating agency[14])	<u>Permits or Consultations</u> All provisions of the Endangered Species Act, including: Biological Opinion (Section 7 of ESA) Incidental Take Permit (Section 10 [a][1][B] of ESA) for BDCP alternatives <u>Other considerations</u> Fish and Wildlife Coordination Act, 16 USC 661-667e Migratory Bird Treaty Act EO 13186 Migratory Birds EO 13112 Invasive Species Central Valley Project Improvement Act
National Marine Fisheries Service (NEPA lead or cooperating agency[15])	<u>Permits or Consultations</u> All provisions of the Endangered Species Act, including: Biological Opinion (Section 7 of ESA) Incidental take permit (Section 10 [a][1][B] of ESA) for BDCP alternatives <u>Other Considerations</u> Essential Fish Habitat under Magnuson-Stevens Fisheries Conservation and Management Act Fish and Wildlife Coordination Act, 16 USC 661-667e
U.S. Army Corps of Engineers (NEPA cooperating agency)	<u>Permits or Consultations</u> Clean Water Act Section 404 Rivers and Harbors Act Section 10 Rivers and Harbors Act Section 14, 33 USC 408 ESA Section 7 consultation Section 106 of the National Historic Preservation Act

[14] NEPA lead agency for actions involving BDCP alternatives. NEPA cooperating agency for actions involving Alternative 4A or other non-HCP alternatives.

[15] NEPA lead agency for actions involving BDCP alternatives. NEPA cooperating agency for actions involving Alternative 4A or other non-HCP alternatives.

Agency	Permit, Decision, Approval, or Other Action[a]
	Other Considerations Federal Water Project Recreation Act 16 USC 460(L) 12-21 Flood Control Act (Public Law 78-534 Stat. 890) Protection of Wetlands (EO 11990) Floodplain Management (EO 11988) Fish and Wildlife Coordination Act, 16 USC 661-667e
U.S. Environmental Protection Agency (NEPA cooperating agency)	NEPA Review (Clean Air Act, Section 309) Clean Water Act Review; and Clean Water Act Section 404 permitting oversight
State Historic Preservation Officer	Permits or Consultations Consultation under National Historic Preservation Act, Section 106; California State Projects (Public Resources Code Sections 5024, 5024.5)
U.S. Coast Guard (Potential NEPA cooperating agency)	Permits Rivers and Harbors Act Section 9 Bridge Permits Construction in Navigable Waters Navigational Aids – Private Aids to Navigation
Natural Resources Conservation Service	Farmland Protection Policy Act
State	
California Department of Water Resources (CEQA lead agency)	Other considerations Water Code Sections 11100 et seq. (Central Valley Project Act) Water Code Sections 12930 et seq. (California Resources Development Bond Act) Water Code 11451 (Control of Project) Approval of SWP water supply contract amendment and funding agreements
California Department of Fish and Wildlife (CEQA responsible agency, trustee agency)	Permits or Consultations NCCP Findings and Approval, Fish and Game Code Sections 2800 et seq. for BDCP alternatives California Endangered Species Act, Incidental Take Permit – Section 2081(b) for Alternative 4A or other non-HCP alternatives Streambed Alteration Master Agreement (Fish and Game Code Section 1602) Scientific Collection permits under Fish and Game Code State wildlife areas Encroachment Permit Other considerations Instream Flow – Public Resources Code Section 10000 et seq. Fish and Game Code Section 5650 – water pollution Fish and Game Code Section 1790 – wetlands Fish and Game Code Section 3503 – Nests and Eggs Fish and Wildlife Coordination Act, 16 USC 661-667e Migratory Birds, Fish and Game Code Section 3513 Raptors, Fish and Game Code Section 3503.5 Code Section 1002 and California Code of Regulations Title 14 Sections 650 and 670.7 (Plan implementation)

Agency	Permit, Decision, Approval, or Other Action[a]
State Water Resources Control Board (CEQA responsible agency)	Permits or Consultations Section 401 Water Quality Certification and Waste Discharge Requirements, Porter-Cologne Act Water Right Change Petitions Clean Water Act Section 402 National Pollutant Discharge Elimination System Permit Compliance and NPDES Construction Stormwater General Permit Petitions for Extension of Time for Existing Water Right Permits Water Quality Order 99-08-DWQ: General Permit for Storm Water Discharges Associated with Construction Activity (33 USC 1342) Water Right for Long-term Transfer Petitions Other considerations Water Quality Control Plan for San Francisco Bay/Sacramento-San Joaquin Delta Estuary Basin Plan Amendment (33 USC 13240) General Certification Order for Dredging for Restoration Projects Groundwater Quality Monitoring Act, Water Code Sec 10780-10782.3 Porter-Cologne Act, California Water Code Sec 13000 et seq. Surface Water Rights, California Code of Regulations Section 303 State Water Board Decision 1641 (Water Quality)
Central Valley Regional Water Quality Control Board (potential CEQA responsible agency)	Permits or Consultations Discharges Associated with Construction Activity (33 USC 1342) Regional General Permits Waste Discharge Requirements for Dredging Projects or Fill-Related Activities Other considerations Basin Plan Amendment (33 USC 13240)
San Francisco Bay Regional Water Quality Control Board (potential CEQA responsible agency)	Permits or Consultations National Pollutant Discharge Elimination System (316[b] Permit) Stormwater Permit Waste Discharge Requirements for Dredging Projects or Fill-Related Activities Other considerations Basin Plan
Delta Stewardship Council (CEQA responsible agency)	Other considerations Determining, on appeal, whether a BDCP alternative meets statutory criteria in the Delta Reform Act for inclusion in the Delta Plan (Water Code Section 85320) Determining, on appeal, whether Alternative 4A or other non-HCP alternative is consistent with the Delta Plan (Water Code Section 85225 et seq.)
State Lands Commission (CEQA responsible agency, trustee agency)	Other considerations Possible lease involving granted tide and submerged lands

Agency	Permit, Decision, Approval, or Other Action[a]
California Department of Parks and Recreation (potential CEQA responsible agency, trustee agency)	Permits or Consultations Encroachment Permit
California Department of Boating and Waterways (potential[b] CEQA responsible agency)	Other considerations Coordination on construction and placement of gates, signage, and use of gates
California Department of Transportation (CEQA responsible agency)	Permits or Consultations Encroachment Permit for realignment of State Route 160
Central Valley Flood Protection Board	Permits or Consultations Coordination consistent with local sponsor requirements under USACE Section 408 requirements
Regional Air Pollution Control Districts, California Air Resources Board (potential CEQA responsible agencies)	Permits or Consultations Permit to Operate an Internal Combustion Engine Stationary Source Permit Use of Portable Equipment During Construction Other considerations Clean Air Act
California Department of Public Health (potential CEQA responsible agency)	Permits or Consultations Water Supply Permits for Operations of Public Drinking Water Systems Other considerations State Drinking Water Program
San Francisco Bay Area Conservation and Development Commission (potential CEQA responsible agency)	Other considerations California Coastal Act/McAteer-Petris Act
Division of Safety of Dams (potential CEQA responsible agency)	Permits or Consultations California Code of Regulations Title 23, Section 310
California Public Utilities Commission	Permits or Consultations Right of way; potential relocation of utilities
Local and Other	
State and Federal Contractors Water Agency (NEPA cooperating agency)	Joint Powers Authority created for purposes of pursuing BDCP research and study
Western Area Power Administration (potential NEPA cooperating agency)	System Impact Study Facilities Studies Provide transmission service[16]

[16] If requested, to support Reclamation's pending decision, Western Area Power Administration may perform the necessary construction, upgrades, relocations, or modifications of facilities and structures necessary, and provide transmission service.

Agency	Permit, Decision, Approval, or Other Action[a]
Port of Stockton	Permits or Consultations Coordination consistent with local sponsor requirements under USACE Section 408 requirements
Contra Costa County (NEPA cooperating agency)	Floodplain development regulations (required by National Flood Insurance Program) Williamson Act cancellations Surface Mining and Reclamation Act
Sacramento County (NEPA cooperating agency)	Floodplain development regulations (required by National Flood Insurance Program) Williamson Act cancellations Surface Mining and Reclamation Act
Solano County (NEPA cooperating agency)	Floodplain development regulations (required by National Flood Insurance Program) Williamson Act cancellations Surface Mining and Reclamation Act
Yolo County (NEPA cooperating agency)	Floodplain development regulations (required by National Flood Insurance Program) Williamson Act cancellations Surface Mining and Reclamation Act
Reclamation District 999 (NEPA cooperating agency)	Easement/Right of way
Reclamation District 150 (NEPA cooperating agency)	Easement/Right of way
Reclamation District 551 (NEPA cooperating agency)	Easement/Right of way
Reclamation District 3 (NEPA cooperating agency)	Easement/Right of way
North Delta Water Agency (NEPA cooperating agency)	Interest in resource issues
Individual SWP Contractors	
Alameda County Flood Control and Water Conservation District, Zone 7 (potential CEQA responsible agency)	Possible actions related to the BDCP alternatives
Santa Clara Valley Water District (potential CEQA responsible agency)	Possible actions related to the BDCP alternatives
Kern County Water Agency (potential CEQA responsible agency)	Possible actions related to the BDCP alternatives
Metropolitan Water District of Southern California (potential CEQA responsible agency)	Possible actions related to the BDCP alternatives

Agency	Permit, Decision, Approval, or Other Action[a]
Individual CVP Contractors[c]	
San Luis & Delta-Mendota Water Authority (potential CEQA responsible agency)	Possible actions related to the BDCP alternatives
The Westlands Water District (potential CEQA responsible agency)	Possible actions related to the BDCP alternatives

[a] This list is not all inclusive and the agencies may use the EIR/EIS for other requirements not identified in this table.

[b] The term *potential* is used in this table generally. Whether particular entities are responsible agencies will be determined when a final BDCP is approved.

[c] To be determined when financing agreements are identified.

1.7 Public Scoping and Issues of Known Controversy

Public scoping meetings were held in 2008 and 2009 to gather public input on the scope of the EIR/EIS and to involve stakeholders, other agencies, and the public early in the decision-making process to identify issues and concerns to examine in the preparation of the EIR/EIS. During the scoping process, 2,950 comments were received. The majority of the comments related to water supply components of the proposed project, referred to as conveyance alignment approaches. In addition to the formal scoping meetings, other opportunities to involve the public in the environmental review process included Steering Committee meetings from 2006 to 2009; public workshops in 2009; working group meetings and public information meetings in 2011; and ongoing briefings, presentations, and meetings with interested stakeholders throughout BDCP development. In each of these public settings, time has been allotted for public comment. More detailed information on the scoping process is provided in Chapter 32, *Public Involvement, Consultation, and Coordination*, Section 32.1.1. The scoping report is provided in Appendix 1D to this EIR/EIS, and includes the Notice of Preparation of an EIR/Notice of Intent to prepare an EIS, as well as written comments and testimony from agencies and the public from the NEPA/CEQA public scoping meetings. Comments received in other forums mentioned above have been considered throughout the planning effort and are part of the administrative record.

NEPA and CEQA required that the lead agencies identify issues of known controversy that were raised during the scoping process and throughout the development of the project alternatives described in the Draft EIR/EIS. The project proponents considered these concerns in the development of the proposed project, and the CEQA lead agency and NEPA lead agencies considered these concerns in preparation of the Draft EIR/EIS. Significant environmental effects resulting from constructing and operating facilities associated with the proposed project would be mitigated to the extent feasible, in some cases to less than significant levels. The following list outlines those issues that were identified by agencies and the public relative to the proposed project.

- **Range of Alternatives.** The range and adequacy of alternatives is an issue of concern to the public as well as to governmental agencies. In response to concerns raised on this topic in comments on the Draft EIR/EIS, the RDEIR/SDEIS provided three new alternatives (4A [preferred alternative], 2D, and 5A) that have been included in the Final EIR/EIS along with the alternatives evaluated in the Draft EIR/EIS. The alternatives development and screening process is discussed in Appendix 3A, *Identification of Water Conveyance Alternatives, Conservation Measure 1*, Attachments 1 through 7, which provide additional details on the information that was used in developing the alternatives.

- **Biological Resources.** The complexity of the project raises many concerns over environmental consequences for the aquatic ecosystem and fish species, and for the terrestrial ecosystem and plant and wildlife species. Identifying an alternative implementation strategy that separated the water conveyance plan from the broader habitat restoration elements of the BDCP alternatives and accelerating environmental restoration through EcoRestore may alleviate some of these concerns. The approach of separating water conveyance from broad environmental restoration is reflected in Alternatives 4A, 2D, and 5A. These alternatives are described in Chapter 3, *Description of Alternatives.*
- **Biological Goals and Objectives.** Controversy exists between the BDCP alternatives' conservation goals and the reasonable use of natural resources and lands for economic development. This issue is somewhat reduced under Alternatives 4A, 2D, and 5A because of the revised approach that limits habitat improvements to those needed to offset conveyance facility effects. Generally, land-based impacts would be reduced under Alternatives 4A, 2D, and 5A when compared with the BDCP alternatives. These comparative changes are provided in the land-use based analysis in Chapters 9, 10, 12 through 20, and 24 through 27. These chapters address terrestrial biological resources, land use, agricultural resources, recreation, cultural resources, mineral resources, paleontological resources, and other resources.
- **Climate Change.** The likely effects of climate changes on water supplies and the Delta ecosystem during the 50-year life of the BDCP alternatives prompted many comments during the formal public review process for the Draft EIR/EIS. Comments on the Draft EIR/EIS reflected widespread concerns that the anticipated effects of climate change and habitat restoration are too speculative and that there is too much uncertainty about such effects to allow for a 50-year permit period. These comments are among the reasons the lead agencies, in issuing the RDEIR/SDEIS, introduced Alternatives 4A, 2D, and 5A, which do not include an HCP/NCCP and do not seek 50-year incidental take permits. The effects of climate change are factored into the analysis of each alternative in each resource chapter, and are addressed in Chapter 29, *Climate Change*, and associated appendices.
- **Water Supply, Surface Water Resources, and Water Quality.** Water supply and surface water resources—key drivers for development of the proposed project and its alternatives —remain controversial issues for a wide array of stakeholders (e.g., agricultural interests, hunting and fishing interests, water agencies, local jurisdictions) because of the potential changes in Delta hydrologic conditions attributable to changes in the SWP and CVP points of diversion in the Delta. Water quality is an issue of concern because of uncertainties regarding activities associated with conveyance facilities and their operations and restored habitat that could change flow regimes, which could lead to discharge of sediment, possible changes in salinity patterns, and potential water quality changes. The DWR and Reclamation will seek to obtain authorization from the State Water Board for new SWP points of diversion, which would likely include State Water Board conditions on DWR and Reclamation water rights to protect beneficial uses in the Delta. Such changes would not include changes in water rights; however, there are concerns that the proposed project could result in the potential for increased exports and redistribution of Delta water. These issues are addressed in Chapter 5 *Water Supply*, Chapter 6, *Surface Water*, and Chapter 8, *Water Quality*.

- **Flood Management.** Flood management is a potentially controversial issue because implementation of the proposed project would entail modification of some existing levees as well as changes in flow regimes and other changes, including habitat restoration in the Yolo Bypass and within restoration opportunity areas in the Delta under the BDCP alternatives. These issues are addressed in Appendix 6A, *BDCP/California WaterFix Coordination with Flood Management Requirements*.
- **Agricultural Resources.** Because the Plan Area is largely devoted to agricultural uses, concern about the effects of the proposed project on existing agricultural activities are controversial, as expressed in comments on the Draft EIR/EIS. In addition to conversion of agricultural lands to other uses (i.e., water conveyance facilities and restored/enhanced natural habitat areas), there are concerns that conflicts could arise between continuing agricultural operations and management requirements in areas targeted for conservation actions (e.g., changes in cultivation or pest management practices). Although Alternatives 4A, 2D, and 5A partially address these concerns because each alternative would require much less conversion of agricultural land to habitat than the alternatives that include an HCP/NCCP, implementation of any action alternative would adversely affect agricultural activities. The impacts on agricultural resources are addressed in Chapter 14, *Agricultural Resources*.
- **Socioeconomics.** The key socioeconomic concerns involve the impacts of construction activities on local Delta communities, the potential for loss of revenue and employment associated with the decrease in agricultural production associated with conversion of agricultural land to other uses, as well as the potential decrease in tax revenues due to such a decline in agricultural activities. Alternatives 4A, 2D, and 5A would have lesser socioeconomic effects associated with agricultural land conversions than the BDCP alternatives would have because less land would be converted from agriculture to restored habitat. A comparative discussion of the socioeconomic impacts that would result under each alternative is provided in Chapter 16, *Socioeconomics*.
- **Recreation.** Concerns relating to recreation include potential conflicts between construction and operation of new conveyance facilities and ongoing Delta recreational activities (e.g., boating, fishing, hunting, enjoyment of marinas). In addition, there are concerns about possible conflicts between operable barriers and gates in Delta waterways and recreational boating corridors. Alternatives 4A, 2D, and 5A would have fewer effects on recreation than the BDCP alternatives would have because HCP/NCCP conservation measures that would disrupt recreation activities would not be implemented under Alternatives 4A, 2D, and 5A. However, impacts resulting from constructing the water conveyance facilities under the non-HCP alternatives would be similar to impacts of the BDCP alternatives. The impacts are discussed in Chapter 15, *Recreation*.
- **Aesthetics/Visual Resources.** Potential effects of new facilities on aesthetics and visual resources are controversial to local Delta residents as well as others who utilize the Delta where construction of the facilities would be located; these concerns focus largely on the proposed intake facilities and the power transmission facilities necessary to support them and, to a lesser degree, on new canals that are proposed under some of the alternatives. Although aesthetic impacts are difficult to quantify and in many instances are difficult to mitigate, impacts related to the intake facilities would be reduced by changes reflected in Alternatives 4, 4A, 2D, and 5A to reduce the originally proposed size of the conveyance facilities. Changes in the visual character of the areas that would be restored as a result of implementing HCP/NCCP conservation measures would be avoided under Alternatives 4A, 2D, and 5A because the conservation

measures would not be implemented. These differences are discussed in Chapter 17, *Aesthetics and Visual Resources*.

- **Growth.** One of the project objectives is to increase water supply reliability to SWP and CVP contractors south of the Delta. Increasing the reliability of water could be considered as removal of one of the obstacles related to growth south of the Delta or in export service areas. Concerns regarding the growth-inducing consequences of the BDCP generally focus on the potential effects of a stabilized water supply to the southern part of the state. The potential for growth resulting under each alternative is discussed in Chapter 30, *Growth Inducement and Other Indirect Effects*.
- **Community Issues.** Community issues, such as construction noise, air quality, and traffic circulation effects; conversion of existing land uses; access to private lands; and changes in the character of Delta communities are areas of concern for Delta residents. Plans by DWR to conduct geotechnical drilling surveys were opposed by the local Farm Bureaus because of concerns over confidentiality of the survey results, and the eminent domain process is currently underway to allow acquisition of temporary entry rights on private land for survey work. Although population densities in the Plan Area are relatively low, existing farms and agricultural enterprises could be permanently divided, jeopardizing the ability of that land to continue serving productive agricultural uses. Residences, schools, religious institutions, and other sensitive community land uses could be disrupted by the proposed project during the construction period. These issues have been addressed through evaluation of a wide range of resource impacts addressed in Chapter 23 *Noise*, Chapter 22, *Air Quality and Greenhouse Gases*, Chapter 19, *Transportation*, Chapter 13 *Land Use*, and Chapter 16, *Socioeconomics.*

No additional scoping is necessary under CEQA for a Recirculated Draft EIR or under NEPA for a Supplemental Draft EIS. Yet during the public review period for the Draft EIR/EIS, additional sources of controversy were raised. For example, several commenters expressed concerns regarding the anticipated efficacy of certain habitat restoration measures, and suggested that the water conveyance facilities and the habitat restoration measures should not be treated as a single project. Another common theme was that DWR should pursue shorter-term permits because of the levels of uncertainty regarding both the effectiveness of habitat restoration in recovering fish populations and the future effects of climate change on the Delta and the Sacramento River watershed.

As urged by these commenters, DWR developed three new alternatives that separate proposed conveyance facilities (CM1) from the originally proposed habitat restoration measures and related conservation measures (i.e., CM2 through CM21). As described and analyzed in the RDEIR/SDEIS, the new CEQA preferred alternative (4A) and new Alternatives 2D and 5A include only the conveyance facilities and operations that constitute CM1 under the BDCP alternatives; Alternatives 4A, 2D, and 5A do not include habitat restoration measures beyond those needed to provide full mitigation under CEQA and NEPA. Other conservation measures related to habitat restoration would be excluded. In addition, Alternatives 4A, 2D, and 5A are not intended to serve as NCCPs/HCPs, and DWR would not seek 50-year permits under those alternatives. DWR instead would seek from CDFW an incidental take permit of much shorter duration under Fish and Game Code Section 2081 of CESA, and would participate with Reclamation in consultations with USFWS and NMFS under Section 7 of ESA.

1.7.1 Purpose of Recirculated/Supplemental Documents

As explained above, the Draft EIR/EIS was partially revised and was recirculated in a Partially Recirculated Draft EIR/Supplement to the Draft EIS (RDEIR/SDEIS) for additional public review to address and evaluate the critical changes to Alternative 4 and the addition of Alternatives 4A, 2D, and 5A.

With respect to Alternative 4, the RDEIR/SDEIS described and analyzed the following: changes to conveyance facility design; revisions to proposed operations; changes to the proposed conservation strategy and habitat mitigation approach; and revisions and corrections to the analyses of certain impacts. Alternative 4A would entail the same conveyance facility design changes, but it does not include the same kinds of changes to Alternative 4 related to CM2–CM21 because Alternative 4A has no HCP component.

To provide the public with the information necessary to understand revisions to the various documents and to limit extraneous information, the lead agencies chose not to republish complete revisions to the original Draft EIR/EIS, but rather to prepare materials focusing on new contents of the Draft EIR/EIS. The lead agencies' primary reason for undertaking additional public review of the RDEIR/SDEIS is to further the purposes of both CEQA and NEPA. Because the RDEIR/SDEIS addresses a project of interest and importance to the people, economy, and environment of the State of California, the lead agencies determined that additional formal public input was both desirable and appropriate.

1.7.2 Substantive Draft EIR/EIS Revisions

The RDEIR/SDEIS presented revisions to the Draft EIR/EIS which were made based on public and technical review of the draft documents. The analysis in a number of resource topics were revised for the RDEIR/SDEIS to respond to issues that were raised during the review period for the Draft EIR/EIS by members of the public and reviewing agencies. Some of the revisions presented in the RDEIR/SDEIS are highlighted below.

- Chapter 11, *Fish and Aquatic Resources*, was revised to address design changes associated with the proposed project, to incorporate the latest engineering assumptions and modeling procedures, and to respond to comments raised by the public. Several commenters requested elaboration on the methods used to arrive at CEQA conclusions and NEPA effects determinations and on the effects of contaminants. Additionally, commenters requested analyses of the effects on downstream bays (i.e., San Francisco Bay), and that all analyses include a NEPA conclusion. Since release of the Draft EIR/EIS, additional information has been developed pertaining to the following: the use of reusable tunnel material for restoration efforts; the construction effects of the modification to Clifton Court Forebay; and the construction of an operable barrier at Head of Old River.
- Chapter 8, *Water Quality* was revised to address design changes associated with the proposed project, to include additional analysis, to make clarifications and correct errors, to update analyses based on more recent water quality data and/or criteria, and to respond to comments raised by local, state, and federal agencies and the public. Water quality constituent sections that received the most updating were electrical conductivity, chloride, selenium, bromide, and *Microcystis*. Additionally, an assessment of constituent effects downstream of the Plan Area (i.e., in San Francisco Bay) was added. Several other modifications and additions were made to the assessments for mercury, nutrients, trace metals, and dissolved oxygen.

- Chapter 22, *Air Quality and Greenhouse Gases,* and Appendix 22C, *Bay Delta Conservation Plan/California WaterFix Health Risk Assessment for Construction Emissions*, were both revised. The chapter was revised to address design changes associated with the proposed project, to incorporate the latest engineering assumptions and modeling procedures resulting in revised emissions calculations, and to respond to issues and concerns raised by the public regarding the health risk assessment. Where these design and engineering assumptions could result in substantive changes in other impact analyses, such revisions in other impact analyses were made.
- Chapter 19, *Transportation*, was revised to incorporate the latest engineering assumptions which could result in substantive changes in other impact analyses.
- Chapter 23, *Noise*, was revised to incorporate the latest engineering assumptions.

1.7.3 Public Review of Recirculated/Supplemental Documents

Pursuant to the directives of CEQA, where a lead agency recirculates only revised portions of an EIR, the lead agency may require commenters to limit their new comments to the new material in the recirculated portions of the prior document and may preclude the commenters from commenting anew on topics or text not subject to a partial recirculation. NEPA and the CEQ NEPA Regulations are silent on these issues, but the concept of a "supplement" to a Draft EIS strongly suggests that comments should be limited to material found within the bounds of that new document, and should not address matters already subjected to public review as part of the original Draft EIS.

After the additional round of public review, the CEQA lead agency "need only respond to (i) comments received during the initial circulation period that relate to chapters or portions of the document that were not revised and recirculated, and (ii) comments received during the recirculation period that relate to the chapters or portions of the earlier EIR that were revised and recirculated" (State CEQA Guidelines Section 15088.5[f][2]).

1.8 CEQA/NEPA Terminology

Both CEQA and NEPA require preparation of an environmental analysis to evaluate the potential environmental effects and effects to the human environment of proposed actions (and alternatives to those actions) that are subject to governmental approvals. However, there are several differences between the two in terminology, procedures, environmental document content, and substantive mandates to protect the environment. For this EIR/EIS, the more rigorous of the two laws was applied in cases in which NEPA and CEQA differ. As discussed in more detail in Chapter 4, *Approach to the Environmental Analysis*, Section 4.2.1.1, because CEQA and NEPA have different specifications related to determining environmental effects of project alternatives, separate baselines were developed, and separate presentations related to impact conclusions have been made for CEQA and NEPA.

Many concepts are common to NEPA and CEQA, including their intent and the review process that they dictate. Importantly, both statutes encourage a joint Federal and state review where a project requires both Federal and state approvals. Both processes require an initial review resulting in a notice to the public, scoping, development of alternatives, development of an environmental document analyzing the alternatives, and consideration of public and agency input. These steps are followed by the preparation of a final environmental document and agency decisions (Executive Office of the President of the U.S. and State of California, Governor's Office of Planning and Research 2013). The laws sometimes use differing terminology for common concepts, as illustrated in Table 1-2. Application of similar concepts may not be exactly analogous under NEPA and CEQA.

Table 1-2. Correlated CEQA and NEPA Terminology

CEQA Term	NEPA Term
Environmental Impact Report	Environmental Impact Statement
Notice of Preparation	Notice of Intent
Notice of Completion/Notice of Availability	USEPA Filing/Federal Register Notice and Agency/ Public Review (also known as a Notice of Availability)
Notice of Determination/Findings/ Statement of Overriding Considerations	Record of Decision
Responsible Agency	Cooperating Agency
Project Objectives	Purpose and Need; Objectives and Constraints
Proposed Project and Alternatives	Proposed Action and Alternatives
No Project Alternative	No Action Alternative
Environmental Impacts	Environmental Consequences
Environmental Setting	Affected Environment
Threshold of Significance/Significant Impacts	Although none are specified in NEPA, CEQ regulations require an EIS to identify the direct and indirect effects "and their significance" (40 CFR 1502.16)
Cumulative Impacts	Cumulative Effects

1.9 Related Actions, Programs, and Planning Efforts

This section is generally included in NEPA documents as *related actions*, *interrelated actions*, or *connected actions* as part of scoping (40 CFR 1508.25 ([a][1]). NEPA describes these actions as connected if they automatically trigger other actions that require an environmental analysis; if they cannot or will not proceed unless other actions are taken previously or simultaneously; or if they are interdependent parts of a larger action and depend upon the larger action for their justification (40 CFR 1508.25 [a][i, ii, iii]). There are several additional processes under the Clean Water Act and the Rivers and Harbors Act that could require separate Records of Decision from USACE. Connected actions are limited to actions that are currently proposed (ripe for decision). Actions that are not yet proposed are not connected actions, but may need to be analyzed in the cumulative effects analysis if they are reasonably foreseeable.

Due to the geographic area covered by the proposed project, a large number of activities and studies that are currently ongoing or planned for the near future could affect or be affected by the proposed project actions. Besides the CVP and SWP, additional activities in and around the Plan Area (such as actions part of California EcoRestore), including groundwater storage, conservation, water use efficiencies, hydropower, project and system re-operation, desalination, recycling, and reuse have either been proposed or are possible related to water supply development and management in California. These related studies and projects that have been conducted are summarized in Appendix 1A, *Primer on California Water Delivery Systems and the Delta*; Appendix 1B, *Water Storage*; Appendix 1C, *Demand Management Measures*; and Appendix 1E, *Water Transfers in California: Types, Recent History, and General Regulatory Setting*. These actions are not directly or indirectly related to the project. Where an action is directly or indirectly related to the BDCP, the effects of these actions are included in this EIR/EIS. The actions described in the appendices listed above should give the reader and decision makers a general understanding of ongoing water resource issues in the State of California. If appropriate, these actions are also identified and analyzed in the cumulative impact analysis in the relevant resource chapter.

1.10 Final EIR/EIS Organization

This Final EIR/EIS is organized as shown below.

Chapter 1: Introduction. Contains a background summary and the project area; information related to the statutory basis for preparing an EIR/EIS; intended uses of the document by lead, responsible, cooperating, and trustee agencies; and a summary of document organization.

Chapter 2: Project Objectives and Purpose and Need. Describes the project objectives and the purpose of and need for the project.

Chapter 3: Description of Alternatives. Describes the alternatives evaluated in the EIR/EIS.

Chapter 4: Approach to the Environmental Analysis. Summarizes the environmental impact analysis approach, framework, and bases of comparison for CEQA and NEPA purposes; provides a summary of the regulatory setting; and provides an overview of the cumulative effects analyses conducted for each resource topic.

Chapters 5 through 28: Each of these chapters includes a discussion of the environmental setting/affected environment, analysis methods, environmental consequences, and mitigation measures and environmental commitments for the action alternatives, and the cumulative effects for each of the individual resource topics.

- Chapter 5: Water Supply
- Chapter 6: Surface Water
- Chapter 7: Groundwater
- Chapter 8: Water Quality
- Chapter 9: Geology and Seismicity
- Chapter 10: Soils
- Chapter 11: Fish and Aquatic Resources
- Chapter 12: Terrestrial Biological Resources
- Chapter 13: Land Use
- Chapter 14: Agricultural Resources
- Chapter 15: Recreation

- Chapter 16: Socioeconomics
- Chapter 17: Aesthetics and Visual Resources
- Chapter 18: Cultural Resources
- Chapter 19: Transportation
- Chapter 20: Public Services and Utilities
- Chapter 21: Energy
- Chapter 22: Air Quality and Greenhouse Gases
- Chapter 23: Noise
- Chapter 24: Hazards and Hazardous Materials
- Chapter 25: Public Health
- Chapter 26: Mineral Resources
- Chapter 27: Paleontological Resources
- Chapter 28: Environmental Justice (NEPA only)

Chapter 29: Climate Change. Discusses climate change conditions associated with the action alternatives.

Chapter 30: Growth Inducement and Other Indirect Effects. Describes the potential for the action alternatives to either promote or remove an obstacle related to growth in the project area and the possible impacts of such growth.

Chapter 31: Other CEQA/NEPA Required Sections, including Mitigation and Environmental Commitment Impacts, Environmentally Superior Alternative and Public Trust Considerations. Discusses the relationship between short-term uses of the environment, maintenance, and enhancement of long-term productivity, the irreversible and irretrievable commitment of resources, and potential environmental effects associated with environmental commitments and recommended mitigation measures.

Chapter 32: Public Involvement, Consultation, and Coordination. Describes the consultation and outreach activities that occurred during the document preparation process.

Chapter 33: List of Preparers. Identifies the individuals who prepared this document.

Chapter 34: References Cited. Lists all sources cited in the text. References are also included at the end of each chapter.

Chapter 35: Glossary. Provides definitions for specialized terms related to the project and effects analyses.

This EIR/EIS contains reference to numerous appendices prepared to support the various chapters. The appendices are organized as shown below.[17]

- 1A: Primer on California Water Delivery Systems and the Delta.
- 1B: Water Storage.

[17] See Footnote 3 at the beginning of this chapter for a description of other documents that should be understood to be part of this EIR/EIS.

- 1C: Demand Management Measures.
- 1D: Final Scoping Report.
- 1E: Water Transfers in California: Types, Recent History, and General Regulatory Setting.
- 1F: Supplemental Information for USACE Permitting Requirements.
- 3A: Identification of Water Conveyance Alternatives, Conservation Measure 1.
- 3B: Environmental Commitments, AMMs, and CMs.
- 3C: Construction Assumptions for Water Conveyance Facilities.
- 3D: Defining Existing Conditions, No Action Alternative, No Project Alternative, and Cumulative Impact Conditions.
- 3E: Potential Seismic and Climate Change Risks to SWP/CVP Water Supplies.
- 3F: Intake Location Analysis.
- 3G: Background on the Process of Developing the BDCP Conservation Measures.
- 3H: Intermediate Forebay Location Analysis.
- 3I: BDCP Compliance with the 2009 Delta Reform Act.
- 3J: Alternative 4A (Proposed Project) Compliance with the 2009 Delta Reform Act.
- 4A: Summary of Survey Data Collection Efforts by Department of Water Resources to Obtain Information Regarding Baseline Conditions in Areas That Could Be Affected by BDCP.
- 5A: BDCP/California WaterFix FEIR/FEIS Modeling Technical Appendix.
- 5B: Responses to Reduced South of Delta Water Supplies.
- 5C: Historical Background of Cross-Delta Water Transfers and Potential Source Regions.
- 5D: Water Transfer Analysis Methodology and Results.
- 5E: Supplemental Modeling Related to the State Water Resources Control Board.
- 5F: Comparison of FEIRS Alternatives 2D, 4A, and 5A Modeling Results to RDEIR/SDEIS Modeling Results.
- 5G: Comparison of FEIRS Alternative 4A Modeling Results to the California WaterFix Section BA Proposed Action Modeling Results.
- 6A: BDCP/California WaterFix Coordination with Flood Management Requirements.
- 7A: Groundwater Model Documentation.
- 8A: Water Quality Criteria and Objectives.
- 8B: Summary of Data Availability Used in Environmental Setting.
- 8C: Screen Analysis.
- 8D: Source Water Fingerprinting Results.
- 8E: Bromide.
- 8F: Boron.

- 8G: Chloride.
- 8H: Electrical Conductivity.
- 8I: Mercury.
- 8J: Nitrate.
- 8K: Organic Carbon.
- 8L: Pesticides.
- 8M: Selenium.
- 8N: Trace Metals.
- 8O: San Francisco Bay Analysis.
- 8P: Velocity Probability of Exceedance Curves
- 10A: Soil Associations.
- 10B: Natural Resources Conservation Service Soil Suitability Ratings.
- 10C: Soil Chemical and Physical Properties and Land Use Suitability.
- 11A: Covered Fish Species Descriptions.
- 11B: Non-Covered Fish and Aquatic Species Descriptions.
- 11C: CALSIM II Model Results Utilized in the Fish Analysis.
- 11D: Sacramento River Water Quality Model and Reclamation Temperature Model Results Utilized in the Fish Analysis.
- 11E: Sensitivity Analysis to Confirm RDEIR/SDEIS Determinations for Fish and Aquatic Species Using Updated Model Outputs for Alternatives 2D, 4A, and 5A.
- 11F: Substantive BDCP Revisions.
- 11G: Supplemental Modeling Results at ELT for Alternative 4 at H1 and H2.
- 12A: Special-Status Species with Potential to Occur in the Study Area.
- 12B: Common and Scientific Names of Terrestrial Species.
- 12C: 2009 to 2011 Bay Delta Conservation Plan EIR/EIS Environmental Data Report.
- 12D: Feasibility Assessment of Conservation Measures Offsetting Water Conveyance Facilities Construction Impacts on Terrestrial Biological Resources.
- 12E: Detailed Accounting of Direct Effects of Alternatives on Natural Communities and Covered Species.
- 14A: Individual Crop Effects as a Result of BDCP Water Conveyance Facility Construction.
- 14B: Delta Agricultural Stewardship Strategies.
- 15A: Privately Owned Recreation Facilities, by County.
- 15B: Delta Recreation.
- 15C: Additional Recreation Figures.

- 16A: Regional Economic Impacts of Water Conveyance Facility Construction.
- 16B: Community Characterization Photographs.
- 17A: Candidate KOP Sensitivity Matrix Ratings.
- 17B: Photo Simulation Data Sources and Assumptions.
- 17C: Scenic Quality Rating Summaries.
- 17D: Permanent Impacts after Construction is Complete.
- 17E: Permanent Features.
- 17F: Surge Tower Shadow Data Sources and Assumptions.
- 18A: Archaeological Resources Sensitivity Assessment.
- 18B: Identified Resources Potentially Affected by the BDCP Alternatives.
- 19A: Bay Delta Conservation Plan Construction Traffic Impact Analysis.
- 20A: Details of Public Services and Utilities Supporting the Plan Area.
- 22A: Air Quality Analysis Methodology.
- 22B: Air Quality Assumptions.
- 22C: Health Risk Assessment.
- 22D: DWR Climate Action Plan.
- 22E: General Conformity Determination.
- 23A: Noise Contours—Construction.
- 23B: Noise Contours—Operations.
- 24A: Draft Phase 1 Initial Site Assessment.
- 24B: 2010 Initial Site Assessment.
- 26A: Natural Gas Wells.
- 28A: Census Data.
- 29A: Effects of Sea-Level Rise on Delta Tidal Flows and Salinity.
- 29B: Climate Change Effects on Hydrology in the Study Area Used for CALSIM Modeling Analysis.
- 29C: Climate Change and the Effects of Reservoir Operations on Water Temperatures in the Study Area.
- 29D: Climate Change Analysis and Discussion of Future Uncertainty
- 30A: Population Density in Hydrologic Regions.
- 30B: Water Contractor Profiles.
- 30C: Summary of Secondary Effects of Growth.
- 31A: BDCP Later CM Activity Environmental Checklist.
- 31B: Mitigation Measure WQ-7e. CCWD Settlement Agreement

- 32A: Public Involvement Informational Materials.
- 32B: Draft EIR/EIS Public Review Summary Report.
- 32C: RDEIR/SDEIS Public Review Summary Report.

The Final EIR/EIS also includes responses to comments on the Draft EIR/EIS and RDEIR/SDEIS in Volume II. This portion of the document consists of the following materials.

- Part 1: Master Responses.
- Part 2: Response to Comments.
- Part 3: References.
- Appendix A: Copies of Comment Letters Received on the Draft EIR/EIS and RDEIR/SDEIS.

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Chapter 2
Project Objectives and Purpose and Need

The BDCP/California Water Fix sets out a strategy for the Delta designed to restore and protect ecosystem health, water supply reliability, and water quality within a stable regulatory framework. The BDCP/California WaterFix reflects the outcome of a multiyear collaboration between the California Department of Water Resources (DWR), U.S. Bureau of Reclamation (Reclamation), state and federal fish and wildlife agencies, state and federal water contractors, nongovernmental organizations, agricultural and fishing interests, and the general public. The project objectives and purpose and need described in this chapter were developed as a part of this process. Chapter 3, *Description of Alternatives*, sets out the range of reasonable alternatives to meet the project objectives and purpose and need for the BDCP/California WaterFix EIR/EIS.

2.1 Overview

One of the primary challenges facing California is how to comprehensively address the increasingly significant and escalating conflict between the ecological needs of a range of at-risk Delta species and natural communities that have been and continue to be adversely affected by a wide range of human activities, while providing for more reliable water supplies for people, communities, agriculture, and industry.

This challenge must be addressed in decisions of DWR, the California Department of Fish and Wildlife (CDFW), and the State Water Resources Control Board (State Water Board), as they endeavor to strike a reasonable balance between these competing public policy objectives and various actions taken within the Delta, including the BDCP/California WaterFix. State policy regarding the Delta is summarized in the Sacramento–San Joaquin Delta Reform Act of 2009, which states:

> it is the intent of the Legislature to provide for the sustainable management of the Sacramento-San Joaquin Delta ecosystem, to provide for a more reliable water supply for the state, to protect and enhance the quality of water supply from the Delta, and to establish a governance structure that will direct efforts across state agencies to develop a legally enforceable Delta Plan." (California Water Code, Section 85001, subd. [c]).
>
> The Delta "serves Californians concurrently as both the hub of the California water system and the most valuable estuary and wetland ecosystem on the west coast of North and South America." (California Water Code, Section 85002).

The ecological health of the Delta continues to be at risk, and the conflicts between species protection and Delta water exports have become more pronounced, as amply evidenced by the continuing court decisions regarding the intersection of the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), and the operations criteria of the State Water Project (SWP) and the federal Central Valley Project (CVP). Other factors, such as the continuing subsidence of lands within the Delta, increasing risk of seismic activity and levee failures, and sea level rise and potentially wider variations in hydraulic conditions associated with climate change, serve to further exacerbate these conflicts. Simply put, the system as it is currently designed and operated does not appear to be sustainable from either an environmental or an economic perspective, and evaluating a fundamental, systemic change to the current system is necessary. This change is necessary if

California is to "[a]chieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem." (California Public Resources Code Section 29702, subd. [a]).

DWR and several state and federal water contractors, collectively referred to as the project proponents, are applying for permits under state and federal endangered species laws and propose to implement the California WaterFix. For the California WaterFix alternatives (Alternatives 4A, 2D and 5A), DWR is the lead agency for compliance with CEQA and Reclamation is the lead agency for compliance with NEPA. Should a BDCP alternative be selected, DWR would be the lead agency for compliance with CEQA, and Reclamation, the U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS) would be co-lead agencies for compliance with NEPA.

2.2 Regulatory Background

The CEQA project objectives document the reasons the project proponents are undertaking the proposal and what objectives they intend to achieve by that proposal. NEPA requires that an EIS include a statement of "purpose and need" to which the federal agency is responding in proposing the alternatives, including the proposed action (40 Code of Federal Regulations [CFR] 1502.13). The project objectives and the purpose and need statement are the starting points for the state and federal agencies in developing the reasonable range of alternatives to be evaluated in detail in the EIR/EIS (State CEQA Guidelines Sections 15124[b], 15126.6[a]; 40 CFR 1502.14). The following sections present the project objectives for the BDCP/California WaterFix in compliance with the requirements of CEQA and the purpose and need statement in compliance with the requirements of NEPA. Both the project objectives and the purpose and need statement serve to explain why the proposed project is being considered and to assist in the decision-making process. The overall project objectives and purpose and need for the proposed project is the same for DWR and Reclamation; however, DWR's proposed action includes the construction of new conveyance facilities and related operational changes, and Reclamation's proposed action only includes operational changes. Therefore, the project objectives and purpose and need are presented in separate sections below.

2.3 Project Objectives

CEQA requires that an EIR contain a "statement of the objectives sought by the proposed project." Under CEQA, "[a] clearly written statement of objectives will help the Lead Agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations. The statement of objectives should include the underlying purpose of the project" (State CEQA Guidelines Section 15124[b]). Here, as the CEQA lead agency, DWR is adopting project objectives separately from the federal agencies' purpose statement as set forth in Section 2.4, as well as the description of project need as set forth in Section 2.4.1.

DWR's fundamental purpose in proposing the proposed project is to make physical and operational improvements to the SWP system in the Delta necessary to restore and protect ecosystem health, water supplies of the SWP and CVP south of the Delta, and water quality within a stable regulatory framework, consistent with statutory and contractual obligations.

The fundamental purpose is informed by past efforts taken within the Delta and the watersheds of the Sacramento and San Joaquin Rivers, including those undertaken through the CALFED Bay-Delta Program and Delta Risk Management Strategy. The fundamental purpose, in turn, gives rise to the following project objectives.

- Address adverse effects to state and federally listed species related to:
  - The operation of existing SWP Delta facilities and construction and operation of facilities for the movement of water entering the Delta from the Sacramento Valley watershed to the existing SWP and CVP pumping plants located in the southern Delta.
  - The implementation of actions to improve SWP and/or CVP conveyance that have the potential to result in take of species that are listed under the ESA and CESA.
- Improve the ecosystem of the Delta by reducing the adverse effects to certain listed species of diverting water by siting additional intakes of the SWP and coordinated operations with the CVP.
- Restore and protect the ability of the SWP and CVP to deliver up to full contract amounts, when hydrologic conditions result in the availability of sufficient water, consistent with the requirements of state and federal law and the terms and conditions of water delivery contracts and other existing applicable agreements.

In addition to the project objectives enumerated above, the project objectives listed below guide the development of the proposed project and alternatives.

- To meet the standards identified in the ESA and the California Fish & Game Code, including the CESA or NCCPA, by, among other things, minimizing and fully mitigating the impacts of take, and, if possible, protecting, restoring, and enhancing aquatic and terrestrial natural communities and ecosystems that support listed and sensitive species within the geographic scope of the proposed project.
- To make physical improvements to the conveyance system in anticipation of rising sea levels and other reasonably foreseeable consequences of climate change.
- To make physical improvements to the conveyance system that will minimize the potential for public health and safety impacts resulting from a major earthquake that causes breaching of Delta levees and the inundation of brackish water into the areas in which the SWP and CVP pumping plants operate in the southern Delta.
- To develop projects that restore and protect water supply and ecosystem health and reduce other stressors on the ecological functions of the Delta in a manner that creates a stable regulatory framework under the ESA and either the CESA or NCCPA.
- To identify new operations and a new configuration for conveyance of water entering the Delta from the Sacramento River watershed to the existing SWP and CVP pumping plants in the southern Delta by considering conveyance options in the north Delta that can reliably deliver water at costs that are not so high as to preclude, and in amounts that are sufficient to support, the financing of the investments necessary to fund construction and operation of facilities and/or improvements.

2.4 Project Purpose and Need

Just as CEQA requires an EIR to include a statement of project objectives as described above, NEPA requires that an EIS include a statement of purpose and need to which the federal agency is responding in proposing the alternatives, including the proposed action (40 CFR 1502.13).

The need for this project is to improve California's water conveyance system to respond to increased demands upon and risks to water supply reliability, water quality, and the aquatic ecosystem. The Delta has long been an important resource for California, providing municipal, industrial, agricultural and recreational uses, fish and wildlife habitat, and water supply large portions of the state. However, by several key criteria, such as declines in populations of several fish species, seismic risk to levees and the Delta infrastructure, continuing land subsidence, and rising sea level, the Delta is now widely perceived to be in crisis. The operations of the CVP are currently constrained in the South Delta. Reclamation can increase its operational flexibility to provide water supply and minimize and avoid adverse effects to listed species by coordinating CVP operation with the proposed new SWP facilities and conveyance.

The federal agency purpose of the proposed action is to improve the movement of water entering the Delta from the Sacramento Valley watershed to the existing SWP and CVP pumping plants located in the southern Delta in a manner that minimizes or avoids adverse effects to listed species, supports coordinated operation with the SWP, and is consistent with the Project Objectives described above in Section 2.3, which in summary includes:

1. Restoring and protecting aquatic, riparian and associated terrestrial natural communities and ecosystems of the Delta, and

2. Restoring and protecting the ability of the SWP and CVP to deliver up to full contract amounts of CVP Project water, when hydrologic conditions result in the availability of sufficient water, consistent with the requirements of applicable state and federal law and the terms and conditions of water delivery contracts and other existing applicable agreements.

2.4.1 Project Need

The Delta has long been an important resource for California, providing municipal, industrial, agricultural and recreational uses, fish and wildlife habitat, and water supply for large portions of the state. However, by several key criteria, such as declines in populations of several fish species, seismic risk to levees and the Delta infrastructure, continuing land subsidence, and rising sea level, the Delta is now widely perceived to be in crisis. Improvements to the water conveyance system are needed to respond to increased demands upon the system and risks to water supply reliability, water quality, and the aquatic ecosystem. CVP operations are currently constrained in the south Delta. Reclamation can increase its operational flexibility to provide water supply and minimize and avoid adverse effects on listed species by coordinating CVP operation with the proposed new SWP facilities and conveyance.

Appendix 1A

Primer on California Water Delivery Systems and the Delta

Appendix 1A
Primer on California Water Delivery Systems and the Delta

The Sacramento-San Joaquin Delta (Delta or Bay Delta) is a region where two of California's largest rivers meet. Freshwater from the rivers mingles with saltwater from the Pacific Ocean, creating the West Coast's largest estuary. When first explored by the Spanish in the 1770s, the Delta was a vast marsh covered with tules and teeming with wildlife. Today the Delta is a highly engineered environment, composed of 57 leveed island tracts and 700 miles of sloughs and winding channels.

The watersheds for the Sacramento and San Joaquin Rivers and the Delta serves a number of competing uses. They provide water for much of California. They also provide rich and productive habitat for more than 500 species of fish and wildlife and support a number of endangered species. Railways, highways, and utilities crisscross the Delta, and ships traveling up and down deepwater channels to Sacramento and Stockton transport millions of tons of cargo to busy ports. The Rivers and the Delta also provide significant recreational opportunities.

Over decades, physical, biological and chemical alternations have occurred. Delta channels have been widened, straightened, deepened, connected, leveed, and gated. Rivers have been dammed and flows manipulated. Hydraulic mining has had lasting effects on sediment dynamics. Non-native and invasive species have been introduced and become established. Agriculture, industry, and municipalities use the Rivers and the Delta to discharge and remove runoff. Many of these changes have contributed to the Delta's decline as a natural estuary.

The proposed project is not intended solve all of these problems or to address all of the factors that have contributed to the Delta's decline. The scope of the BDCP/California WaterFix is within the Delta itself with a specific purpose to restore and protect its ecosystem health, SWP and CVP water supply, and water quality within a stable regulatory environment. Other efforts, particularly the Delta Plan, are focused on the broader interests and issues currently facing the Delta region as a whole.

This appendix provides background on the Delta and its development, the many issues facing the Delta, and other past and present efforts to address the Delta's many problems to provide context for the relatively narrow scope and purpose of the proposed project.

1A.1 The Sacramento–San Joaquin Delta

1A.1.1 Today's Delta

The Sacramento–San Joaquin River Delta, or California Delta, is an expansive inland river delta and estuary in northern California. The Delta is formed at the western edge of the Central Valley by the confluence of the Sacramento and San Joaquin Rivers, and lies just east of where the rivers enter Suisun Bay. The rivers' combined fresh water flows roll through the Carquinez Strait, a narrow break in the Coast Range, and into San Francisco Bay's northern arm. Suisun Marsh and adjoining bays are the brackish transition between fresh and salt water. The city of Stockton is located on the

San Joaquin River on the eastern edge of the Delta. Portions of six counties—Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo—make up the Delta. Figure 1A-1 shows the outline of the legally defined (statutory) Delta.

The Delta consists of a myriad of small natural and artificial channels (called sloughs), creating a system of isolated lowland islands and wetlands defined by dikes or levees. The islands in the Delta are not islands in the classic sense, but are referred to as such because they are completely surrounded by water and in many cases are so isolated that they are accessible only by boat, ferry, or aircraft. An extensive system of earthen levees has allowed widespread farming throughout the Delta. Its peat soil makes it one of the most fertile agricultural areas in California and arguably even the nation, contributing billions of dollars to the state's economy. Certain specialty crops, such as asparagus, are grown in the Delta in quantities unmatched anywhere else in the United States.

The Delta is crucial to the state's overall water picture. It is the heart of California's two largest surface water delivery projects, the State Water Project (SWP) and the Central Valley Project (CVP). Since the 1940s, its existing channels have been used to transport water to the projects' pumps in the western and southwestern Delta. From there, Delta water is transported south and west through canals and aqueducts to cities in the Bay Area, millions of acres of San Joaquin Valley farmland and more than 25 million people in southern California. Two-thirds of the state's residents rely on the Delta for at least a portion of their drinking water.

The Delta is also an important fishery habitat. An estimated 25% of all warm water and anadromous sport fishing species and 80% of the state's commercial fishery species live in or migrate through the Delta. Substantial runs of anadromous fish—salmon, steelhead, and sturgeon—once migrated up the Sacramento and San Joaquin Rivers to spawn. The surrounding waterways serve as passageways for 130 fish species that call the estuary home.

Additionally, the Delta provides valuable habitat for a wide variety of wildlife, with 380 types of animals residing within the ecosystem. Birds make up the majority of wildlife species, as the estuary offers important wintering habitat for millions of traveling ducks and geese. Amphibians, reptiles and mammals also are found within the estuary.

The Delta is a popular recreational spot in the state. Its islands offer camping, hiking, sightseeing, bicycling, hunting and horseback riding, while Delta channels offer boating, water-skiing and fishing. All these recreational activities contribute to the local economy, but they also increase pressure on the already fragile estuary.

1A.1.2 Changes in Delta Conditions

The Delta has undergone significant physical and biological modifications over the past 150 years, including the reclamation of 700,000 acres of tidal marsh and adjoining floodplains, as well as significant changes in riverine and tidal hydrology, and water quality (Moyle et al. 2010). Habitats for Delta native fishes have changed dramatically as a result of changes in hydrologic patterns from dams and water diversions, upstream land use changes, tidal marsh reclamation, and channelization of rivers and tidal channels (Moyle et al. 2010). As a result, the estuary is now one of the most highly modified and controlled estuaries in the world, having lost much of its variability and complexity (Moyle et al. 2010). In addition, there have been continual invasions of nonnative species and large changes in water quality from pollution and upstream diversions of fresh water (Moyle et al. 2010). These changes have caused the decline and extinction of native biota of the Delta, most notably some fishes, and maintains an environment that is increasingly hostile to native species (Moyle et al. 2010).

Historic fisheries in the Bay-Delta included salmon, steelhead trout, sardines and herring. Commercial fisheries were established for salmon, smelt, sole, flounder, sardine, herring and anchovy. In the 1800s, there were few controls on these fisheries, and in time, over-fishing contributed to declines in native species. Early settlers responded to these declines by introducing new species such as American shad and striped bass, both of which supported commercial fisheries for many years. To mitigate for the impacts caused by construction of dams and/or to boost dwindling salmon runs, a number of fish hatcheries were established. However, fish populations continued to decline, leading eventually to commercial fishing bans on white sturgeon, steelhead trout, striped bass and American shad. Central Valley fall-run Chinook salmon tentatively still support commercial fisheries but commercial and recreational fishing has been restricted or completely closed in recent years due to population declines. Today the Delta is a highly altered ecosystem which supports an assemblage of primarily alien species that thrive in fairly clear, warm, fresh water with strong tidal fluxes (Moyle et al. 2010). The aquatic habitat in the Delta has become simplified into a system of rip-rapped canals, cross hatched by navigation cuts that convey fresh water for export from and through the Delta during summer and which reduce outflows at other times of the year (Moyle et al. 2010). The demand for low salinity water and altered hydrology to support pumping operations has reduced the variability in salinity during the critical summer months, favoring the expansion of ecosystem-altering species such as overbite clam in Suisun bay and Brazilian waterweed in the Delta (Moyle et al. 2010). Nonnative freshwater species such as largemouth bass have increased dramatically and dominate Delta food webs while at the same time native species have collapsed (Moyle et al. 2010). There are other factors which affect the native Delta fish, including contaminants such as artificial hormones, reduced invertebrate food supply, altered food webs, disease, harmful algae blooms, lack of tidal marsh and floodplain habitat, and the change in Delta hydraulics caused by pumping for water for export from the South Delta (Moyle et al. 2010).

The extensive development of the SWP and CVP infrastructure in California has altered both the temporal and spatial distribution of Delta water through installations of water diversions, levees, pumps, and flow-altering barriers. Control of river flow and stage through the operation of SWP and CVP dams and water transfer facilities has reduced the winter and spring floods into the Delta, while maintaining elevated flows in the summer and late fall periods (National Marine Fisheries Service 2009). These seasonal flows influence the transport of eggs and young organisms through the Delta and into San Francisco Bay, playing an important role in the reproductive success and survival of many estuarine species including salmon, striped bass, American shad, delta smelt, longfin smelt, splittail, sturgeon and others (Bureau of Reclamation 2011). Temporal variations in freshwater flow are hypothesized to be the most important natural factor influencing the Delta ecosystem (CALFED 2008).

In addition, long-term future trends predict increased water clarity, increased nonnative species introductions, altered spatial and temporal habitat availability, altered food webs, and decreased abundance of fish in the northern Delta estuary and pelagic (open water) environments (CALFED 2008). As a result, the hydrologic state of the Delta no longer reflects environmental conditions to which many native Delta organisms are adapted.

1A.2 Issues Affecting the Delta Today

There are a myriad of environmental stressors affecting the Delta, from nonnative species to upstream pollution. In addition, there are a number of other issues that affect how the Delta functions are managed. The following section provides a brief overview of some of the major issues facing the Delta today.

1A.2.1 Demands on Water Supply

With the construction of the CVP and SWP, the Delta became a critical link in the state's complex water distribution system. Valley rivers and Delta channels transport water from upstream reservoirs to the South Delta, where state and federal facilities (the Harvey O. Banks Delta Pumping Plant and the Jones Pumping Plant) pump water into the California Aqueduct and CVP canals. The Delta is a conduit for water that is used for a wide range of in-stream, riparian, and other beneficial uses, including: critical habitat for several native aquatic and terrestrial species; drinking water for more than 25 million people in Central and Southern California and portions of the Bay Area; and irrigation water for 4 million acres of irrigated farmland throughout the Delta and San Joaquin Valley.

The water balance within the Delta—that is, the comparison of total inflows to total outflows—is controlled by supply from the Sacramento and San Joaquin rivers, eastside rivers and streams (Mokelumne and Cosumnes rivers), contributions from Coast Range watersheds, upstream diversions, demand from in-Delta users, outflows from the Delta to the San Francisco Bay and Pacific Ocean, and exports to agricultural and municipal and industrial (M&I) users outside of the Delta. In-Delta precipitation and storage and periodic tributary inflows provide additional water supplies to the Delta but are minor compared with the river water contributions. The largest system outflow is the portion of inflow that travels through the Delta, contributes to in-channel and wetland habitats, and exits through the San Francisco Bay to the Pacific Ocean. The second largest outflows are exports through the SWP and the CVP, followed by in-Delta use and local diversions.

There are over 3,000 diversions that remove water from upstream and in-Delta waterways for agriculture and M&I uses. Of these, 722 are located in the mainstem San Joaquin and Sacramento rivers and 2,209 diversions are in the Delta (Herren and Kawasaki 2001). In the Delta, the SWP and CVP use the Sacramento and San Joaquin rivers and other Delta channels to transport water from river flows and reservoir storage to two water export facilities in the South Delta (i.e., the Jones Pumping Plant and the Banks Pumping Plant). Water from these facilities is exported for urban and agricultural water supply demands throughout the San Joaquin Valley, Southern California, the Central Coast, and the southern and eastern San Francisco Bay Area. Of the over 2,200 water diversions in the Delta, most are unscreened and used for in-Delta agricultural irrigation (Herren and Kawasaki 2001). Additionally, water from industrial diversions at Pittsburg and Antioch provide cooling for generators producing electric power at the Mirant Delta LLC (Mirant) power plants.

In the past decade, California's population experienced a 25% growth rate, double the national average. State officials in the California Department of Finance estimate the State's current population of 37 million will exceed 52 million by 2030 and reach nearly 60 million by 2050. In its 2009 update of the California Water Plan, DWR used three possible scenarios of future conditions to forecast water demands up to the year 2050, which ranged to as high as 10 million af per year.

In addition to the demands placed upon water from the Delta as a result of California's growing population, water projects must meet operational requirements including those within biological opinions of federal regulatory agencies for the protection of certain fish and wildlife species, and those for D-1641, with critical life stages that depend on freshwater flows. Meeting these Delta water operational requirements has resulted in an overall reduced and less flexible water supply.

With forecasts of reduced precipitation, shifts in timing of peak flow and runoff periods, reductions in snowpack, and impacts from sea level rise as a result of global climate change, the struggle to meet these divergent demands will be magnified in the future. Even so, the California Legislature has been clear that the Delta remains "the hub of the California water system, as [t]he economies of major regions of the state depend on the ability to use water within the Delta watershed or to import water from the Delta watershed." Specifically, "[m]ore than two-thirds of the residents of the state and more than two million acres of highly productive farmland receive water exported from the Delta watershed" (California Public Resources Code (PRC), §§ 85002, 85004).

1A.2.2 Delta Salinity

With rivers feeding into it and marine bays at its western edge, the Delta is the junction for seawater and fresh water within the wider estuary system. As such, salinity levels fluctuate daily and seasonally, depending on the elevation of tides and magnitude of freshwater inputs, respectively (CALFED 2008). Prior to human intervention, salty ocean water from the San Francisco Bay invaded the Delta during dry summers when mountain runoff ebbed. Then, during the winter, heavy runoff from the mountains could expel sea water from the Delta and even the Bay. Historical accounts show that the location of where saltwater transitioned to fresh water was largely dependent upon the dryness of the year. A wet year resulted in a substantially fresh water San Francisco Bay; whereas, a severe drought allowed salt water to move inland, as far as Sacramento.

Natural salinity levels have been altered within the Delta through the use of various gates and barriers, as well as locations and operations of export facilities and upstream reservoirs, which together may influence many of the native aquatic organisms within the Delta estuary. As reservoir releases changed the timing of flows and exports have increased from historic conditions, Delta salinity has decreased, creating less than optimal environmental conditions for native species and often favoring nonnative species (Lund et al. 2008). Water management has had a similar effect on water quality as observed by the reduced variability of freshwater flow, such that salinity conditions have become more constant (Lund et al. 2008).

Delta salinity has been a major concern since the City of Antioch's 1920 lawsuit against irrigators in the Sacramento Valley, whose upstream water withdrawals reduced freshwater flows into the Delta and increased the salinity at water intakes in the western Delta. Salinity affects the use and taste of urban water supplies, the productivity of farmland, and the viability of different organisms within aquatic ecosystems. For many decades, this issue was discussed in terms of where the salinity gradient—that is, the transition from seawater to freshwater (referred to as X2 by scientists)—should be located in the estuary. Since the 1920s, to meet water supply needs, it has been regarded as desirable to maintain the Delta, as much as possible, as a freshwater system, Suisun Bay and Marsh as brackish water systems, and San Francisco Bay as a marine (saltwater) system. SWP and CVP reservoirs are operated in part to alleviate the problem of seasonal salt water intrusion into the Delta by making releases of fresh water year-round. However, salinity intrusion from the ocean or accumulation of minerals from farming discharges into Delta rivers remains a problem. Increasingly, it has been recognized that salinity and other, broader, water quality problems in the Delta are compounded by the quality of upstream and in-Delta drainage, with consequences for both urban and agricultural users as well as for fish and wildlife.

Agricultural drainage (or in-Delta drainage) also contributes to the Delta's salinity problems. Because most Delta islands are below sea level, water from surrounding channels seeps through the levees onto the land. Farmers must pump this water from their lands while adding controlled amounts of fresh water needed for productive agriculture. In the south Delta, where farmers rely primarily on the waters of the San Joaquin River for their irrigation supply, the process of irrigation concentrates salts in the drainage water, which is then pumped into nearby Delta channels. When the current is not sufficient to "flush" these salts through the Delta, there can be localized salinity problems.

The salt content of drainage water flowing down the San Joaquin River, primarily from the west side of the valley, is high, and sources of dilution water are limited. Most of the valley averages less than 10 inches of rain per year, and fresh water from Sierra tributaries is either exported or diverted for consumptive uses. Flows in some stretches of the San Joaquin River during the summer irrigation season consist almost entirely of these irrigation return flows. In turn, salty return flows increase the salt content of water used downstream by Delta farmers and the amount of salty water flowing into the estuary. Over the last decade, steps have been taken to reduce the volume of agricultural drainage flow into the San Joaquin River.

Salinity is a critical component of the Delta, having broad impacts on the quality of water in the Delta available for drinking, agriculture, and biological resources use. Salinity concentrations are not uniformly distributed throughout the Delta because of the complex interactions between tidal and freshwater inputs that are subject to spatial and temporal variability.

A detailed discussion of salinity and its effects on the aquatic ecosystem in the Delta is provided in EIR/EIS Chapter 8, *Water Quality*, and Chapter 11, *Fish and Aquatic Resources*.

1A.2.3 Water Quality

Because the Delta is a source of drinking water for more than 20 million Californians, the quality of this water is very important. Cycling of nutrients, carbon, and other organic and inorganic materials are some of the major chemical processes driving the ecological conditions of the Delta. Water quality impacts on Delta ecosystems date back to the Gold Rush era when hydraulic mining washed large amounts of sediment from surrounding landforms into the Delta's major tributaries. In addition, hundreds of organic and inorganic toxins are present in the Delta system and may cause adverse physiological responses in humans, plants, fish, or wildlife (Hinton 1998; California Department of Fish and Game 2010). These contaminants—organic, inorganic, and biological pathogens—are found in many forms and have the ability to affect the ecosystem in many ways and at different life stages of individual species.

More specifically, the contaminants present in the Delta include: metals, such as mercury (and methylmercury) and selenium; pesticides; inorganic nutrients (e.g., forms of nitrogen, ammonia, and phosphorus); organic matter; and pharmaceuticals (CALFED 2008). These contaminants may cause acute toxicity, such as mortality, or chronic toxicity, such as reduced growth, reproductive impairment, or other subtle effects. Contaminants can also affect the sustainability of healthy aquatic food webs and interdependent fish and wildlife populations (CALFED 2000). Some contaminants are naturally occurring at low levels, but with human disturbance, contaminants can be present in amounts or concentrations high enough to pose life-threatening effects.

The following are the principal sources that affect water quality in the Delta:

- Historical drainage and sediment discharged from upstream mining operations in the late 1800s and early 1900s contributed metals such as cadmium, copper, and mercury.
- Stormwater runoff can contribute metals, sediment, pathogens, organic carbon, nutrients, pesticides, dissolved solids (salts), petroleum products, and other chemical residues.
- Industrial and municipal wastewater treatment plant discharges can contribute salts, metals, trace organics, nutrients, pathogens, pesticides, organic carbon, and oil and grease.
- Agricultural irrigation return flows and nonpoint discharges can contribute salts (including bromide), selenium, organic carbon, nutrients, pesticides, pathogens, and sediment.
- Water-based recreational activities (such as boating) can contribute hydrocarbon compounds, nutrients, and pathogens.
- Atmospheric deposition can contribute metals, nutrients, pesticides, and other synthetic organic chemicals, and may lower pH.
- Seawater intrusion can contribute salts, including bromide, which affect total dissolved solids concentrations and can contribute to the formation of unwanted chemical byproducts in treated drinking water.

The length of time during which nutrients and contaminants are present is another important aspect of water quality contamination because of the potential for resident organisms' increased exposure and subsequent chronic effects. Delta sloughs are particularly susceptible because of their longer water residence time before flows move the water through the system.

Recently the U.S. Environmental Protection Agency (EPA) identified the water quality stressors it believes are the most significant, individually and/or cumulatively, for aquatic species health in the Delta estuary (*Water Quality Challenges in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: EPA's Action Plan*, August 2012). The EPA's list of water quality contaminants includes selenium, ammonia, pesticides, and Contaminants of Emerging Concern (U.S. Environmental Protection Agency 2012, Appendix I, p. 1).

As described by the EPA, aquatic life toxicity caused by total ammonia nitrogen is one of the suspected contributors to the pelagic organism decline in the Delta, monitoring data, laboratory testing, and multi-year field observations indicate that concentrations of total ammonia nitrogen in Delta waterways may be toxic to desirable algae species and invertebrates which are significant food sources for pelagic fish. Depressed algal populations and primary productivity is also caused by light limitation and clam grazing in the Bay Delta Estuary. Total ammonia nitrogen levels in Bay Delta waterways may also preferentially support an aquatic ecosystem community composed of toxic blue green algae and jelly fish.

1A.2.4 Suspended Sediments

Suspended sediments are a natural component of the Delta and are not inherently toxic, but have direct as well as indirect impacts on the Delta ecology. The Delta was created as a result of sediment deposition from the Sacramento and San Joaquin Rivers entering the ocean. Many of the species in the Delta have adapted to these highly turbid conditions. Over the last three decades, water in the Delta has become less turbid due to a variety of physical and biological changes.

For instance, construction of upstream dams has reduced the inflow of sediments to the downstream Delta. Levees and other flood management activities have also reduced the amount of sediments transported in the rivers because these facilities are designed to reduce erosion; therefore, turbidity in the river is reduced. The increase of invasive, aquatic weeds also results in areas of reduced mobilization of sediments. These reductions of intertidal mud and sand has reduced the availability of critical habitat for a variety of organisms such as mudworms and waterfowl, as well as increased the potential to uncover and mobilize previously buried contaminants such as mercury and selenium. The resulting decreased turbidity alters the natural system in the Delta by increasing light penetration, altering primary production, and affecting predator-prey interactions through increased water transparency and susceptibility to predation pressure (CALFED 2008; U.S. Fish and Wildlife Service 2008).

Additional information regarding water quality and specific impacts to fish and aquatic resources can be found in EIR/EIS Chapter 8, *Water Quality* and Chapter 11, *Fish and Aquatic Resources*.

1A.2.5 Delta Levees

The Delta is an integral part of the Sacramento and San Joaquin Valley River natural conveyance systems. It receives runoff from 40 percent of the State's land. This system has been extensively modified to redirect and deliver part of the water to meet the needs of two-thirds of the State's population and irrigate millions of acres of farmland. Today, over 1,100 miles of levees protect the 738,000 acres of Delta islands, tracts and population centers from flooding, as well as protecting a large portion of the State's water supply. See Figure 1A-2. The levee systems have allowed farmers to drain and reclaim a large portion of the Delta from its original state as a tidal marsh. These levees were built to prevent flooding and allow cultivation of the rich soil, while protecting towns and cities as well as public infrastructure such as highways, railroads and pipelines.

A sound, well-maintained, levee system is vital to protect not only the farms and towns and transportation corridors on Delta islands, but also the supply of fresh water moving through Delta waterways. When levees fail, water rushes into the lower-than-sea-level islands, pulling salt water from the bay into the Delta. If numerous levees were to fail simultaneously in the Delta, there is a significant risk that large amounts of salt water could flow into the Delta and raise salinity levels. The resulting high salinity levels could require the shutdown of the export pumps in the Delta that supply water to millions of people.

A majority of the levees protecting the Delta (approximately 65 percent) are not within the federal/state Sacramento Flood Control Project system and are constructed and maintained by island landowners or local reclamation districts. These levees are generally built to an agricultural standard and may be somewhat less stable than those constructed and maintained to protect urban areas. Improvement and maintenance of these "non-project" levees can be very challenging. The natural peat deposits that made the Delta such a fertile farming location make poor building materials for levees and/or their foundations. Oxidization of these peat soils has led to island and levee subsidence, which has increased the burden on the levee system. Another way that the Delta levees are distinguished from levees along rivers such as the Sacramento is that they are constantly exposed to water, making them more comparable to dams. However, unlike dams, they are not constructed or regulated to the same high engineering standards. Delta levees need to withstand the daily cycle of tides, wind and boat wakes. Levees in the west Delta receive the strongest impact from tidal influences; soils there are the least stable and most susceptible to liquefaction. Burrowing animals further threaten levees, because they burrow and weaken levees before they are detected.

Additionally, land subsidence, sea level rise, and changes in climate make Delta levees increasingly vulnerable to failure from earthquakes, floods, and other causes. Our understanding of the Delta's vulnerability to natural disaster has been highlighted by recent scientific analysis, which calculated the probability of levee failure due to flooding or earthquake, and by real-world events such as Hurricane Katrina and the 2011 earthquake and tsunami in Japan. These events demonstrated the level of destruction that can result from breached levees. Although levee vulnerability in the Delta is not easy to quantify, it is estimated that levee breaches are very likely in the event of an earthquake.

Since 1980, 27 Delta islands have been partially or completely flooded, including a "sunny-day failure" in June of 2004 at Upper Jones Tract. The levee gave way unexpectedly without any apparent impetus. When pump-out operations began a month later, approximately 140,000 af of water covered the 12,000 acres of Upper and Lower Jones Tracts to an average depth of about 12 feet. DWR estimated total costs related to the levee break at about $90 million, including approximately $45 million in direct flood fighting and levee-repair costs, and millions more in losses of crops and property. A levee break near Isleton, in June of 1972, allowed large volumes of brackish water from San Francisco Bay to rush into the Delta, curtailing state and federal export operations. Approximately 300,000 af of fresh water was released from upstream reservoirs to help flush the intruding salt water out of the Delta.

Repairing the levee damage caused by a natural disaster such as a large earthquake or major flooding could take years, if it could be completed at all, given the cost. Widespread flooding could force a long-term shutdown of the SWP/CVP pumps that keep much of California supplied with water.

Currently, the State has several programs in place to help manage risk and improve the environment in the Delta. Local reclamation districts are responsible for maintaining their levees, but they may be reimbursed for a portion of the costs of their work under the State's Delta Levees Subvention Program established in 1973. The Delta Flood Protection Fund Act of 1988 significantly increased reimbursement opportunities. Another State program, the Delta Levee's Special Project program, provides financial assistance to local levee maintaining agencies for rehabilitation of levees in the Delta. Since the inception of the program, more than $100 million has been provided to local agencies in the Delta for flood control and related habitat projects. The State is also working to manage the risk through emergency response and preparedness. For instance, DWR has been stockpiling materials in key Delta locations for emergency repairs and flood fighting activities. DWR is also working with CalEMA, the United States Army Corps of Engineers and local agencies to coordinate efforts in planning for emergencies. Additional State programs to reduce risk and enhance the Delta include: subsidence control/reversal, beneficial use of dredge material, habitat enhancement and on-going levee evaluations.

In addition to levee construction and repair, there are several major planning efforts currently in development to further maintain and enhance this critical resource. The Delta Stewardship Council is an independent agency of the State and is charged to "develop, adopt, and commence implementation of the Delta Plan," a comprehensive, long-term, management plan for the Delta. The Delta Protection Commission developed its *Land Use and Resource Management Plan for the Primary Zone of the Delta* (Delta Protection Commission 2010) in 2010. This plan contains policies to guide local government uses for the Delta including policies for levees. Outside of the State, the federal government has eight distinct ongoing studies involving the Delta.

1A.2.6 Land Subsidence in the Delta

An issue that has increased in importance over time is the subsidence of Delta lands. A portion of the Delta lands now lie 25 feet or more below sea level and below the level of the water in the surrounding channels. See Figure 1A-3. In many cases, the reclamation of the islands initiated the subsidence process, because much of the material used to elevate the levees was taken from the interior of reclaimed islands, thereby lowering the island while elevating its protective barrier. Another cause of the subsidence is the soil itself. The peat soils are rich in nutrients, but oxidize as they decompose, releasing carbon dioxide and causing the exposed land to subside as much as 3 inches per year.

Soil burning, mostly associated with the potato farming that developed by 1900, also accounted for much early subsidence. Despite the benefits of burning—weed control, fertilization, and the facilitation of the seedbed—it accelerated subsidence and allowed for salt accumulation and increased wind erosion.

Land subsidence is a critical problem because the process puts additional stress on levees and renders the system of Delta levees unstable, creating a greater likelihood of levee failure and subsequent flooding. In the event of a levee failure, land subsidence would result in greater saltwater intrusion into the Delta.

Additionally, subsidence adds to farming costs because it requires additional levee rebuilding, drainage excavation, and pumping both for regular operations and recovery after floods. However, in general, Delta farmers have continued to farm subsided lands. Even though some of the more destructive farming practices have ceased, slowing down the rate of subsidence, Delta islands continue naturally to subside due to the exposed peat soils.

1A.2.7 Pelagic Organism Decline

The four primary pelagic (open water) fish of the upper Delta (delta smelt, longfin smelt, striped bass and threadfin shad), have shown substantial variability in their populations, with evidence of long-term declines for these species (Baxter et al. 2008). By 2004, these declines became widely recognized and discussed as a serious management issue, and collectively became known as Pelagic Organism Decline (POD). Concerns surrounding POD focus on the fish species that rely on the pelagic zone for spawning, early life history, and perennial habitat. The apparent simultaneous declines of these four fish species occurred despite differences in their life histories and in how each species utilizes Delta habitats. These differences suggested one or more Delta-wide factors to be important in their declines (Baxter et al. 2008).

A multi-agency work team was created in 2005 to evaluate the potential causes of POD, which likely include a combination of factors: stock-recruitment effects, a decline in habitat quality, increased mortality rates, and reduced food availability from invasive species competition. The team organized an interdisciplinary effort that included scientists from DWR, California Department of Fish and Wildlife (CDFW), Central Valley Regional Water Quality Control Board (RWQCB), Reclamation, U.S. Environmental Protection Agency (USEPA), U.S. Geological Survey (USGS), California Bay-Delta Authority, San Francisco State University, and University of California at Davis. A conceptual model, including a suite of 47 studies, was developed to aid in the evaluation of POD, and to describe possible mechanisms by which a combination of long-term and recent changes in the ecosystem could produce the observed pelagic fish declines (Baxter et al. 2008). The conceptual model is intended to assess how different stressors may be linked to the POD, and is based on classical food web and fisheries ecology. It contains four major components: (1) prior fish abundance; (2) habitat; (3) top-down effects; and (4) bottom-up effects (Baxter et al. 2008). A substantial synthesis effort is also included in the model to produce, among other outputs, life cycle models for each of the primary species.

1A.2.8 Fish Entrainment

Freshwater diversions in the Delta range from small pumps and siphons that serve individual farms to the state and federal facilities in the North and South Delta that are used to export water. These facilities directly affect Delta fish species through entrainment and impingement and related mortality. Export pumping and the associated alterations to the movement of water through the Delta may be responsible, in part, for declines of species such as striped bass (Stevens et al. 1985), Chinook salmon (Kjelson and Brandes 1989), and delta smelt (Bennett 2005). Entrainment occurs at Delta export facilities, agricultural diversions, and power plants, where fish species are trapped by the facility during operations and subsequently exposed to high levels of predation and direct mortality from impingement[1] (Reclamation 2008). The effects of diversions on individual species vary depending on the facility type, and while efforts are made to salvage entrained fish and transport them to another location in the Delta, losses of fish due to predation remain high despite these efforts (Bureau of Reclamation 2008, California Department of Water Resources 2009). These non-natural increases in mortality possibly inhibit the abundance, distribution, diversity, and growth of special-status species populations such as Chinook salmon, steelhead, delta smelt, longfin smelt, and splittail.

Both the SWP and the CVP operate fish salvage facilities to reduce the impacts associated with fish entrainment (for more detailed information on existing facilities and operations see BDCP Chapter 4 on Covered Activities). The SWP operates the John E. Skinner Fish Protective Facility and the CVP operates the Tracy Fish Collection Facility. Both salvage facilities have similar salvage processes where the fish are intercepted by louvers, collected, held in tanks, and trucked to various locations throughout the Delta. DWR and the Reclamation measure the efficiency of their salvage facilities by evaluating multiple factors including louver efficiency, prescreen predation, and transport efficiency. Both facilities currently operate at less than 100% salvage efficiency.

1A.2.9 Nonnative Species

The Delta is one of the most invaded ecosystems in the world, the result of accidental and purposeful introductions of nonnative species that have been occurring over many decades (State Water Resources Control Board 2008). Over the past several decades, the accidental introduction of many marine and estuarine organisms from the ballast water of ships has greatly changed the planktonic and benthic (bottom and shore dwelling) invertebrates of the Delta and directly affected the food web. Additionally, water management structures and activities have contributed to a reduction in the Delta's naturally diverse and variable ecosystem, resulting in more favorable conditions for successful colonization by invasive animal and plant species. Invasive aquatic and terrestrial species from around the world dominate the Delta today, particularly in fresh and low salinity habitats (CALFED 2008).

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[1] Impingement occurs when the force of a diversion causes a larger organism (in this case, fish) to be pinned against the fish screens. The force is such that it does not allow the fish the opportunity to free itself.

Nonnative species are known to have harmful effects on the Delta ecosystem and may directly and indirectly threaten native species by altering ecosystem functions and the food web and competing with or directly preying upon native species. Recent conservation interest has focused on the introduction of invasive clams and invasive aquatic plant species that may have a large impact on the ecology of the Delta (CALFED 2008; State Water Resources Control Board 2008). Nonnative invertebrate species currently found in the Delta, such as the Asian (*Corbicula fluminea*) and overbite clams (*Potamocorbula amurensis*), as well as recent California invaders (not yet found in the Delta) such as quagga and zebra mussels, have high colonization and filtration rates that limit phytoplankton and zooplankton abundance. Nonnative aquatic weeds also pose serious problems in the Delta because of their ability to displace native plant species, harbor nonnative predatory species, reduce food web productivity, reduce turbidity, and interfere with water conveyance and flood management systems. For example, Brazilian waterweed is often referred to as an “ecosystem engineer” because it has affected the natural environment within the Delta by reducing suitable habitat for native species, reducing turbidity, and improving habitat conditions for invasive species (CALFED 2008).

More information regarding nonnative species in the aquatic environment can be found in EIR/EIS Chapter 11, *Fish and Aquatic Resources*. Descriptions of nonnative species that impact terrestrial communities in the Delta can be found in EIR/EIS Chapter 12, *Terrestrial Biological Resources*.

1A.3 History of Water Supply Facilities and Systems

As a water distribution system, the Delta of today not only serves the State and federal projects but also many agricultural and municipal water diverters surrounding and within the Delta itself. Delta water from the State Water Project serves both urban and agricultural areas in the Bay Area, the Silicon Valley, the San Joaquin Valley, the Central Coast, and Southern California. All of the major water development projects that export from the upstream watersheds or Delta (or develop water for in-Delta urban use) are listed below, along with their approximate year of initial water delivery.

List of Key In-Delta and Upstream Urban & Export Projects

Project	Watershed	Year Completed
Mokelumne River Aqueduct	East	1929
Hetch Hetchy Aqueduct	San Joaquin	1934
Contra Costa Canal	Delta	1940
Friant-Kern Canal	San Joaquin	1951
Delta Mendota Canal (Jones Pumping Plant)	Delta	1951
SWP (Banks Pumping Plant)	Delta	1968
North Bay Aqueduct	Delta	1988

This section provides a brief history of the development of the Delta as a water distribution system with a focus on the largest of the water supply systems, the SWP and CVP.

Water supply development in California began well before the state was admitted into the Union. Between 1772 and the mid-1800s, construction of the first water storage and diversion projects was initiated in support of the developing missions (Lauer 2008). These projects firmly established the practices of diversion, storage, and conveyance of water for irrigation purposes. Early irrigation projects provided little in the way of long-term storage or flood management. As a result, crops were often ruined by devastating floods and droughts. Water demands increased during the Gold Rush and local mining boom in the 1840s and 1850s (Apple 2004). The development of the transcontinental railroad further stimulated the demand for water. In response, throughout the latter part of the 19th and the beginning of the 20th Century, larger irrigation projects were constructed in the San Joaquin and Sacramento Valleys (Paggi 2001). Miles of canals were dug by local farmers and diversions were created. However, these rudimentary water distribution systems were still not capable of providing an ample, reliable water supply.

In the early part of the 20th century, California water leaders recognized that many areas lacked the engineered works and financial resources to meet their water needs. The concept of a statewide water development project was first proposed in 1919 by Col. Robert Marshall of the United States Geological Survey (USGS). Under Marshall's plan, a dam would be constructed on the San Joaquin River near Friant and water would be diverted to areas in the eastern San Joaquin Valley. In addition, water in the Sacramento Valley would be collected, stored, and transferred to the San Joaquin Valley by a series of reservoirs, pumps, and canals. The main storage facility would be the Shasta Dam. Hydroelectric power generated at Shasta Dam would provide the power to send water from the Delta to irrigated lands in the San Joaquin Valley.

Intrigued by Marshall's plan, the California Legislature authorized a series of investigations. In 1931, after extensive study, the State developed the first California State Water Plan. This plan was passed by the Legislature in 1933 as part of the California Central Valley Project Act. The Act authorized the sale of revenue bonds to finance the construction of the State Water Project. However, because of the Great Depression, the bonds didn't sell. To assist California, Congress passed the Federal Central Valley Project Act, which authorized the U.S. Bureau of Reclamation (Reclamation) to construct several of the facilities that were identified and described in the State's Central Valley Project Act. The primary purpose of these facilities was to satisfy agricultural water demands in the Sacramento and San Joaquin River Valleys. Specifically, the Act authorized the construction of the Shasta Dam on the upper Sacramento River, Friant Dam on the San Joaquin River, Contra Costa Pumping Plant and Canal in the Delta, the C. W. "Bill" Jones Pumping Plant (Jones Pumping Plant), and the Delta-Mendota Canal in the Delta and the San Joaquin Valley. The construction of other facilities called for in the State Water Plan, such as the Trinity River Division and Folsom Dam and Power Plant, was authorized in subsequent years.

Additional water imports into Southern California began in the 1950s to meet an increasing urban (municipal) demand. In response to the growing water demands in the southern San Joaquin Valley and southern California, the California Legislature passed the Burns-Porter Act in 1960 to fund the creation of the SWP. The SWP consists of a complex system of dams, reservoirs, power plants, pumping plants, canals, and aqueducts to deliver water. Although initial transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be built as needed.

The period between 1940 and 1970 witnessed the most extensive development of water projects in California. During this period, most of the current features of the SWP and CVP were constructed, several other federal dams and reservoirs were built, and several locally owned and operated dams and reservoirs were constructed or expanded.

Following are key milestones in the history of the water supply system:

- 1931: The federal government and the State Water Resources Commission (Hoover-Young Commission) recommend that the federal government construct the CVP and that the state operate the facilities.
- 1933: The State of California passes the CVP Act and authorizes $170 million worth of bonds for the construction of the Shasta Dam and Power Plant, Friant Dam and Power Plant, Contra Costa Canal, Madera Canal, Friant Kern Canal, other dams and pumps on the San Joaquin River, transmission lines from Shasta to Antioch, and a pump station between the Sacramento and San Joaquin Rivers. However, because of the Great Depression, the bonds fail to sell.
- 1935: The federal government approves $20 million in Emergency Relief Appropriation Funds and the Rivers and Harbors Act authorizes the CVP.
- 1937: Congress reauthorizes the Rivers and Harbors Act, including the CVP, and states the purposes of the project.
- 1944: Congress adopts the Flood Control Act of 1944, including authorization for the Shasta, Folsom, and New Melones dams.
- 1954: Congress adopts the Grassland Development Act to add fish and wildlife interests as authorized purposes of the CVP and to authorize cooperation with the State to supply water to grasslands for waterfowl interests.
- 1955: Congress adopts the Trinity River Act to authorize the Trinity River Division to allow for preservation and propagation of fish and wildlife.
- 1957: The State Water Plan is completed, which presents preliminary plans for developing all of the State's water resources in order to meet its ultimate water needs. Those plans include a system of reservoirs, aqueducts, pumping and power plants that would transport water from areas of surplus in the north to the water-deficient south.
- 1959: The California Legislature adopts the State Water Plan and enacts the Burns-Porter Act, which provides for initial funding of $1.75 billion in general obligation bonds and authorizes construction of SWP facilities.
- 1960: Congress adopts the San Luis Authorization Act to authorize the San Luis Unit and provide for Reclamation participation in recreation facilities.
- 1960: The Burns-Porter Act is approved by California voters to finance the SWP.
- 1962: Congress modifies the 1944 New Melones Dam authorization to include irrigation, power, wildlife and fishery enhancement, recreation, and water quality.
- 1965: Congress adopts the Auburn-Folsom South Unit Authorization Act to authorize the Auburn-Folsom South Unit, including participation in the development of recreation facilities.
- 1986: Congress adopts Public Law 99-5546 to authorize the Secretary of the Interior to execute the Coordinated Operations Agreement (COA) for the SWP and CVP.
- 1992: Congress adopts Public Law 102-575, with 40 separate titles including Title 34, which is the Central Valley Project Improvement Act (CVPIA). The CVPIA amends the authorized purposes and requires changes to the management of the CVP, particularly for the protection, restoration, and enhancement of fish and wildlife.

1A.3.1 Central Valley Project

The CVP was originally conceived as a State project to protect the Central Valley from water shortages and floods by regulating and storing water in reservoirs in the water-rich northern half of the State and transporting it to the water-poor San Joaquin Valley and its surrounding areas by means of a series of canals, aqueducts and pumping plants. While the Central Valley is an ideal place for agriculture because of its rich soils and favorable weather, early farmers in central California often found themselves troubled by frequent floods in the Sacramento Valley and a general lack of water in the San Joaquin Valley. Following the passage of the CVPIA in 1992, the CVP now includes the protection, restoration, and enhancement of fish and wildlife as equal project purposes.

The basic concept and facilities of the CVP were included in the first California State Water Plan formulated in the 1930s. In the Depression era, however, the State was unable to sell the necessary bonds to finance the project. Most of the water development envisioned by the State was eventually accomplished by the federal CVP, beginning with its initial authorization in 1935. Construction on the CVP began in 1937 with the Contra Costa Canal, which began delivering water in 1940. The next facility built was Shasta Dam, the keystone of the CVP. Work on the dam began in 1938, and water storage started even before its completion in 1945. Congress subsequently passed 13 separate measures to authorize the construction of other major water management and storage facilities over the next three decades, including Friant Dam, which was completed in 1942. The final dam, New Melones, was completed in 1979. See Figure 1A-4 for an illustration of the major components of the CVP. Today, some features of the project remain unconstructed, some are still only partly finished, and others are still awaiting authorization.

The CVP remains one of Reclamation's most ambitious projects and has grown over nearly 80 years to become one of the largest water storage and transport systems in the world. In years of normal precipitation, it stores and distributes about 20 percent of the state's developed water—about 7 million acre-feet[2] (af)—through its massive system of reservoirs and canals. Water is transported 450 miles from Lake Shasta in northern California to Bakersfield in the southern San Joaquin Valley.

There are eight divisions of the CVP and ten corresponding units, many of which operate in conjunction, while others are independent of the rest of the network. The eight divisions are Shasta, Sacramento River, Trinity River, American River, Friant, Delta, West San Joaquin, and San Felipe.

The Shasta Division consists of a pair of large dams (Shasta and Keswick) located on the Sacramento River north of the City of Redding. The Shasta Dam is the primary water storage and power-generating facility of the CVP. It impounds the Sacramento River to form Shasta Lake, which can store over 4,500,000 af of water. Shasta Dam functions to regulate the flow of the Sacramento River so that downstream diversion dams and canals can capture the flow of the river more efficiently, and to prevent flooding in the Sacramento–San Joaquin Delta where many water pump facilities for San Joaquin Valley aqueducts are located. The Keswick Dam functions as an afterbay (regulating reservoir) for the Shasta Dam, and like Shasta, generates power. Releases from Shasta and Keswick dams help control salinity in the Delta Division, as well as provide cold water flows for migrating salmon.

[2] An acre-foot is the amount of water that would cover a 1-acre area to a depth of 1 foot. One acre-foot equals 325,851.429 U.S. gallons.

The Sacramento River Division includes diversion dams, pumping plants, and canals that provide municipal water supplies and irrigation. The Red Bluff Diversion Dam, on the Sacramento River about 2 miles southeast of Red Bluff, diverts water from the Sacramento River to the Corning and Tehama–Colusa Canals. To meet migration needs, newly installed pumps are used to divert water from the Sacramento River to the Tehama–Colusa and Corning canals during periods when the dam gates are opened. The Sacramento River supplies water to Tehama, Glenn, Colusa, and Yolo counties for irrigation.

The Trinity River Division's primary purpose is to divert surplus water from runoff and melting snow from the Trinity River, in the Klamath River Basin, via the Lewiston Dam and Clear Creek Tunnel, into the Sacramento River drainage downstream of Shasta Dam, in order to provide more flow in the Sacramento River and generate peaking power in the process. Water from the Trinity River Division enters the Sacramento River at Keswick Reservoir in the Shasta Division. Trinity Dam forms Trinity Lake, which is the second largest CVP water-storage reservoir, with just over half the capacity of Shasta. Lewiston Dam lies just downstream of Trinity Dam and diverts water into the Clear Creek Tunnel, which brings it into a third reservoir, Whiskeytown Lake on Clear Creek, a tributary of the Sacramento River.

The American River Division is located in north-central California, on the east side of the Great Central Valley. It manages the water of the American River, which drains off the Sierra Nevada and flows into the Sacramento River. The American River Division stores water in the American River watershed to both provide water supply for local settlements and supply it to the rest of the system. The division is divided into three units: Folsom, Sly Park, and Auburn-Folsom South. Two structures impound the water of the American River - Folsom Dam and Nimbus Dam. The Folsom Unit consists of Folsom Dam, its primary water storage component, and Nimbus Dam, which serves as its downstream forebay. These two dams provide flood management on the American and Sacramento rivers.

South of Sacramento lies the Delta. The Delta is crucial to the State's overall water supply, as it is in the heart of both the SWP and CVP water systems. Water from the Delta is sent southward via a series of aqueducts and pumping plants to supply water to farms and cities. The Delta Cross Channel intercepts Sacramento River water as it travels westward toward Suisun Bay, and diverts it south through a series of man-made channels, the Mokelumne River, and other natural sloughs, marshes and distributaries. From there, the water travels to the Jones Pumping Plant, which raises water into the Delta-Mendota Canal, which in turn travels 117 miles southward to Mendota Pool on the San Joaquin River, supplying water along the way to other CVP reservoirs. The Tracy Fish Collection Facility sits at the entrance of the Jones pumping plant to catch fish that would otherwise end up in the Delta-Mendota Canal. A second canal, the Contra Costa Canal, captures fresh water near the central part of the Delta, taking it 48 miles southward, distributing water to the Clayton and Ygnacio Canals in the process, and supplying water to Contra Loma Dam, eventually terminating at Martinez Reservoir.

The Friant Dam is the largest component of the Friant Division of the CVP. The dam crosses the San Joaquin River where it spills out of the Sierra Nevada, forming Millerton Lake, which provides water storage for San Joaquin Valley irrigators. The entire flow of the San Joaquin River, except for flood management and irrigation releases, is held at Millerton Lake and delivered south for irrigation purposes through the Friant-Kern Canal to Tulare, Fresno and Kern counties, and north through the Madera Canal to the Chowchilla River. The San Joaquin River Restoration Program influences the San Joaquin River's flow from Friant Dam to the confluence of Merced River. The program has two goals – to restore a self-sustaining Chinook salmon fishery in the river, and to reduce or avoid adverse water supply impacts from restoration flows. Interim Flow water releases began from Friant Dam into the San Joaquin River on October 1, 2009 and Full Restoration Flows are scheduled to start no later than January 1, 2014.

Along the Stanislaus River, a major tributary of the San Joaquin River, is the New Melones Dam and Powerplant. The dam primarily operates as a flood management and power facility, but Reclamation has contracts to supply water to several water districts in the northern San Joaquin Valley area.

The CVP also has a number of facilities for storing and transporting water on the west side of the San Joaquin Valley. The West San Joaquin Division and San Luis Unit consist of several major facilities that are shared with the State Water Project. The San Luis Unit provides storage for the CVP for dry seasons. The San Luis Unit facilities are jointly operated by Reclamation and California's Department of Water Resources (DWR). The William R. Gianelli Pumping-Generating Plant, one of the joint facilities, pumps surplus water from the Delta-Mendota Canal and the California Aqueduct into San Luis Reservoir, the largest off-stream storage reservoir in the United States. When water flow through the Delta becomes too low, water is released from the San Luis Unit into the Delta-Mendota Canal and the California Aqueduct.

The San Felipe Division has facilities that divert water from the San Luis Reservoir into lands west of the Coastal Mountain Range, south of the San Francisco Bay.

Approximately 250 contracts provide for varying amounts of CVP water to be distributed across 29 counties. Most of these contracts were initially for a term of 40 years although many have been renewed consistent with the requirements of CVPIA. The nature of the contracts varies, as some were entered into with entities that claim water rights senior to those of the CVP, while other contracts are for water service. Some of the contracts, including the Sacramento River Settlement Contracts, the San Joaquin Exchange Contracts, and certain state and federal wildlife refuge contracts, have defined minimum diversions or deliveries.

1A.3.2 State Water Project

Even before the construction of major features of the CVP had been completed, interest was expressed that California build its own water project, one that would deliver irrigation water to Southern California and to San Joaquin Valley farms that were ineligible for CVP water.

In 1951, A. D. Edmonston, the state engineer, unveiled a blueprint for what became the Feather River Project (today, the SWP). The Legislature approved the project, but no funding was provided to build it. Despite the lack of funding, interest in the project continued to build, gaining critical momentum in 1955 when a Christmas Eve flood of the rain-swollen Feather River claimed 64 lives north of Sacramento and caused $200 million in property damage.

The SWP and its funding was finally authorized by the California Legislature in 1959 and approved by the voters in 1960 through the Burns-Porter Act. The Burns-Porter Act expressly authorized the State of California to enter into contracts for the sale, delivery, or use of water made available by the State Water Resources Development System [California Water Code 12937(b)(4)]. The initial water resource facilities that were authorized under the Act included the Oroville Dam and Reservoir, Harvey O. Banks Pumping Plant (Banks Pumping Plant), California Aqueduct, San Luis Dam and Reservoir, and additional downstream conveyances, pumping facilities, and storage reservoirs. Water was first delivered in 1962 through a portion of the South Bay Aqueduct to Alameda and

Santa Clara counties. Large-scale water deliveries began in the late 1960s. By 1972, SWP water reached Southern California.

The SWP was planned, designed, constructed and is now operated and maintained by DWR. Today, the SWP is the world's largest publicly built and operated water and power development and conveyance system, consisting of 34 storage facilities, reservoirs and lakes; 20 pumping plants; 4 pumping-generating plants; 5 hydroelectric power plants; and about 701 miles of open canals and pipelines. Figure 1A-4 shows the names and locations of primary water delivery facilities. Water from rainfall and snowmelt runoff is stored in SWP facilities and delivered via SWP transportation facilities to water agencies and districts in the Southern California, Central Coastal, San Joaquin Valley, South Bay, North Bay, and Upper Feather River areas. The Project provides water for 25 million of California's estimated 37 million residents and irrigates about 750,000 acres of farmland. However, the SWP is also operated to improve water quality in the Delta, control Feather River flood water, generate power, provide recreation, and enhance fish and wildlife.

Oroville Dam is the centerpiece of the SWP and its largest water storage facility. The Oroville Dam is located about 70 miles north of Sacramento at the confluence of the three forks of the Feather River. Lake Oroville releases water into the Feather River, which travels down the river to the confluence with the Sacramento River, the state's largest waterway. Water flows down the Sacramento River into the Delta. Some of the SWP's water supply is diverted into the North Bay Aqueduct via Barker Slough Pumping Plant and is used in Napa and Solano counties.

Near Byron, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. Banks Pumping Plant lifts water from Clifton Court Forebay into the 444-mile-long California Aqueduct. Water then enters Bethany Reservoir, where the South Bay Aqueduct begins. The South Bay Aqueduct serves Alameda and Santa Clara counties.

Most of the water delivered to Bethany Reservoir from Banks Pumping Plant, however, flows into the California Aqueduct. This main artery of the SWP conveys water to the agricultural lands of the San Joaquin Valley and to the urban regions of Southern California. Water in the mainstem of the California Aqueduct flows south by gravity into the San Luis Joint-Use Complex, which was designed and constructed by the federal government and is operated and maintained by DWR. Within the complex are the O'Neill Forebay, the Sisk Dam, the San Luis Reservoir, the Gianelli Pumping-Generating Plant, Dos Amigos Pumping Plant, and the San Luis Canal. Generally, water is pumped into the San Luis Reservoir from late fall through early spring, where it is temporarily stored for release later in the year to meet summertime peaking demands of SWP and CVP water contractors.

SWP water not stored in the San Luis Reservoir, as well as water eventually released from the San Luis Reservoir, flows south through the San Luis Canal, a section of the California Aqueduct which serves both the SWP and CVP. After leaving the San Luis Joint-Use Complex, water travels through the central San Joaquin Valley and splits off near Kettleman City into the Coastal Branch Aqueduct, completed in 1997, to serve San Luis Obispo and Santa Barbara counties.

The remaining water in the mainstem of the California Aqueduct is pumped up California's hilly terrain, lifted more than 1,000 feet by four pumping plants—Dos Amigos, Buena Vista, Teerink, and Chrisman—until it reaches the SWP's largest pumping plant, the Edmonston Pumping Plant. Its fourteen motor-pump units, each standing about 65 feet tall and weighing more than 400 tons, lift water nearly 2,000 feet up and over the Tehachapi Mountains through 8.5 miles of tunnels and siphons. As the water reaches the bottom of the Tehachapi Mountains, it bifurcates into two branches: the West Branch and the East Branch (mainstem).

Water in the West Branch is pumped by the Oso Pumping Plant into Quail Lake. From there, water enters a pipeline leading into the Warne Powerplant to generate power. Water is then discharged into Pyramid Lake, travels through Angeles Tunnel, and into the Castaic Powerplant (the latter two are joint developments by DWR and the Los Angeles Department of Water and Power, the owner of the facilities). At the end of the West Branch is Castaic Lake, the terminal reservoir, and Castaic Lagoon, a popular southern California recreation spot.

Water flowing down the East Branch generates power at the Alamo Powerplant then is pumped uphill by the Pearblossom Pumping Plant, which lifts water 540 feet into the San Bernardino Mountains. From there, water flows downhill through an open aqueduct, linked at its end to four underground pipelines that carry the water into the Mojave Siphon Powerplant, which discharges water into Silverwood Lake. When water is needed, it is discharged through the San Bernardino Tunnel into Devil Canyon Powerplant and its two afterbays. The 28-mile-long Santa Ana Pipeline then takes the water underground to Lake Perris, the southernmost SWP facility and one of Southern California's most popular recreation spots. The East Branch extension is nearly 33 miles of pipeline, linking parts of the service areas of the San Bernardino Valley Municipal Water District and the San Gorgonio Pass Water Agency to the California Aqueduct. The East Branch Extension, Phase 1, carries water from Devil Canyon Powerplant Afterbay to Cherry Valley, bringing water to Yucaipa, Calimesa, Beaumont, Banning, and other communities. Phase 2, when completed, will assist with this delivery.

The SWP was originally designed to include substantial upstream storage to reduce the frequency and magnitude of variations in supply and provide more reliable and consistent deliveries to urban and agricultural water users on a year-to-year basis. Many upstream storage projects have been extensively studied and planned but never built, such as those at Los Banos Grandes and Sites, as well as the enlargement of the Shasta Reservoir.

In the 1960s, DWR entered into long-term water supply contracts with 32 water districts and agencies to provide water from the SWP. Over the years, a few of these water agencies have been restructured. Today, there are 29 agencies and districts that have long-term contracts with DWR for the delivery of SWP water. These agencies, in turn, deliver water to wholesalers or retailers or deliver it directly to agricultural and M&I water users.

The amount of each contract for SWP water is specified in "Table A." Table A amounts are used to define each contractor's proportion of the available water supply that DWR will allocate and deliver to that contractor. Each year, contractors may request an amount not to exceed their Table A amount. The Table A amounts are used as a basis for allocations to contractors, as the actual supply to contractors is variable and depends on the amount of water available. The contracts are in effect for the following periods, whichever is longest based on the contract: the project repayment period that extends to the year 2035, 75 years from the date of the contract, or the period ending with the latest maturity date of any bond issued to finance project construction costs.

1A.4 Operational Framework of the Delta

Over the last several decades, laws and regulations to protect, conserve, and restore environmental resources have been enacted, shaping the way that DWR and Reclamation manage and operate the SWP and CVP facilities. Reservoir releases and Delta exports must be coordinated to ensure that both projects operate within agreed-upon procedures and in a manner consistent with the terms and conditions imposed in their water rights permits and licenses. State Water Resources Control Board (SWRCB) decisions and orders, court decisions, and the state and federal biological opinions and related court decision for endangered species largely determine Delta regulatory requirements for water quality, flow, and operations. The SWRCB Water Quality Control Plan (WQCP) and applicable water rights decisions, as well as other agreements, must be considered in determining the operations of both the SWP and CVP. The Federal Endangered Species Act has greatly influenced CVP and SWP operations, especially in the last decade. Major state and federal regulatory actions that have historically influenced operations of the SWP and/or the CVP are summarized in Table 1A-1.

Appendix Table 1A-1. Major Federal and State Regulatory Actions Affecting SWP and/or CVP Operations

Action	Year	Description
Flood Control Act of 1944	1944	Congress adopted Flood Control Act of 1944 including authorization for Shasta, Folsom, and New Melones dams.
CVP Water Contracts	1944	Shasta Dam completed on the Sacramento River, initial CVP water contracts signed, and water diversions began.
CVP Water Contracts	1950	CVP signs water rights contracts with riparian and senior appropriative water rights holders on Sacramento and American rivers.
Grassland Development Act	1954	Congress adopted the Grassland Development Act to add fish and wildlife purposes as authorized purposes of the CVP and to authorize cooperation with the state to supply water to Grasslands for waterfowl conservation.
Reclamation Project Act	1956	Congress reauthorized the Reclamation Project Act including provision for right of renewal for long-term CVP agricultural user contracts for terms not to exceed 40 years.
California Water Plan	1957	The California Water Plan was completed. It described a comprehensive master plan for the control, protection, conservation, distribution, and utilization of the waters of California.
Fish and Wildlife Coordination Act	1958	Congress adopted the Fish and Wildlife Coordination Act to integrate U.S. Fish and Wildlife Service (USFWS) conservation programs with federal water resources facilities, to authorize facilities to mitigate CVP-induced damages to fish and wildlife resources, and to require consultation for CVP facilities with USFWS.
Interagency Delta Committee	1961	DWR established the Interagency Delta Committee to evaluate solutions for Delta problems. A Report from the committee recommended various Delta facilities, including the Peripheral Canal.
Water Quality Control Plan	1967	SWRCB adopted the WQCP for the Delta pursuant to Federal Water Pollution Control Act of 1965.
National Environmental Policy Act	1969	Congress adopted the National Environmental Policy Act (NEPA), which establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment, and provides a process for implementing these goals within federal agencies.
California Environmental Quality Act	1970	California Environmental Quality Act enacted, instituting a statewide policy of environmental protection requiring state and local agencies within California to follow a protocol of analysis and public disclosure of potential environmental impacts prior to project approval.
SWRCB WR Decision D-1379	1971	SWRCB adopted Water Rights Decision-1379 establishing Delta water quality standards.

Action	Year	Description
Endangered Species Act	1973	Congress adopted the Endangered Species Act, the purposes of which are to provide a means of conserving the ecosystems upon which endangered and threatened species depend, and to provide a program for conserving those species.
SWRCB WR Decision-1485	1978	SWRCB adopted Decision-1485 to guarantee water quality protections for agricultural, municipal, and fish and wildlife uses.
USACE Public Notice 5820A, issued pursuant to Section 10 of the Rivers and Harbors Act	1981	Modified previous permits for the operation of the Banks Pumping Plant and Clifton Court Forebay. Limits diversions into Clifton Court Forebay; maximum diversion rates into CCF are 13,870 af daily (and 13,250 af over a 3-day average).
California Endangered Species Act (Cal Fish & Game Code 2050 et seq.)	1984	The California Endangered Species Act established the policy of the State to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy.
Coordinated Operations Agreement	1986	Coordinated agreement regarding the operations of SWP and CVP by DWR and Reclamation. Determined the respective water supplies of the CVP and the SWP while allowing for a negotiated sharing of Sacramento–San Joaquin Delta excess outflows and the satisfaction of in-basin obligations between the two projects.
Sacramento River Winter-run Chinook Salmon listing	1989	Sacramento River winter-run Chinook salmon listed as endangered species by the State of California and as threatened by the federal government.
SWRCB Orders WR 90-05 and WR 91-01	1990, 1991	Water right orders, by the SWRCB, that modified Reclamation water rights to incorporate temperature control objectives in the upper Sacramento River.
Central Valley Project Improvement Act	1992	CVPIA mandated changes in the purposes and management of the CVP, particularly for the protection, restoration, and enhancement of fish and wildlife.
National Marine Fisheries Service (NMFS) Biological Opinion for Winter-run Chinook Salmon	1992, 1993, 1995	NMFS Fisheries Biological Opinion issued for winter-run Chinook salmon. RPA required specific Sacramento River operations to protect winter-run.
USFWS Biological Opinion for Delta Smelt and Sacramento Splittail	1993, 1994, 1995	USFWS Biological Opinion for delta smelt and Sacramento splittail issued. Operational criteria to protect delta smelt established.
SWRCB WR Decision-1631	1994	The SWRCB modified the Los Angeles Department of Water and Power water rights to divert water from tributaries to Mono Lake.
Bay Delta Plan Accord and SWRCB Order WR 95-06	1994, 1995	The Bay Delta Plan Accord, an agreement and associated SWRCB order, provided for the operations of the SWP and CVP to protect Bay-Delta water quality. It also provided for further evaluation of Bay-Delta operations, pursued under the newly established CALFED Program.
Water Quality Control Plan for the San Francisco Bay/ Sacramento–San Joaquin Delta estuary and SWRCB Revised WR Decision-1641	1995, 2000, 2006	The WQCP revision established revised water quality objectives for flow and salinity in the Delta and superseded previous plans. The SWRCB adopted a water rights order (later revised) to provide for the operations of the SWP and CVP to protect Bay-Delta water quality. The 2006 revisions did not include substantive changes to water quality standards from the 1995 WQCP.

Action	Year	Description
Monterey Agreement and Amendments, Settlement Agreement, and Monterey Plus EIR	1995, 2003, 2010	Monterey Agreement between DWR and SWP contractors to revise water supply allocation and management under the SWP water supply contracts.
NMFS Biological Opinions	1996, 1997	NMFS Biological Opinions issued. Established criteria to protect Coho salmon and steelhead in coastal streams.
CALFED Bay-Delta Program EIS/EIR and Record of Decision (ROD)	1999, 2000	Beginning of the CALFED Bay-Delta Program EIS/EIR and ROD, involving Reclamation, DWR and other state and federal agencies committed to implementing a long-term plan to restore the Bay-Delta, guided by four major resource management objectives—water supply reliability, ecosystem restoration, water quality, and levee system integrity.
Trinity ROD and Related Decisions	2001, 2004	Trinity ROD and related decisions restored flows on the Trinity River. The ROD was upheld by the federal court in 2004.
NMFS Biological Opinion for Salmonids	2004	NMFS Biological Opinion for Salmonids issued stating a finding of no jeopardy on the effects of the continued long-term SWP and CVP operations.
USFWS Biological Opinion for Delta Smelt	2004, 2005	USFWS Biological Opinion for delta smelt issued stating a finding of no jeopardy on the effects of the continued long-term SWP and CVP operations.
USFWS Biological Opinion	2008	USFWS issued Biological Opinion concluding that the effects of the proposed long-term operation of the SWP and CVP are likely to jeopardize the continued existence of delta smelt. Under Section 7 of the ESA (50 CFR 402.02), USFWS developed a five-part RPA to avoid jeopardy to delta smelt and adverse modification of its critical habitat.
NMFS Biological Opinion	2009	NMFS Biological Opinion issued concluding that the effects of the proposed operations are likely to jeopardize the continued existence of the following species: Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, Southern Distinct Population Segment of North American green sturgeon, and Southern Resident killer whales. NMFS further concluded that the SWP and CVP operations are not likely to jeopardize the continued existence of Central California coast steelhead. NMFS developed an RPA composed of numerous elements for each of the various project divisions and associated stressors and determined that the RPA must be implemented in its entirety in order to avoid jeopardy and adverse modification of critical habitat.

Source: CDFW Tracking Number 2080-2011-022-00; CDFW Tracking Number 2080-2009-011-00; DWR and Bureau of Reclamation 2005 (modified from SDIP Draft EIS/EIR); Bureau of Reclamation 1997.

1A.5 Coordinated Operations Agreement

Because the CVP and SWP use the Sacramento River and the Delta to convey their water supply, reservoir releases and Delta exports must be coordinated to ensure that each project achieves its share of benefit from shared water supplies and bears its share of joint obligations in order to protect beneficial uses.

The agreement between the United States and the State of California for the coordinated operation of the CVP and the SWP was authorized by Public Law 99-546 in 1986, which superseded a 1960 agreement and annual coordination agreements that had been implemented since the SWP came on-line. Coordinated operations, by agreed-on criteria, was anticipated to increase the efficiency of both the SWP and CVP.

Under the COA, DWR and Reclamation agree to operate the SWP and CVP under balanced conditions in a manner that meets Sacramento Valley and Delta needs, while maintaining their respective annual water supplies as identified in the COA. Balanced conditions are defined as periods when the SWP and CVP agree that releases from upstream reservoirs, plus unregulated flow, approximately equal water supply needed to meet Sacramento Valley in-basin uses and SWP and CVP exports. Coordination between the CVP and SWP is facilitated by the implementation of an accounting procedure based on the sharing principles outlined in the COA.[3]

In summary, the COA defines the project facilities and their water supplies, sets forth procedures for coordination of operations, identifies formulas for sharing joint responsibility in order to meet Delta standards and other legal uses of water, identifies how unstored flow will be shared, sets up a framework for the exchange of water and services between the SWP and CVP, and provides for a periodic review every 5 years.

1A.5.1 Considerations in Coordinated Operations

1A.5.1.1 Sacramento River Temperature Control Operations

In 1990 and 1991, the SWRCB issued Water Rights Order 90-05 and 91-01, modifying Reclamation's water rights on the Sacramento River. The orders stated that Reclamation would operate Keswick and Shasta Dams and the Spring Creek Powerplant to meet a daily average water temperature of 56° Fahrenheit (F) as far downstream in the Sacramento River as practicable during periods when higher temperatures would be harmful to fisheries.

1A.5.1.2 CVPIA 3406(b)(2)

On May 9, 2003, the Interior issued its Decision on Implementation of Section 3406 (b)(2) of the CVPIA. Dedication of "(b)(2) water" occurs when Reclamation takes a fish, wildlife habitat restoration action based on recommendations of the FWS (and in consultation with NMFS and CDFW—at the time called the California Department of Fish and Game), pursuant to Section 3406 (b)(2). Such water is used for the primary purpose of implementing the fish, wildlife and habitat restoration purposes and measures authorized by Title XXXIV of Public Law 102-575. Dedication and management of (b)(2) water may also assist in meeting WQCP fishery objectives and helps meet the needs of fish listed under the ESA as threatened or endangered since the enactment of the CVPIA in 1992.

[3] During balanced conditions in the Delta when water must be withdrawn from storage to meet Sacramento Valley and Delta requirements, 75 percent of the responsibility to withdraw from storage is borne by the CVP and 25 percent by the SWP. The COA also provides that during balanced conditions when unstored water is available for export, 55 percent of the sum of stored water and the unstored export water is allocated to the CVP, and 45 percent is allocated to the SWP.

The May 9, 2003, Decision describes the means by which the amount of dedicated (b)(2) water is determined. Planning and accounting for (b)(2) actions are done cooperatively. Actions usually take one of two forms — in-stream flow augmentation below CVP reservoirs or CVP Jones Pumping Plant reductions in the Delta. The (b)(2) water is used for increased in-stream flows greater than those that would have occurred pre-CVPIA on Clear Creek through releases from Whiskeytown Dam; Upper Sacramento River below Keswick Dam; American River below Nimbus Dam; and Stanislaus River below Goodwin Dam. The (b)(2) water also is used to account for export curtailments at the CVP Jones Pumping Plant and increased CVP reservoir releases required to meet X2 outflow requirements per SWRCB D-1641, as well as direct export reductions for fishery management using dedicated (b)(2) water at the CVP Jones Pumping Plant.

1A.5.1.3 Refuge Water Supplies

Many refuges historically received water supplies from multiple sources such as irrigation return flows and temporary annual water contracts pre-CVPIA. However, water conservation programs, concerns about water quality from return flows, and increased demand for water reduced the reliability of these sources. The CVPIA provided a firm water supply (Level 2) for Central Valley wildlife refuges from existing CVP yield at the levels approximately equal to average refuge water supplies that occurred between 1977 and 1984, or equivalent amounts for refuges included in this program since 1984. The CVPIA also provided the ability to acquire an additional increment of water (Level 4) to meet total water demands on the refuges. Currently, the Level 2 water demands are about 422,000 acre-feet/year and Reclamation has been able to acquire water for delivery of about 133,000 acre-feet/year for Level 4 water supplies. The 19 refuges include National Wildlife Refuges and state-owned Wildlife Management Area. Approximately 35 percent of the Level 2 water is delivered to refuges in the Sacramento Valley, and 65 percent of Level 2 water and most of the Level 4 water are delivered to refuges in the San Joaquin Valley.

1A.6 Delta Regulatory Limits

Limits placed on the SWP Banks and the CVP Jones pumping operations under various hydrologic conditions and regulatory mandates sometimes restrict the Delta exports to less than the full CVP and SWP demands for Delta exports. These regulatory limits result from Delta outflow requirements, Delta salinity objectives, export/inflow limits, and permitted or physical export pumping capacity established by various regulatory agencies.

1A.6.1 1995 Water Quality Control Plan and SWRCB Water Right Decision 1641 (D-1641)

The State Water Board's *1995 Water Quality Control Plan* (WQCP) *for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (Bay-Delta Plan [1995]) and the State Water Board's *Final EIR for the Implementation of the 1995 Bay/Delta Water Quality Control Plan* (November 1999) incorporated several elements of the EPA, NMFS, and USFWS' regulatory objectives for salinity and endangered species protection. The plan provided various objectives relating to the operation of the Delta Cross Channel gates, outflow, exports, dissolved oxygen, and salinity. It also stated varying flow objectives for rivers, including the San Joaquin River at Vernalis. Pulse flows were to be provided to facilitate migration of salmon in the San Joaquin system. Depending on the water year type, average flows, from approximately April 15 to May 15, were set to somewhere between 3,110 and 8,620 cubic feet per second (cfs). Export limits during that same time period were set at the larger of 1,500 cfs or a 3-day running average of conditions at Vernalis. The 1995 WQCP has since been updated, but does not include any substantive changes to water quality standards from the 1995 WQCP.

The State Water Board fully implemented the 1995 WQCP with Water Right Decision 1641 (D-1641) in March 2000. D-1641 implements certain water quality objectives for the Sacramento–San Joaquin Bay-Delta Estuary on a long-term basis. In order to achieve these objectives, D-1641 ultimately amended certain water rights of the SWP and CVP.

The changes in regulatory limits for CVP and SWP Delta operations as a result of D-1641 were substantial and included new provisions for the position of X2, export / inflow ratio, and the Vernalis Adaptive Management Plan (VAMP). For example, meeting the X2 objectives can require additional water for outflow.

1A.6.1.1 Habitat Protection Outflow and Salinity Starting Conditions (X2 Standards)

A major regulatory cornerstone of the 1995 WQCP is the development of water quality standards based on the geographical position of the 2-parts-per-thousand (ppt) isohale (aka X2, the salinity gradient). The geographical position of the 2-ppt isohale is considered significant to the biologically important entrapment zone of the estuary and the resident fishery. D-1641 standards create a systematic approach for SWP/CVP operations to 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 SWP/CVP meeting one of three potential equivalents:

- 2.64 mmhos/cm[4] electrical conductivity (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.
- 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 to June time period is defined by regulatory standard tables. The tables determine the required number of X2 days based on the previous month's "8RI," which is the estimated full natural runoff of the largest eight streams in the Sacramento–San Joaquin watershed. Excess compliance days, at the desired geographic compliance location from the previous month, are allowed to be counted toward meeting the current month's regulatory required days.

D-1641 X2 requirements also contain a condition known as the "salinity starting gate" requirement. In all but very dry January conditions, the SWP/CVP project must ensure that the actual X2 water quality (on a daily or 14-day mean) is west of Collinsville for a least one X2 day during the February 1–14 time period. The salinity starting gate requirement is conditional for some dry January conditions and is based on the CALFED Ops Group discretion. The fishery significance of the salinity

[4] Mmhos/cm is a measure of electrical conductivity. Water containing dissolved salts is a better conductor than pure water.

starting gate is considered to place X2 generally west of SWP/CVP export influence and into the Suisun Marsh habitat environment.

1A.6.1.2 Export/Inflow Ratio Export Restrictions

Another significant regulatory cornerstone of the D-1641 standards is an export rate restriction standard known as the export/inflow (E/I) ratio. The E/I ratio is measured as the current average 3-day export rate for the SWP Clifton Court intake and CVP Tracy Pumping Plant divided by the estimated average inflow to the Delta over a 3- or 14-day period. The inflow parameter is required to be on a 14-day basis when hydrologic conditions are such that SWP/CVP exports are not supported by SWP/CVP reservoir storage withdrawals. This generally occurs during the winter and spring. The 3-day inflow parameter basis occurs when SWP/CVP exports are supported by SWP/CVP reservoir storage withdrawals, and generally occurs in the late spring through the first significant rains in the fall or winter. D-1641 standards for the E/I ratio generally require a ratio of 35 percent during February to June and 65 percent in all other months. The E/I standard is relaxed to 45 percent in February after the driest of January runoff conditions (8 River Index < 1.0), or may be relaxed to 45 percent after a January for which the 8 River Index is in the range 1.0 to 1.5, after consultation. The biological rationale of the E/I ratio requirement is to require the SWP/CVP export operations to avoid exporting the leading edge of increased inflows produced by rain events into the Delta environment. Prior to D-1641 E/I ratio standards, the SWP/CVP export operations often increased exports prior to the beginning of increased Delta inflow based on anticipated inflow quantity and duration to the Delta and estimated incremental effects to the Delta water quality environment.

1A.6.1.3 Minimum Delta Outflow

D-1641 instituted a set of minimum monthly Delta outflow requirements. The requirements are designed for the months outside of the February to June X2 period and are segregated by hydrologic year type. D-1641 standards are designed to be complementary to the X2 habitat standard by “regulating” the eastward movement of X2 during the summer timeframe based on hydrologic conditions. Wetter conditions have higher outflow requirements in the July–August timeframe. The standard also sets a minimum outflow requirement for fall/early winter, with minor relaxation for critical years or a dry December. The minimum monthly outflow standards also contain sub-month running average requirements designed to moderate or elevate protection levels when the monthly hydrologic conditions are dominated by a single Delta inflow event.

The regulatory combination of X2 standards, E/I ratio export restrictions, or minimum Delta outflow requirements creates a dynamic hydrologic environment for SWP/CVP operations controlling Delta requirements. When rain events change the anticipated hydrologic conditions to the Delta environment, the controlling Delta requirement can easily and quickly change from a minimum Delta outflow requirement or X2 habitat requirement to an E/I ratio limitation and subsequently back to a sub-month running average minimum Delta outflow requirement. Therefore, the value of projecting SWP/CVP export operations is limited to short time periods. Projecting SWP/CVP export operations over a season or annual basis is sensitive to the magnitude, duration, and season that significant Delta inflow events occur.

1A.6.2 Federal Endangered Species Act

Section 7(a)(2) of the Endangered Species Act (16 U.S.C. § 1536(a)(2)) (ESA) *prohibits* a federal agency action that is likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or modification of its critical habitat. If an agency's proposed action is likely to adversely affect a threatened or endangered species or its critical habitat, it must engage in a formal consultation with either NMFS or USFWS (fish and wildlife services) and obtain a written biological opinion as to the impacts of the proposed action on the listed species. NMFS is consulted for impacts to protected marine species (including anadromous fish), and USFWS is consulted for impacts to protected non-marine and non-anadromous fish and wildlife species. The consultation process may conclude with the fish and wildlife service issuing a non-jeopardy (not likely to jeopardize determination) biological opinion along with an incidental take statement, allowing the action to proceed without prosecution for incidental take of listed species. If the fish and wildlife service finds the action is likely to jeopardize a listed species or adversely modify its critical habitat, a jeopardy biological opinion is issued, which will include a reasonable and prudent alternative (RPA) to the planned action to avoid jeopardy or adverse modification of critical habitat.

In the Delta, the ESA protects multiple species and populations of fish and wildlife, including the endangered Sacramento River winter-run Chinook salmon, California clapper rail, California least tern and salt marsh harvest mouse; and the threatened Central Valley spring-run Chinook salmon, the threatened Central Valley Steelhead, Southern population of North American green sturgeon, delta smelt, California tiger salamander, giant garter snake and California red-legged frog. In 2004, the FWS and NMFS issued non-jeopardy biological opinions for the operation of the CVP and SWP. These opinions were challenged in separate lawsuits, and found inadequate for various reasons. Subsequently FWS and NMFS issued jeopardy biological opinions in 2008 (USFWS Biological Opinion 2008 Biological Opinion for delta smelt) and 2009 (NMFS Biological Opinion and Conference Opinion on the long-term operations of the State Water Project and the Central Valley Project) which each contained an RPA with various actions for the projects to carry out, as well as reduced pumping operations for the protection of the species during various life stages. Though these subsequent biological opinions have also been challenged and FWS and NMFS have been ordered by the federal district court to re-write them, the biological opinions are still in effect, and the projects operate in accordance with them.

1A.6.3 California Endangered Species Act

The California Endangered Species Act (CESA) (Fish and Game Code Sections 2050 to 2089) establishes various requirements and protections regarding species listed as threatened or endangered under state law. California's Fish and Game Commission is responsible for maintaining lists of threatened and endangered species under CESA. CESA prohibits the "take" of listed and candidate (petitioned to be listed) species (Cal. Fish and Game Code, § 2080). "Take" under California law means to "…hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch capture, or kill…" (Cal. Fish and Game Code, 86). The state definition does not include "harm" or "harass," as the federal ESA definition does. As a result, the threshold for take under CESA is typically higher than that under the federal ESA. In accordance with Section 2081 of the California Fish and Game Code, a permit from CDFW is required for projects that could result in the incidental take of a wildlife species state-listed as threatened or endangered. In 2011, CDFW determined that the FWS biological opinion, including its incidental take statement was consistent with CESA under Section 2080.1 of the California Fish and Game Code (Tracking Number 2080-2011-022-00). In

2012, CDFW found that the NMFS biological opinion was consistent with CESA (Tracking Number 2080-2012-005-00).

1A.6.4 Water Rights

California has a dual system of water rights, one for riparian rights holders and one for holders of rights to appropriate surface water from rivers, streams, lakes and underground channels. A landowner whose parcel borders a river has a riparian right to use water from that river on his land. Riparian rights are normally not lost even if not used. California law also allows surface water to be diverted from one point and used (appropriated) beneficially at a separate point. This appropriative right is based on physical control, beneficial use, and, if initiated after 1914, on a permit or license. Appropriative rights are entitlements to a specific amount of water with a definite date of priority. They depend upon continued use and may be lost by non-use. Additionally, appropriative rights may be sold or transferred. Unlike riparian rights, long-term storage of water is considered an acceptable exercise of an appropriative right. However, newly acquired permits for appropriative rights cannot interfere with existing riparian or senior appropriative rights.

Numerous parties hold rights to divert water from the Delta and its upstream tributaries. DWR's SWP, Reclamation's CVP, and other water rights holders divert water from the Delta under appropriative rights. More than 1,000 siphons and pumps are used to divert water from Delta channels under riparian and appropriative rights.

Various water quality and flow objectives have been established by the SWRCB to ensure that the quality of Delta water is sufficient to satisfy all designated uses. Implementation of these objectives requires that limitations be placed on Delta water supply operations, particularly operations of the SWP and CVP, affecting amounts of fresh water and salinity levels in the Delta.

The two largest diverters of Delta water are the State and the federal government for the SWP and CVP, respectively. Diversion and storage of water in upstream reservoirs by the SWP and the CVP, and diversion and export of water from the Delta are authorized and regulated by the SWRCB under appropriative water rights. The third largest diverter of Delta water is Contra Costa Water District. Several municipal users (e.g., Antioch, Mountain House) and many agricultural users also divert water from the Delta under riparian and appropriative rights.

1A.6.5 Delta Water Transfers

A water transfer is a reallocation of water among water users. Water transfers provide much needed flexibility in the allocation and use of water in California. The Governor's Commission on Water Right recognized the importance of water transfers to the future of California's water supply and made a recommendation in its 1976 report regarding the need for specific changes to the Water Code to facilitate the transfer of water.

Over time, language was added to the Water Code to expedite the review and processing of short-term (lasting less than one year) water transfers. Additionally, state and federal agencies have developed procedures to assist in the processing of water transfers proposed by local or private entities. For example, Reclamation accommodates water transfer requests within the CVP through the provisions of the Central Valley Project Improvement Act (CVPIA). DWR allows use of its SWP facilities by its contractors and others under the provisions of Water Code section 1810[5]. Access to pumping plants in the Sacramento–San Joaquin Delta and canal capacities are integral to being able to accomplish water transfers from the northern portions of the State to the central and southern areas of California where the water is most needed.

1A.6.5.1 Lower Yuba River Accord

The most recent long-term transfer arose out of the Lower Yuba River Accord (Yuba Accord) in April of 2005. This collaborative proposal settled long-standing litigation over in-stream flow requirements in the lower Yuba River. The Accord is based on three proposed agreements: a water purchase agreement, including a long-term transfer of about 60 TAF to DWR for the EWA; a conjunctive use agreement; and a fisheries agreement that includes increased minimum flows for fish habitat protection.

The SWRCB approved two one-year pilot programs for the Yuba Accord. The 2006 pilot program established minimum in-stream flows that exceeded state and federal requirements for the lower Yuba River Chinook salmon and steelhead. All 17 conservation groups, agricultural interests, and state and federal agencies participating in the Yuba Accord supported the 2006 pilot program. In late 2006, the Yuba Accord pilot program formally took effect. The EWA purchased 62,000 af of water from the Yuba County Water Agency in 2006, but none of the water could be delivered because of excess conditions in the Delta. The purchase will be delivered when Delta conditions allow for it. After the second successful one-year pilot program in 2007, the SWRCB, in 2008, amended the Yuba County Water Agency's water rights in order to implement the Yuba Accord.

1A.7 Environmental Programs

In order to mitigate or reverse environmental issues caused by development in the Delta as well as operation of the state and federal projects, attempts have been made by various agencies to develop and implement programs to avoid, minimize, or offset adverse environmental impacts resulting from construction and operation of the water project facilities.

1A.7.1 Central Valley Project Improvement Act

On October 30, 1992, the President signed into law the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575) that included Title XXXIV, the Central Valley Project Improvement Act (CVPIA). The CVPIA amends previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation.

[5] Water Code section 1810 allows a party transferring or exchanging water to use available capacity within an existing water conveyance or distribution facility in exchange for fair compensation subject to various considerations.

Among the major changes mandated by the CVPIA are the following:

- Dedicating 800,000 af annually to fish, wildlife, and habitat restoration (Section 3406(b)(2)).
- Authorizing water transfers outside the CVP service area (Section 3405(a)).
- Implementing an anadromous fish restoration program (Section 3406(b)(1)).
- Creating a restoration fund financed by water and power users (Section 3407).
- Providing for the Shasta Temperature Control Device (Section 3406(b)(6)).
- Implementing fish passage measures at the Red Bluff Diversion Dam (Section 3406(b)(10)).
- Planning to increase the CVP yield (Section 3408(j)).
- Mandating firm water supplies for Central Valley wildlife refuges (Section 3406(d)).
- Meeting federal trust responsibility to protect fishery resources (Trinity River) (Section 3406(b)(23)).

The impacts associated with the CVPIA have been analyzed in a Final EIS that was released in October 1999. The CVPIA ROD was signed on January 9, 2001.

Operations of the CVP reflect provisions of the CVPIA, particularly Sections 3406(b)(1), (b)(2), (b)(3) and (b)(9). The Department of the Interior Decision on Implementation of Section 3406 (b)(2) of the CVPIA, dated May 9, 2003 provides the basis for implementing upstream and Delta actions with CVP delivery capability.

Proposed operations also include allocation of water to wildlife refuges through the CVPIA (Section 3406(d)).

1A.7.2 DWR/CDFW Delta Fish Agreement (formerly known as Delta Pumping Plant Fish Protection Agreement and Four Pumps Agreement)

In 1986, DWR and CDFW (at the time, DFG) entered into the Delta Fish Agreement (DFA), a cooperative agreement to mitigate for losses of striped bass, steelhead trout and salmon fisheries directly caused by the SWP pumps. Under this agreement, DWR must mitigate for fish lost at the SWP pumps, including the impacts of adding four new pumps to that facility. Fish screens and other bypass facilities in place since the 1970's are in place to divert fish away from the pump; however, significant losses still occur as a result of screen inadequacies, predation in Clifton Court Forebay, and handling as fish are trucked to release sites in the Delta.

Since 1986, approximately $60 million in combined funding has been approved through this agreement for over 40 fish mitigation projects. These projects have included screening of unscreened water diversions, seasonal barriers to guide salmon away from undesirable spawning habitat, and salmon and steelhead hatchery production projects. The agreement has been amended three times to increase funding. In July of 2005, DWR and CDFW (then, CDFG) expanded the scope of the agreement to establish a separate fund of $2.5 million to address near-term pelagic fish issues related to the POD.

In May 2007, DWR and CDFW (then, CDFG) entered into a Memorandum of Understanding (MOU) to begin negotiations to amend the 1986 Four Pumps Agreement to address direct and indirect take of delta smelt and indirect take of salmon, and methods to develop mitigation credits for this take. These agreements now include mitigation considerations for the longfin smelt. The 2008 Amendment is intended to address the impacts associated with the operation of the Banks pumping plant on native species (winter-run Chinook salmon, spring-run Chinook salmon, delta smelt and longfin smelt) after all feasible operational actions have been implemented to minimize or avoid direct and indirect impacts.

DFW and DWR, in cooperation with other state and federal agencies and public interest groups, have been working on mitigation projects to restore populations of these fish by rearing and stocking fish, fish hatchery modernizations, spawning gravel replacement, stream flow enhancement and other projects.

1A.7.3 Trinity River Studies

In October 1984, USFWS began a 12-year study to describe the effectiveness of increased flows and other habitat restoration activities on restoring fishery populations in the Trinity River. The original EIS/EIR evaluated alternatives to restore and maintain natural production of anadromous fish in the Trinity River mainstem, downstream of Lewiston Dam, and was circulated as a public draft in October of 1999. This draft was finalized in October of 2000, culminating in a signed ROD in December of 2000 that outlines a plan for restoration of the Trinity River and its fish and wildlife populations. The restoration strategy is now in the implementation phase, and includes direct in-channel actions, continued watershed restoration activities, replacement of bridges and structures within the floodplain, and a rigorous program to monitor and improve restoration activities. Historically, an average annual quantity of approximately 1.3 MAF of water has been diverted from the Trinity River to the Sacramento River system (1964–1992). A change in the Trinity River flow requirements and a corresponding change in the amount of water diverted to the Sacramento River system may affect future flows to the Delta.

1A.7.4 San Joaquin River Agreement

The 1995 WQCP included water quality and flow objectives for the San Joaquin River Basin. The flow objectives were a source of dispute because the San Joaquin River stakeholders were not represented in the negotiations that established the objectives (1994 Bay-Delta Accord). They also disputed the scientific information regarding the relationship of flow to salmon survival. As a result, an association of water users on the San Joaquin River system filed suit against the SWRCB, challenging the flow objectives contained in the WQCP.

In an effort to settle this issue out of court, the San Joaquin River interests collaborated with other water users, environmental groups and government agencies to identify feasible, voluntary, actions to protect the San Joaquin River's fish resources and implement the SWRCB's objectives. Initial meetings, started in 1996, culminated in an agreement with the Delta water export interests. This agreement is known as the Letter of Intent to Resolve San Joaquin River Issues.

In this agreement, fishery biologists from state and federal agencies and other stakeholders outlined a program of study to gather the best available scientific information on the impact of flows and SWP/CVP export rates on salmon smolt survival in the lower San Joaquin River. The result of this study was a scientific adaptive fishery management plan commonly known as the Vernalis Adaptive Management Plan (VAMP). In addition, the VAMP intended to evaluate what impact the Head of Old River Barrier has on salmon smolt survival.

The San Joaquin River stakeholders recognized the value of implementing VAMP, as well as taking other actions to help implement the 1995 WQCP. This recognition led to the development of the San Joaquin River Agreement (SJRA) which provided funding for water and biological monitoring. A Statement of Support for the San Joaquin River Agreement was signed by most of the parties to the negotiations, committing them to the program once all environmental and regulatory procedures required by the NEPA, CEQA, and SWRCB were complete.

The San Joaquin River Group Authority, Reclamation, and the USFWS adopted the final *EIS/EIR for Meeting Flow Objectives for the San Joaquin River Agreement, 1999–2010*. Reclamation issued a ROD in February 1999. The SWRCB adopted D-1641 on December 29, 1999, subsequently revised on March 15, 2000, providing for implementation of the Agreement. The agreement expired in 2010.

1A.7.4.1 Head of Old River Fish Barrier (HORB)

DWR and participating agencies use temporary fish barriers as a tool to facilitate the following goals:

- Improve water supplies for South Delta water diverters.
- Improve water quality conditions in the Stockton Deep Water Channel.
- Prevent young Chinook salmon from entering the Old River, thereby reducing the likelihood of entrainment at the South Delta facilities.

In 2006, a temporary barrier was not installed at the head of the Old River in spring or fall due to high flows on the San Joaquin River. When installed, the spring season barrier helps improve conditions for juvenile Chinook salmon migrating out of the San Joaquin River Basin. The fall barrier, on the other hand, helps with low dissolved oxygen (DO) levels in the lower San Joaquin River and prevents migrating adult Chinook salmon from entering the Old River while allowing them to continue down the main stem of the San Joaquin River. Temporary agricultural barriers are installed to increase water levels in the South Delta for local water users. In 2006, barriers were installed at Middle River from July 7th to November 18th, at the Old River near Tracy from July 17th to December 8th, and at the Grant Line Canal from July 20th to December 6th. Agricultural barriers are removed in late fall due to the lack of need for irrigation water and possible conflicts the barriers may cause with migrating Chinook salmon.

Due to the concerns for the protection of delta smelt, a physical barrier was not installed in 2008 or in 2009 at the head of the Old River. In 2009, however, DWR, in cooperation with Reclamation, began the initial testing of a non-physical behavior barrier at the head of the Old River. At the same time, DWR was conducting a complementary study on the effects of South Delta temporary barriers on juvenile salmon. Many of the receivers used in these studies were established to complement the VAMP study, thus providing a better picture of the salmon smolt route selection and survival through key channels within the interior of the South Delta. Receiver locations for the VAMP study were coordinated with these two studies to ensure that the maximum amount of data is available to all three studies and that no duplication of effort takes place. In addition, the VAMP fish releases were also coordinated to complement these studies.

1A.7.4.2 San Joaquin River Restoration Program

The San Joaquin River Restoration Program (SJRRP) is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from restoration flows.

The SJRRP is a direct result of a Settlement reached in September 2006 on an 18-year lawsuit to provide sufficient fish habitat in the San Joaquin River below Friant Dam near Fresno, California, by the U.S. Departments of the Interior and Commerce, the Natural Resources Defense Council (NRDC), and the Friant Water Users Authority (FWUA). The Settlement received Federal court approval in October 2006. Federal legislation was passed in March 2009 authorizing Federal agencies to implement the Settlement.

The Settlement is based on two goals:

- Restoration: To restore and maintain fish populations in "good condition" in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.
- Water Management: To reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement (San Joaquin River Restoration Program 2011).

1A.8 Delta Governance and Comprehensive Delta Planning

1A.8.1 Delta Protection Act

In September of 1992, the California Legislature declared that the Sacramento–San Joaquin Delta, consisting of approximately 738,000 acres, is a natural resource of statewide, national, and international significance, containing irreplaceable resources, and that it is the policy of the State to recognize, preserve, and protect those resources for the use and enjoyment of current and future generations.

Recognizing the possible threat to Delta resources from urban encroachment, having the potential to significantly impact agriculture, wildlife habitat, and recreation uses, former Senator Patrick Johnston sponsored SB 1866, leading to the adoption of the Delta Protection Act. The Act, which is often referred to as the Johnston-Baker-Andal-Boatwright Delta Protection Act of 1992, was signed by the Governor on September 23, 1992, with subsequent amendments in 1996, 1998, 1999, and 2000. It is codified in the State Public Resources Code beginning with Section 297000.

The Act includes mandates for the designation of primary and secondary zones within the legal Delta, creation of a Delta Protection Commission, and completion of a Land Use and Resource Management Plan for the Primary Zone.

1A.8.1.1 Delta Protection Commission

The Delta Protection Act of 1992 provides for regional coordination by establishing the 23-member Delta Protection Commission (the Commission). The Commission's diverse composition affords opportunities for stakeholder representation in the areas of agriculture, habitat, and recreation. As specified in the Act, members of the Commission include: landowners from north, south, west, and central Delta reclamation districts; a member of the County Board of Supervisors from each of the five Delta counties (Sacramento, San Joaquin, Contra Costa, Yolo and Solano); a representative from the Sacramento Area Council of Governments (SACOG), San Joaquin Council of Governments (SJCOG), and the Association of Bay Area Governments (ABAC); high level leaders from CDFW, and state departments of Parks and Recreation, Boating and Waterways, Water Resources, Food and Agriculture, and the State Lands Commission; and Delta residents or landowners in the areas of production agriculture, outdoor recreation, and wildlife conservation.

The Commission is to develop a long-term resources management plan for the Delta Primary Zone. As called for in the Act, a Land Use and Resource Management Plan (LURMP) for the Primary Zone of the Delta was prepared and adopted by the Commission in 1995 and revised in 2002. The goals of this regional plan are to "protect, maintain and, where possible, enhance and restore the overall quality of the delta environment." The LURMP sets out findings, policies, and recommendations resulting from background studies in the areas of environment, utilities and infrastructure, land use, agriculture, water, recreation and access, levees, and marine patrol/boater education/safety programs.

As provided in the Act, local government general plans are to be consistent with the provisions of the LURMP. The Commission serves as an appeal body in the event an action of a local entity on a project within the Primary Zone is challenged as being inconsistent with the Act or the LURMP. In 2009, SBX7-1 reduced the composition of the existing Delta Protection Commission from 23 members to 15 members. Additionally, the Commission was charged with reviewing and amending the "Delta Plan" every 5 years.

1A.8.2 Bay-Delta Accord

On December 15, 1994, the Bay-Delta Accord, a state/federal agreement on Bay-Delta environmental protection, was signed. The Accord was the result of over 12 months of scientific analysis and multi-interest negotiations. In the end, a broad range of stakeholder groups, including environmental organizations, business groups, and urban and agricultural water agencies, from throughout California signed or supported the Accord. In December of 1997, state and federal representatives agreed to extend the Accord an additional year to allow CALFED, the cooperative state-federal planning effort created after water and environmental stakeholders and state and federal officials agreed to the landmark 1994 Bay-Delta Accord, sufficient time to complete its work toward a comprehensive solution for the estuary.

The signing of the Bay-Delta Accord was a landmark event that ushered in a new era in California water management. It signaled a stakeholder policy shift, away from numerous lawsuits of the previous two decades, to an attempt to form a collaborative effort to craft a viable long-term solution for the Bay-Delta.

The Accord established interim Bay-Delta standards supported by both state and federal governments. It committed water users to provide money and water for the improvement of the Bay-Delta ecosystem, and in return guaranteed a three-year reprieve from additional species protection requirements. Many of the Accord's standards were adopted by the SWRCB in the 1995 Water Quality Control Plan (WCQP) and implemented through D-1641.

The agreement also gave life to a long-term planning process aimed at finding comprehensive solutions to environmental and water supply problems in the Bay-Delta. That process, known as the CALFED Bay-Delta Program, was also a collaborative, state/federal effort, which additionally identified a package of projects and programs needed to restore the Bay-Delta's ecosystem and improve water supply reliability and water quality.

1A.8.3 CALFED Bay-Delta Program

The groundwork for many of these programs was laid by CALFED. The CALFED Bay-Delta Program was designed to address the complex issues that surround the Bay-Delta and is a cooperative interagency effort involving 25 state and federal agencies with management or regulatory responsibilities for the Bay-Delta. The establishment of the CALFED Bay-Delta Program represents state and federal government in partnership, and launched the largest, most comprehensive water management program in the world.

CALFED was a 30-year plan guided by four major resource management objectives for achieving a Delta that has a healthy ecosystem and can supply Californians with the water they need: water supply reliability, ecosystem restoration, water quality, and levee system integrity. As a way of sustaining CALFED's long-held approach of fulfilling its objectives in a concurrent and balanced manner, these objectives are further addressed through 11 program elements: water management, storage, conveyance, ecosystem restoration, environmental water account, levee system integrity, watershed management, water supply reliability, water use efficiency, water quality, water transfers, and science.

On August 28, 2000, Reclamation, DWR, and other state and federal agencies committed to implementing a long-term plan to restore the Bay-Delta, in the CALFED Bay-Delta Program (CALFED) ROD upon certification of a programmatic EIR/EIS. The ROD describes a strategy for implementing an overall plan to fix the Delta and identifies complementary actions the CALFED agencies will also pursue in coordination with the plan's programs and in support of the stated goals. Nothing in the ROD was intended to, nor did it, affect the regulatory responsibilities of individual CALFED agencies. In 2005, a legal action challenging the ROD was upheld in favor of the ROD. This decision was later overturned by the court of appeals. In 2008, the California Supreme Court affirmed the lower court's decision that the programmatic document was legally adequate.

The California Bay-Delta Act of 2003 established the California Bay-Delta Authority (Authority) as the new governance structure and charged it with providing accountability, ensuring balanced implementation, tracking and assessment of the CALFED Bay-Delta Program progress, using sound science, assuring public involvement and outreach, and coordinating and integrating related government programs.

In January 2010, as part of the 2009 California water legislative package, the Act was repealed. Simultaneously, the legislation transferred the responsibilities and authorities of the Authority to the newly created Delta Stewardship Council (Council). The Council was given the authority to "administer all contracts, grants, easements, and agreements made or entered into by the California Bay Delta Authority." It further provided that all contracts entered into by the Authority were not void or voidable, but would continue until the end of the term. Finally, the Council was given "all of the administrative rights, abilities, obligations and duties of the Authority."

The Act expressly did not modify the program authority of participating agencies, like the Department of Water Resources or the Department of Fish and Wildlife, as those departments retained all of their existing powers. Nor did the Act mandate that these departments carry out any specific activity, as those remained under the existing authorities of each department. Thus any obligations agreed to by the CALFED agencies were unaffected by the passage of the Act in 2003 or its repeal in 2010.

New long-term planning efforts are described below.

1A.8.4 Sacramento–San Joaquin Delta Vision

In September 2006, Governor Schwarzenegger signed Executive Order S-17-06, which launched the Delta Vision process by establishing a Blue Ribbon Task Force, a cabinet-level Delta Vision Committee, Delta Science Advisors, and a Stakeholder Coordination Group. The executive order charged the Blue Ribbon Task Force with developing both a long-term vision for a sustainable Delta and a plan to implement that vision. The task force completed its vision for the Delta in January of 2008, and its strategic plan in October of 2008. The executive order charged the cabinet-level Delta Vision Committee with reviewing the completed work of the task force and making its own implementation recommendations to both the Governor and Legislature by December 31, 2008.

1A.8.4.1 Blue Ribbon Task Force

A key component of Delta Vision was the Governor's appointment of an independent Blue Ribbon Task Force that would be responsible for recommending future actions to achieve a sustainable Delta.

- The Task Force members would be persons with demonstrated experience and expertise in addressing and resolving complex natural resource management issues involving significant economic and governance issues.
- Task Force recommendations would not be constrained by past decisions or policies relating to the Delta, and would benefit by the advice of science advisors selected by the Delta Vision Committee.
- The Task Force would convene in public meetings and be supported by input from local governments, technical and scientific advisors, and a Stakeholder Coordinating Group.
- Science advisors and the Stakeholder Coordinating Group would be selected by the Delta Vision Committee created by the Governor as part of Executive Order S-17-06. The Delta Vision Committee included the Secretary of Resources as chair, and the Secretaries of Business, Transportation and Housing; the Department of Food and Agriculture and the Cal-EPA; and the president of the California Public Utilities Commission.
- The Task Force would submit recommendations to the Delta Vision Committee by October 31, 2008, and the Delta Vision Committee would review task force recommendations and report its findings to the Governor.
- Based on the work of the task force and the Delta Vision Committee, the Governor would submit a report to the legislature by December 31, 2008.

1A.8.4.2 Delta Strategic Plan

The Delta Strategic Plan identified and evaluated alternative implementing measures and management practices that would be necessary to implement Delta Vision recommendations. The final Task Force strategic plan recommendations were submitted to the public and the Delta Vision Committee by October 31, 2008. A report on the final Delta Strategic Plan was submitted by the Delta Vision Committee to the Governor and the Legislature on January 2, 2009.

The Delta Vision Committee recommended that the State manage the Delta according to two co-equal goals: "Restore the Delta ecosystem and create a more reliable water supply for California." The Committee also recommended that the Legislature incorporate these goals into state law. Recognizing the Delta as a unique and valuable place, however, the Delta Vision Committee also recommended actions to protect the Delta's unique characteristics and strengthen the Delta's emergency preparedness. Finally, the Delta Vision Committee recommended actions to govern the Delta in a way that would achieve these goals.

Many of the recommendations made by the Blue Ribbon Task Force in the Delta Strategic Plan were later incorporated into the 2009 Comprehensive Water Package.

1A.8.5 Delta Risk Management Strategy

In the spring of 2006, the Department of Water Resources initiated a two-year "Delta Risk Management Study" (DRMS) to analyze risks to the levee system. The DRMS was an outgrowth of the Management Program Element described in the CALFED ROD. The purpose of the DRMS was to analyze and quantify the risk of levee failures in the Delta. It was also intended to provide a set of alternative plans to reduce the risk of levee failures that would be considered in subsequent decision and implementation initiatives, such as Delta Vision and the USACE CALFED Levee Stability Program. Risk reduction measures that would be common to all possible alternatives would be recommended for immediate implementation.

The 2000 CALFED Programmatic ROD presented its Preferred Program Alternative, which described actions, studies, and conditional decisions to help fix the Delta. As part of the Preferred Program Alternative, the DRMS would assess major risks to Delta resources from floods, seepage, subsidence, climate change, and earthquakes for a Stage 1 implementation.

The DRMS' objectives were twofold. First, the study evaluated potential impacts to the Sacramento–San Joaquin Delta and related assets that could result from various potential stressing events. Second, DRMS developed a report, which outlined options or strategies to protect and reduce risk to Delta assets and related beneficiaries.

The purposes of the DRMS were to evaluate ongoing and future risks of levee failure, identify probable consequences, and identify levee maintenance and upgrades that were necessary and economically justified to reduce risk. Data gained from this critically important study would help establish the priorities for near and long-term actions that would reduce risks associated with catastrophic levee failure in the Delta.

DRMS provided important technical information on not only the probability of Delta levee failures, but also the consequences of failed levees on the Delta and water export regions. DRMS Phase I, which was quantification of the risk of Delta levee failures, was completed in July 2007; Phase II, which was identification of risk reduction measures, was released in June 2011.

1A.8.6 2009 Comprehensive Water Package

On November 4, 2009, the California State Legislature passed a wide-ranging water package, Legislative Bills SBX7, aimed primarily at addressing the State's aging water infrastructure, future water supply issues throughout California regions, and the environmental plight of the Sacramento–San Joaquin Bay-Delta. The package included an $11.14 billion bond proposal to fund drought relief, water supply reliability, Delta sustainability, statewide water system operational improvements, conservation and watershed protection, groundwater protection, and water recycling and water conservation programs. Initially the bond was scheduled to go before voters in November of 2010, but the Legislature voted to postpone the vote. The bill package was intended to improve planning in the Bay-Delta area and to set up mechanisms by which future decisions about water supply and allocation can be balanced with ecological concerns. In addition, the legislation includes measures that aim to improve groundwater monitoring and record keeping on water diversion activities, promote water conservation, and require more efficient use of water by the urban and agricultural sectors.

The 2009 Comprehensive Water Package consists of a five-bill package:

- Senate Bill 1 (SBX7-1): Delta Governance and Management.
- Senate Bill 2 (SBX7-2): Water Bond Measure.
- Senate Bill 6 (SBX7-6): Groundwater Monitoring.
- Senate Bill 7 (SBX7-7): Water Conservancy.
- Senate Bill 8 (SBX7-8): Water Rights Enforcement.

1A.8.6.1 Delta Stewardship Council and the Delta Plan

The Delta Stewardship Council was created by SBX7-1, which made comprehensive changes to the governance of the Delta. The bill established that the Delta Stewardship Council has jurisdiction over land use projects in the Delta area. The Delta Stewardship Council is composed of members who represent different parts of the State and offer diverse expertise in fields such as agriculture, science, the environment, and public service. Of the seven members, four are appointed by the Governor, one each by the Senate and Assembly, and the seventh is the chair of the Delta Protection Commission. In addition, they are advised by a 10-member board of nationally and internationally renowned scientists.

The mission of the Delta Stewardship Council is to achieve coequal goals through development of a Delta Plan[6]. As stated in the California Water code, "'Coequal goals' means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place" (CA Water Code § 85054). The Delta Plan is a comprehensive, long-term management plan to achieve these goals for the Delta and it is anticipated to be one of the most complex and comprehensive planning efforts in the State's history. The Delta Plan and an EIR have also been prepared with the purpose of obtaining approval, under federal law, that the Delta Plan is consistent with the Coastal

[6] Part 4 of the Sacramento–San Joaquin Delta Reform Act of 2009 describes the responsibilities of the Delta Stewardship Council with respect to the development of the Delta Plan.

Zone Management Act. The Delta Plan EIR is programmatic in nature due to the broad nature of the Delta Plan. Future environmental documents will be completed by other agencies when they implement projects that are subject to consistency reviews by the Delta Stewardship Council, or which are encouraged or otherwise influenced by the Delta Plan.

Eight draft versions of the Delta Plan were written between February 2011 and November 2012. The Proposed Final Delta Plan, as well as the Final Delta Plan Program EIR and the Final Rulemaking Package, were adopted by the DSC at its May 16, 2013 meeting. Once the State Office of Administrative Law and California Secretary of State approve the plan, the proposed policies in the Delta Plan will become enforceable regulations. The Proposed Final Delta Plan consists of 14 policies and 73 regulations.

1A.8.6.2 Sacramento–San Joaquin Delta Conservancy

The Sacramento–San Joaquin Delta Conservancy (the Conservancy) was created by SBX7-1 to promote environmental restoration and the economic well-being of the Delta. The Conservancy also leads state efforts that advance environmental protection in the Delta in collaboration and cooperation with local communities, and others, to preserve, protect, enhance and restore the heritage, property, natural resources, economy, and agriculture of the Sacramento–San Joaquin Delta and Suisun Marsh, with particular emphasis on agriculture and increasing opportunities for tourism and environmental education for the benefit of the Delta region, its communities and the State.

The Conservancy also leads efforts that advance environmental protection in the Delta and the economic well-being of Delta residents. The Conservancy's goal is to implement projects that will result in integrated environmental, economic and social benefits. To reach that goal, the Conservancy works in collaboration with local communities, interested groups and state and federal agencies to seek creative opportunities to address challenges and reach agreement for moving these efforts forward. The Conservancy strives to ensure that programs and projects are prioritized and funded in a balanced manner according to geography and its legislative responsibilities.

To identify local needs and develop long-term partnerships, the Conservancy held public workgroups to help develop goals, criteria, priorities and performance measures for each of its mandated areas. A final strategic plan was completed in June 2012 which will direct future projects and activities.

1A.8.6.3 Bay Delta Conservation Plan/California WaterFix

The proposed project is a unique undertaking by DWR and other public water agencies to provide for long-term sustainability of the Delta. The BDCP/California WaterFix sets out a comprehensive long-term strategy for the Delta designed to restore and protect ecosystem health, water supply, and water quality within a stable regulatory framework. This EIR/EIS describes in detail and analyzes the proposed project.

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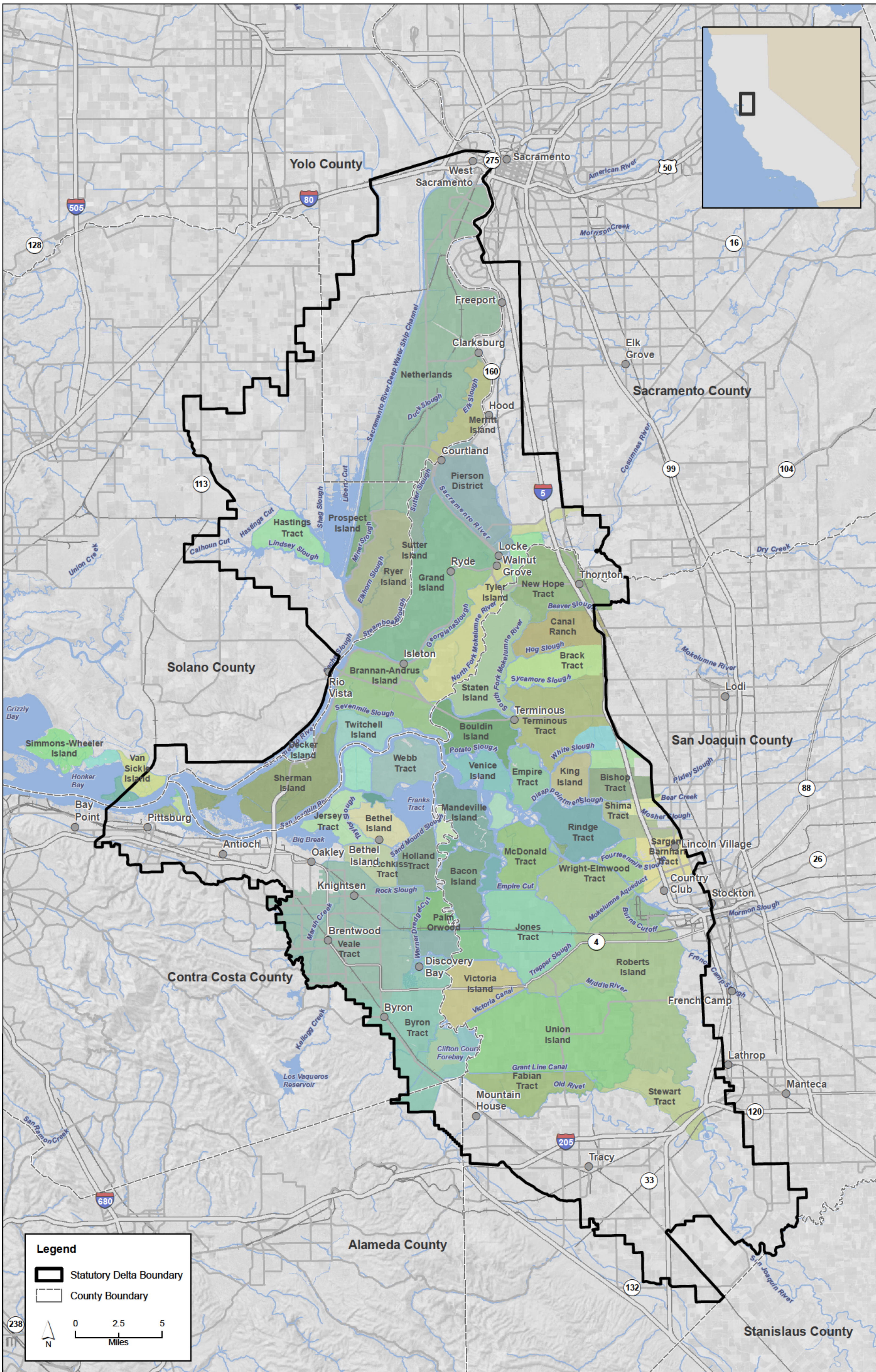

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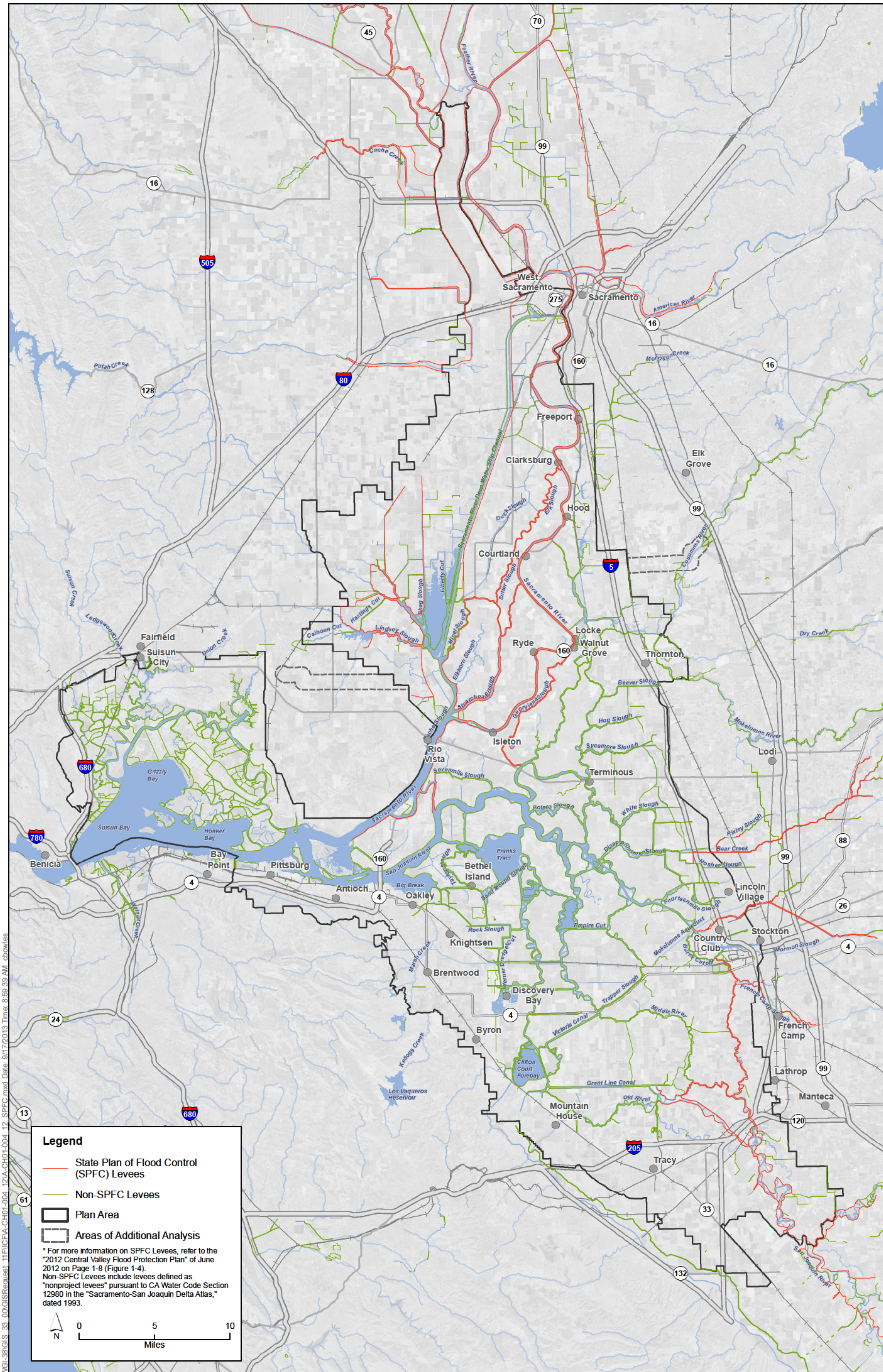
Sources: Plan Area, ICF 2012; Delta Boundary, DWR 2002; Islands, DWR 2004;

Figure 1A-1
The Sacramento–San Joaquin Delta



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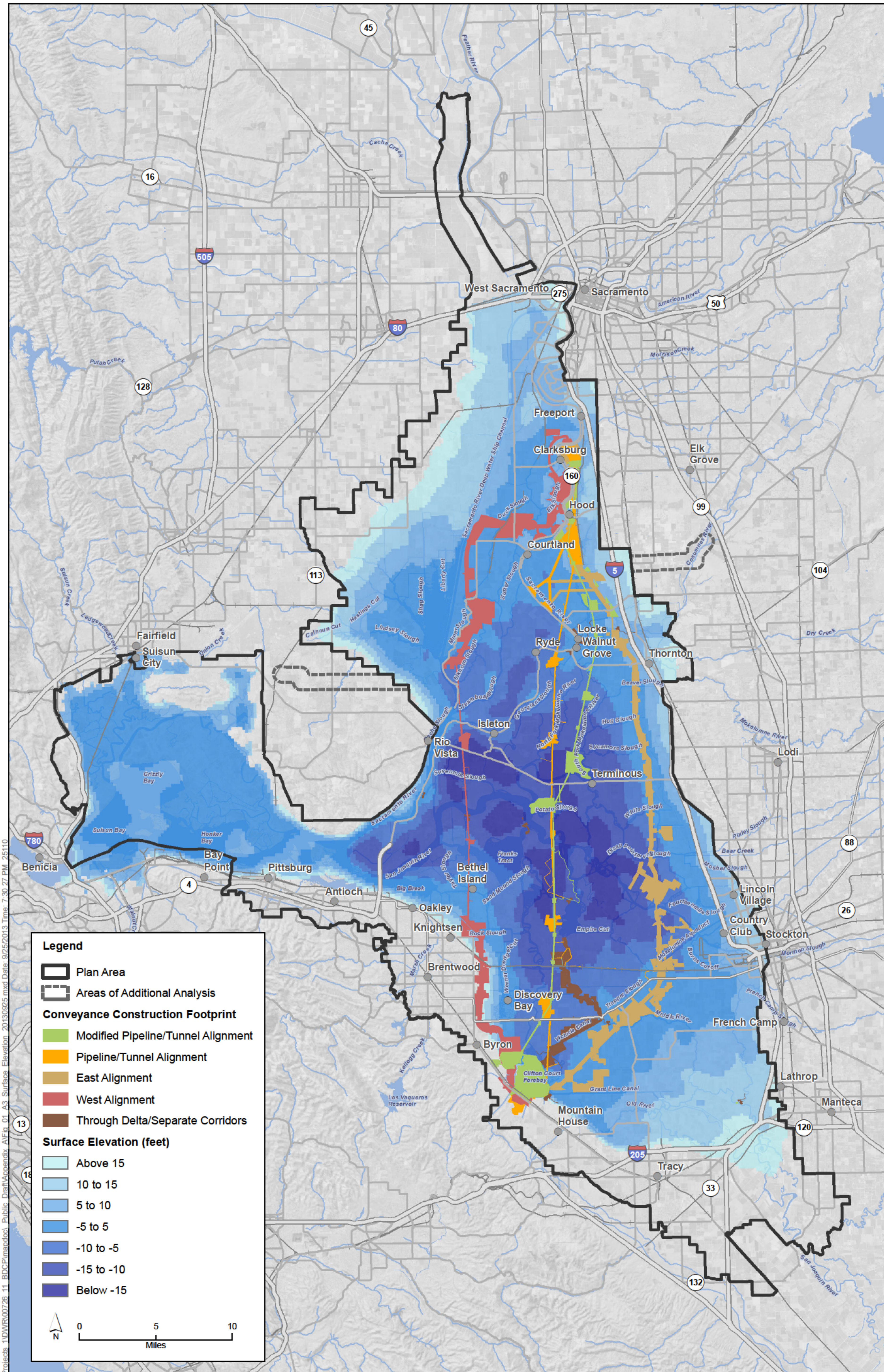
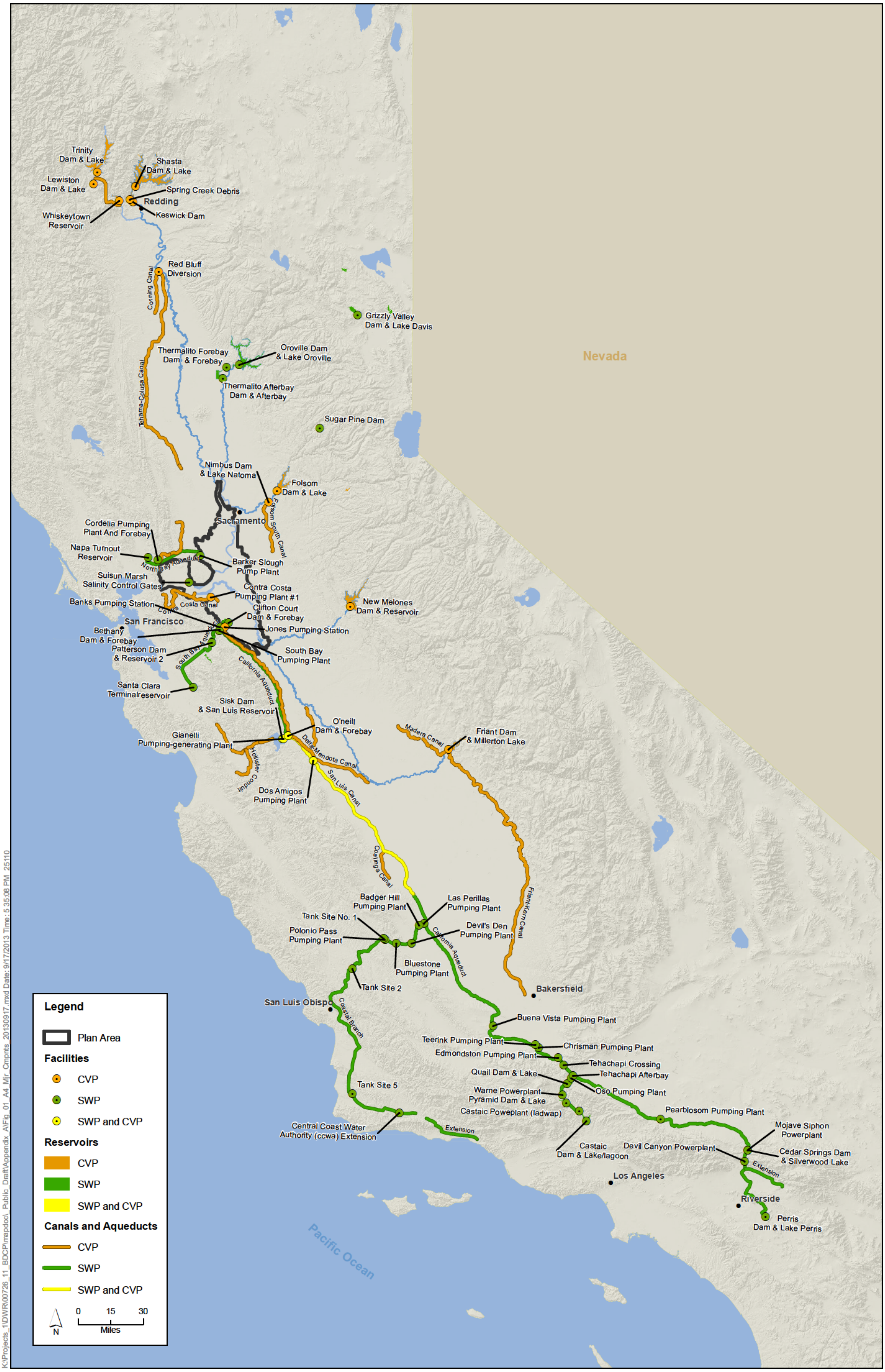
Sources: Plan Area, California Levee Database v3 0 r1 (31 December 2011).

Figure 1A-2
SPFC and Non-SPFC Levees



Sources: Plan Area, ICF 2012; Area of Additional Analysis, ICF 2012; Constructability (Rev 10b), DHCCP DWR 2012; Constructability (Rev 2b), DHCCP DWR 2013; Constructability (Rev 3b), DHCCP DWR 2012; Elevation, URS 2008.

Figure 1A-3
Subsidence in the Delta



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Sources: Dams/Pumps, DWR 1994; Plan Area, ICF 2012; SWPCVP Lakes, HDR 2011; SWPCVP Canals/Aqueducts, HDR 2011;

Figure 1A-4
Major Components of the SWP and CVP

Appendix 1E

Water Transfers in California: Types, Recent History, and General Regulatory Setting

Appendix 1E

Water Transfers in California: Types, Recent History, and General Regulatory Setting

1E.1 Introduction

The purpose of this Appendix is to provide a basic understanding of water transfers in California with an emphasis on transfers that move water through the Sacramento-San Joaquin Delta (Delta). This Appendix provides an overview of various types of water transfers, their recent history, and the regulatory setting that governs transfers.

In its 1976 report, the Governor's Commission on Water Rights recognized the importance of water transfers to the future of California's water supply and made recommendations regarding the need for specific changes to the Water Code to facilitate the transfer of water. Many of these changes were accomplished in the following years and are reflected in the discussions below.

Water transfers involve a change in the place of water use, from the water's historic point of diversion and use, to a new location either within or outside the watershed of origin. Water may be transferred from one user to another for a variety of purposes, including agricultural, municipal and industrial uses. It may also be transferred for environmental purposes such as in-stream flow augmentation and wildlife refuges. Water transfers and exchanges can be temporary - either short-term (up to 1 year) or long-term (more than one year but not permanent) or permanent.

Water transfers can be an effective water management tool providing much-needed flexibility in the allocation and use of water in California. Transfers in California are primarily executed to meet dry-year demands rather than to obtain a primary water supply for either agricultural or municipal development. Transfers are particularly useful for meeting critical needs during drought periods. Transfers, however, must be carried out in a responsible manner in order to assure that they do not result in adverse impacts to other water users or third parties.

A key component of a water transfer is a determination of the quantity of water available for transfer. This quantity is calculated by determining the amount of new water the surface water system will realize as a result of the actions taken by the individual or agency proposing the transfer. This is known as a "real water determination". The baseline for purposes of the analysis is the amount that would have been available downstream of the historic point of diversion or return flow in the absence of the transfer. In other words, the amount of water available for transfer cannot exceed the amount of demonstrated reduction in consumptive use or augmentation of the streamflow by the transferor.

An active transfer market has existed in California for a number of years. The most common through-Delta transfers to date have been short-term (up to 1 year) transfers from agricultural users within the Sacramento Valley to agricultural and urban users south of the Delta to meet critical dry year demands. The primary facilities used in exporting through-Delta transfer water are the State Water Project (SWP) Harvey O. Banks Pumping Plant (Banks) and the Central Valley Project (CVP) Jones Pumping Plant (Jones). This appendix will discuss the key role the SWP and CVP (collectively Projects) play in facilitating through Delta water transfers, as well as the limitations resulting from regulatory restrictions governing Project operations.

Access to pumping plants in the Sacramento/San Joaquin Delta and canal capacities is essential to accomplishing water transfers from the northern portions of the State to the central and southern areas of California. (Transfers south of the Delta and transfers and exchanges among state and federal contractors also occur but are not discussed in this Appendix since they do not result in increased water exported from the Delta. Water transfers are common among agencies in the San Joaquin Valley and are discussed in Appendix 5C.) Water Code Section 1810 et seq. encourages water transfers by requiring any state, regional or local agency to allow bona fide transferors[1] the use of available conveyance capacity provided the prospective transferor can show that the transfer will not injure any legal user of water or unreasonably affect fish, wildlife, or other instream beneficial uses or unreasonably affect the economy or environment of the county from which the water is diverted.

1E.2 Types of Water Transfers

Water transfers can be structured as temporary - either short-term transfers (one year or less) or long-term transfers (two years or more), or as permanent transfers. There are also transfers based on water exchanges, in which water is transferred in one year and returned, either in full (even exchange) or in part (uneven exchange), at a later time. Transfers involve a one-way movement of water, while exchanges involve a commitment to return a negotiated amount of water at a later date, and may include some monetary compensation as well.

The most common types of water transfers are based on reservoir storage releases, substitution of groundwater for surface water diversions, and crop idling. Other methods can be used to make water available for transfer; however, these three methods represent the bulk of water transfers within California to date. Crop shifting and water conservation measures can also be used to develop water for transfer. However, crop shifting and water conservation based transfers are not common.

A basic tenet underlying all water transfers is that they must be based upon the availability of “real water”, that is, water that would not be in the watercourse absent the transfer. Each transfer is unique and must be evaluated individually to determine the quantity and timing of real water made available. Unless a transfer is based upon “real water”, the water conveyed to the buyer will come at the expense of other water users or the environment. A more in depth discussion on the issue of developing responsible transfers is provided on California Department of Water Resources’ (DWR’s) website, “Responsible Water Transfers”, at http://www.water.ca.gov/watertransfers/.

A key element in evaluating whether a transfer generates real water is establishing what would occur in the absence of the transfer or, the baseline conditions. Establishing the baseline conditions can be difficult and the method for doing so varies with the type of transfer proposed, but is critical in assuring responsible transfers. More detailed information on how DWR and the U.S. Bureau of Reclamation (Reclamation) evaluate water transfers and assess real water is provided in the Draft

[1] Section 1811 of the Water Code defines “bona fide transferor “ to mean “ a person or public agency, as defined in Section 20009 of the Government Code with a contract for sale of water that may be conditioned upon the acquisition of conveyance facility capacity to convey the water that is the subject of the contract.”

Technical Information for Preparing Water Transfer Proposals prepared by DWR and Reclamation and available at http://www.water.ca.gov/watertransfers/.

1E.2.1 Reservoir Reregulation

Reservoir reregulation involves an increased release of water from a reservoir compared to normal operations. The transfer water is conveyed downstream to a new point of diversion either within or outside the watershed. It is important that storage releases are coordinated with the agency conveying the water to assure that the additional flows can be rediverted at the new downstream diversion point.

The release of additional water from the reservoir for transfer creates a lower "end of season" storage in the reservoir than would have existed absent the transfer. Consequently, more water must be captured the following year to refill the reservoir. If the reservoir operator refills the additional vacated storage at a time when those flows would also have been available to other legal users downstream of the reservoir, the transfer would result in an injury to other downstream legal users in the year(s) following the transfer. To avoid injuring downstream users, sellers must refill the vacated reservoir storage at a time when downstream users would not have otherwise been able to capture the water, either in downstream reservoirs or direct diversion facilities. If refill causes an injury due to its timing, additional water must be released to compensate for the injury. This means that the storage capacity vacated due to the transfer can only be refilled at times when the Delta is in excess conditions or, if there is another reservoir downstream of the transfer reservoir, the storage space can only be refilled after the downstream reservoir fills or reaches its flood control elevations. Reservoir refill criteria are typically included in any reservoir reoperation transfer to assure that no other legal users of water are injured by the transfer.

1E.2.2 Groundwater Substitution

In a groundwater substitution transfer, a water user with a right to divert surface water forgoes this right and pumps groundwater for the period of the transfer, thereby making the forgone surface diversions available to a user downstream. The quantity of surface water available is based on the quantity of groundwater actually pumped less any streamflow depletion losses.

Additional groundwater pumping will, to some extent, have an effect on the surface water supply, referred to as streamflow depletion. The impacts of the transfer on streamflow can continue to occur long after the transfer has been completed. If the additional streamflow depletion occurs at a time when excess flow is available, downstream users are not affected. However, if the depletion occurs at a time when other downstream users could divert that water, the transfer could have an impact on other legal users.

Accounting for the impact of the transfer on streamflow is essential to determining the amount of real water available for transfer and to avoid injury to downstream water users. The amount and timing of the impacts, however, cannot be directly measured but can be estimated through the use of mathematical models. Although the work required to accurately assess the appropriate streamflow depletion factor for a particular transfer can be time-consuming and costly, the assessment of an appropriate streamflow depletion factor is necessary to protect other legal users of water.

An increase in groundwater pumping has the potential to affect not only the streamflow, but other groundwater users and water quality as well. DWR and Reclamation require that the transferor implement a monitoring program to assess potential groundwater level and water quality impacts. For transfers conveyed through either the SWP or the CVP, the Seller is required to develop and implement a monitoring and mitigation plan to address any concerns raised by the monitoring data or other potentially affected parties.

1E.2.3 Crop Idling

Water can also be made available for transfer through crop idling. In crop idling-based transfers, sellers are paid to idle fields that would have been planted during the transfer season absent the transfer. The amount of water made available for transfer is based on the reduction in consumptive use, which is calculated as the evapotranspiration of applied water (ETAW). ETAW is the portion of applied water that is evaporated from the soil and plant surfaces and actually used by the crop. ETAW does not include the portion of the applied water that is lost as deep percolation to groundwater or conveyance losses without project specific documentation supporting an alternate method. Unless the acreage overlies an unusable groundwater basin or discharges to a saline sink, these depletions contribute to the overall water supply and are excluded from the calculation of transferable water.

Actual crop water requirements vary by crop, region and growing season. It is not feasible to determine the actual ETAW for the specific conditions of each individual transfer; therefore, average ETAW values are used to estimate transfer water. Historic cropping patterns are used to establish baseline crop acreage. Baseline acreage is important to establish what would have been planted in the absence of the transfer.

Idling agricultural acreage can result in impacts to parties not directly involved in the transfer, such as agricultural workers and seed or equipment suppliers. In order to minimize such potential “third party impacts” resulting from crop idling transfers, crop idling is typically limited to no more than twenty percent of the irrigated acreage within the agency transferring water or the within the county from which the water is transferred.

Water made available by crop idling is made available on the seasonal ETAW pattern. Unless storage is available, export capacity must coincide with the pattern of availability to allow export of the transfer water. The existing window for transfer capacity at the SWP and CVP export facilities in the Delta is currently limited to July through September (discussed below in Regulatory Framework). Depending on the crop, transfer water from crop idling is typically made available May through September. Unless storage capacity upstream of the export location is available, any water made available from crop idling outside the transfer window cannot be exported by either the SWP or CVP Delta pumps. Crop idling water made available from May through June ETAW can represent a significant portion of the transfer water, and the loss of this portion can make crop idling transfers that lack access to storage infeasible. A change in the seasonal restriction on export of transfer water could affect the feasibility of crop idling transfers in areas within the Delta watershed.

1E.2.4 Crop Shifting

Water Transfers based on crop shifting involve a change in crops planted by a grower, substituting a lower water using-crop (one with a lower ETAW) for a more water intensive crop. A cropping history is required to establish baseline cropping patterns. The water available for transfer as a result of crop shifting is the difference between the ETAW of the historic crop type and the alternate lower water intensive crop. Crop shifting transfers are only practical in regions where the agricultural land is suited to multiple crop types, allowing a shift to an alternate crop. The restrictions on export of transfer water noted above under crop idling apply to crop shifting as well.

1E.2.5 Water Conservation

Implementation of water conservation measures can result in numerous benefits for an agricultural or municipal user, such as reduction in the discharge of poor quality agricultural drainage, or improved availability of limited supplies within the user's service area. However, only those conservation measures that result in a reduction in the consumptive use of water or prevent water from discharging to an unusable water supply make water available for transfer. Conservation measures such as lining or replacing an unlined ditch may generate water for transfer to the extent that riparian vegetation is reduced or surface or groundwater discharges to an unusable basin are eliminated. Documentation of the conditions, including water diversion and use, before and after the conservation measures were implemented is necessary to demonstrate the amount of transferrable water. Transfers based on implementation of water conservation measures have been limited because most conservation programs do not meet the above tests.

1E.3 Regulatory Framework

As discussed above, water transfers can involve both surface and groundwater rights. A basic understanding of both types of water rights is important to understand the legal and regulatory constraints that affect water transfers and their implementation.

One of the primary tests that each prospective transferor must meet is to show that there will be no injury to any other legal user of water from the transfer. This "no injury rule" applies to any proposed change in the historic exercise of a water right regardless of the priority date of the right. The no injury rule is codified in various sections of the Water Code, including Sections 1702, 1706 and 1810.

The no injury rule protects senior water users (those with the oldest water rights) from junior diverters while protecting junior water right holders from the expansion of senior water rights. Junior water right holders would be harmed if seniors could increase the amount of water they divert under their senior priority by expanding their service area or transferring water that was historically available to other downstream users. Likewise, juniors could be hurt if seniors could change their point of diversion, place of use or purpose of use in a manner that reduces the quantity or quality of water relied upon by juniors for their diversion. A more comprehensive discussion of the no injury rule and assuring responsible transfers is provided in "Responsible Water Transfers" posted on DWR's Water Transfers website at http://www.water.ca.gov/watertransfers/.

1E.3.1 Surface Water

California recognizes a dual system of water rights comprised of both riparian and appropriative rights. Riparian rights attach to the land abutting a watercourse and are limited to the direct diversion of available natural flow. Riparian rights are generally not transferrable, with the exception of petitions to transfer water for instream flow filed with the State Water Resources Control Board (SWRCB) under Water Code Section 1707. Appropriative rights allow a water user to divert and use water in areas not abutting the stream, including areas outside the watershed. Appropriative rights can also be obtained to store water. The priority of appropriative rights is based on the date when the user first initiated efforts to put the water to beneficial use. This principle is sometimes referred to as "first in time, first in right". More specific information on water rights, water transfers and the SWRCB process is available on the SWRCB Division of Water Rights website at http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_transfers/.

1E.3.1.1 Pre-1914 Appropriative Rights

Prior to 1914, there was no permitting authority responsible for issuing water rights. Water users established a water right by simply putting water to beneficial use. In some cases, notice was posted at the proposed point of diversion or with the county. Water rights initiated before 1914 are referred to as pre-1914 appropriative rights. The priority date for pre-1914 water rights is based on the date the notice was posted or the date water was first put to beneficial use. In times of water shortage, users with the most senior priority date may divert up to the full quantity of their right before more junior appropriators can begin diverting. Pre-1914 water rights are not within the jurisdiction of the SWRCB, the current water rights permitting agency. However, the extent of the pre-1914 appropriative right is limited to the quantities historically put to beneficial use within the historic place of use. Pre-1914 appropriators are also prevented from wasting or unreasonably using water consistent with Article 10, Section 2, of the California Constitution.

Pre-1914 rights holders can change the purpose of use, place of use or points of diversion without notifying the SWRCB; however, the "no injury rule" applies to pre-1914 water rights (Water Code Section 1706). The change cannot result in an increase in the amount of water used under the water right, including changes in timing of the diversions if the changes will result in a reduction in the amount of water that would be available at that time to other legal users.

Pre-1914 water rights holders must also comply with the requirements of the California Environmental Quality Act (CEQA) prior to implementing a water transfer. The lead agency, typically the selling agency, normally prepares an Initial Study, and then either a Negative Declaration or an Environmental Impact Report (EIR) disclosing the potential environmental effects of the water transfer. Unlike post-1914 transfers, there is no statutory exemption from these requirements under the Water Code,. If the transfer involves any federal action, including use of federal facilities or Federal approval of the transfer, compliance with the National Environmental Policy Act (NEPA) is required as well. Assuring compliance with Water Code Section 1706, CEQA and/or NEPA is generally the responsibility of the water right holder or the federal approving agency.

If the transfer involves a dedication of water for instream purposes, the water right holder should seek to protect this water right by filing for a water right change under Section 1707 of the Water Code. This section allows water users, including pre-1914 water right holders, to make changes to their water rights for "preserving or enhancing wetlands habitat, fish and wildlife resources or recreation in or on the water". The benefit in seeking such a change is the protection of this water from forfeiture and the protection of the additional flow from the historic point of diversion to the most downstream point of the transfer for instream enhancement purposes.

The SWRCB may approve an instream flow petition, provided that the specific findings set forth in the appropriative processing provisions of the Water Code can be made and the SWRCB finds that the change "will not increase the amount the party is entitled to use, will not unreasonably affect any legal user of water, and otherwise meets the requirements" of the Water Code.

1E.3.1.2 Post-1914 Appropriative Rights

The Water Commission Act of 1913, which went into effect on December 19, 1914, established an administrative process for the permitting of water rights. Those wanting to obtain a water right after 1914 are required to file an application and obtain a permit from the SWRCB prior to diverting water. The permit establishes a quantity of water that may be directly diverted or stored, as well as the authorized place, purpose and season of use. The priority of the water right is based on the date the application was filed. A post-1914 water rights holder proposing to transfer water must file a petition for change with the SWRCB, and receive approval prior to implementing the transfer. As with pre-1914 water rights, these changes are not allowed if they would injure "any legal user of water" (see Water Code Section 1702).

Appropriative water rights can be lost through non-use. Specific changes to the Water Code were enacted to protect water rights from forfeiture as a result of transferring water either short-term or long term. Water Code Sections 1010, 1011, 1011.5, 1244, 1440, 1731, and 1737, 1745.07 were specifically added to provide protection to water right holders who transfer water.

1E.3.1.2.1 Short Term Transfers – Water Code Section 1725 et seq.

Water Code Sections 1725-1729 provide an expedited process for post-1914 transfers of up to one year in duration. Water Code Section 1729 exempts short term transfers from the requirements of CEQA. The seller must demonstrate that the transfer water would have been consumptively used or stored in the absence of the transfer. The Board must find that the transfer would not injure any legal user of water or unreasonably impact fish, wildlife or other instream beneficial uses. The water user must file a petition for change with the SWRCB. The Board issues a notice of the petition and there is a 30 day public review period during which time potentially affected parties can file a protest of the proposed change. Following a review of the petition and the resolution of any valid protests, the Board may issue an order approving the change, provided the Board can make the required findings. No transfer water can move until an order approving the transfer is issued.

1E.3.1.2.2 Long Term Transfers – Water Code Section 1735 et seq.

There is no expedited SWRCB process for long-term transfers. Analysis of a long-term transfer proposal is required to determine if approval of the transfer will result in impacts to other legal users or the environment over the entire term of the transfer. Transfer proponents must comply with CEQA; and if federal action or facilities are involved, compliance with NEPA is also required. A more rigorous analysis than what might be required for a temporary change may be necessary to assess potential accumulation of impacts associated with the transfer over the life of the transfer.

Long-term transfers also must comply with the SWRCB’s standard noticing and protest processes. If valid protests to the proposed change cannot be resolved through negotiation between the parties, then a hearing must be held prior to the approval or denial of the requested transfer. The same findings related to no substantial injury to legal users of water and no unreasonable effects on fish and wildlife or other instream beneficial uses are necessary before the SWRCB can approve a long-term transfer.

1E.3.2 Groundwater

There is no administrative process for permitting extraction of groundwater in California except in the few basins that have been adjudicated. The majority of the adjudicated groundwater basins are located in southern California. Groundwater use in California is analogous to riparian rights. Overlying users have the ability to install a well and use the naturally occurring groundwater for beneficial use on their overlying land. The overlying users share equally in the resource. Users overlying a basin may import water to a basin and retain a right to the imported water, less any losses and, other users within the basin cannot claim a right to imported water.

Groundwater pumping in excess of natural recharge is a significant problem in a number of areas in the state. If the condition persists over a long period of time, areas of overdraft can develop and may affect groundwater pumpers within the basin. Managing groundwater extraction in an overdrafted basin can present significant challenges, and solutions to the issue of overdraft are as varied as the regions within the state.

Extractions of groundwater for transfer must comply with any applicable groundwater management plans, other local plans, and any groundwater ordinances. Compliance with local requirements (including ordinances relating to well drilling, well spacing, and groundwater extraction) and local groundwater management plans, as well as compliance with Water Code Section 1745 et seq., is required depending on the source of any groundwater substitution transfers. Compliance is usually the responsibility of the entity proposing the groundwater substitution transfer, and would be confirmed by the project that would be asked to export the water from the Delta.

The approval process associated with a proposed groundwater transfer varies by county. Table 1E-1 provides brief descriptions of the water transfer requirements for those counties in the region north of the Delta that currently have such requirements, in geographic order from north to south.

More information on local groundwater management and evaluation of groundwater substitution transfers is provided in the Draft Technical Information for Preparing Water Transfer Proposals prepared by DWR and Reclamation and available at http://www.water.ca.gov/watertransfers/.

Precipitation and streamflow are the source of recharge for groundwater basins. A change in the amount of groundwater pumping affects both the groundwater and surface water resources. The timing and magnitude of the impacts to the surface water supply varies from place to place depending on a number of factors, including geology, hydrology, regional groundwater use, and depth and construction of the wells among others. Groundwater pumping will result in some level of streamflow depletion, the effect of which may extend well beyond the area from which transfer is made, depending on the specifics of the transfer. It is important that the impacts to streamflow from increased groundwater pumping are accounted for in the transfer to prevent injury to other legal users of water. Streamflow depletion cannot be directly measured and must be estimated using a technical analysis including groundwater modeling considering the specific conditions of the transfer and hydrogeology.

Table 1E-1. Description of County Ordinances Related to Groundwater Transfers

County	Description	Sources for more information
Shasta	Ordinance pertaining to the Redding Groundwater Basin portion of Shasta County requires a permit for extraction and export of groundwater, either directly or indirectly, for use outside the county. Application for a transfer permit should be submitted to the chief engineer of the Shasta County Water Agency.	Shasta County Water Agency (530) 225-5181 http://www.co.shasta.ca.us/index/pw_index/engineering/water_agency.aspx
Tehama	Ordinance requires a permit to extract groundwater for off-parcel use, prohibits mining of groundwater, and restricts the radius of influence associated with the operation of a well participating in transfer operations to the parcel on which the well is located, among other requirements.	Tehama County Health Agency, Environmental Health Division (530) 527-8020 http://www.tehamacountypublicworks.ca.gov/Flood/
Butte	Ordinance requires permits for groundwater extraction for use outside the county, and requires a permit for groundwater substitution pumping. Butte County also has a well spacing ordinance. The Butte County Water Commission advises the Board of Supervisors with technical information from the Butte County Water Advisory Committee and Technical Advisory Committee.	Butte County Department of Water and Resource Conservation (530) 538-4343 http://www.buttecounty.net/Water and Resource Conservation.aspx
Glenn	Ordinance uses basin management objectives of groundwater levels, groundwater quality, and land subsidence to help define safe yield and overdraft of the basin. The ordinance is enforced by the Glenn County Board of Supervisors.	Glenn County Department of Agriculture (530) 934-6501 http://www.glenncountywater.org/about_us.aspx
Colusa	Ordinance requires a permit for extraction and export of groundwater, either directly or indirectly, for use outside the county. Application for a transfer permit is filed with Colusa County Groundwater Commission, through the director of the Planning and Building Department.	County Director of Planning and Building (530) 458-0480 http://www.codepublishing.com/CA/colusacounty/ http://colusagroundwater.ucdavis.edu/index.htm
Yolo	Ordinance (Title 10, Chapter 7, Groundwater) requires a permit for extraction and export of groundwater, including the extraction of groundwater to replace a surface water supply. Application for a permit should be filed with the Director of Community Development.	Director of Planning and Public Works (530) 666-8775 http://www.yolocounty.org/Modules/ShowDocument.aspx?documentid=1899
Sacramento	Ordinance (Title 3 section 3.40.090, Ground and Surface Water Export) requires a permit for groundwater or surface water to be transported in any manner outside the county. Application for a permit must be filed with the director of the Sacramento County Department of Water Resources.	Sacramento County Department of Water Resources (916) 874-6851 http://www.countycounsel.saccounty.net/Documents/sac_017441.pdf

Transfers involving groundwater may involve groundwater substitution (in lieu pumping described earlier), transfer of groundwater from a banking program or direct transfer of groundwater. Each type of groundwater based transfer presents a unique set of issues and concerns.

1E.3.2.1 Groundwater Substitution

The most common type of groundwater based transfer is groundwater substitution. Groundwater substitution transfers are an option for water users that have access to both surface water and groundwater supplies. In a groundwater substitution transfer, a water user that typically uses surface water switches to groundwater pumping for all or a portion of its demand and allows the surface supply to be delivered to the buyer's service area. The groundwater is used within the existing place of use, and therefore there is no export of groundwater from the basin. Transfer of the surface water must comply with the applicable water rights requirements depending on whether it is diverted under claim of a pre or post-1914 water right.

The amount of water available for transfer is determined by metering the quantity of water pumped and applying a streamflow depletion factor based on an analysis of the specific wells and geology of the groundwater basin.

As noted above, more information on local groundwater management and evaluation of groundwater substitution transfers is provided in the Draft Technical Information for Preparing Water Transfer Proposals prepared by DWR and Reclamation and available at http://www.water.ca.gov/watertransfers/.

1E.3.2.2 Groundwater Banking Transfer

Groundwater banking involves the conjunctive use of surface and groundwater resources in which surface water supplies in excess of current demands are delivered to groundwater recharge facilities. Groundwater may be recovered directly through groundwater recovery pumping or through in lieu recovery. In lieu recovery can be accomplished where the agency operating the groundwater banking program also has access to surface water supplies which can be delivered in exchange for the previously stored groundwater. In an in lieu exchange, the ownership of the previously stored groundwater changes from the bank depositor to the groundwater banking authority. The amount of water available for recovery may be reduced by the amount of natural losses and in some cases an additional assessment is imposed on the banking operation.

From a water rights perspective, the surface water stored in a groundwater banking program is treated like water stored in a surface reservoir. It retains the water rights limitations specified under the water right, including its place of use. When water is extracted from groundwater storage, it must be used within the authorized place of use specified in the surface water permits. Just as directly diverted or stored surface water may be transferred, surface water stored in a groundwater banking facility may be transferred. Transfers to an area outside the authorized place of use of the water right must comply with the requirements discussed above, depending on whether the stored water was diverted under claim of pre or post-1914 water rights.

1E.3.2.3 Direct Export of Groundwater

As noted earlier, for the most part, appropriation of groundwater is not regulated by the State. Some groundwater basins have been adjudicated and any transfer or change in groundwater use from an adjudicated basin must be in conformance with the adjudication or be approved by the court.

Water users proposing to export groundwater from Delta-Central Sierra Basins must comply with the provisions of Water Code 1220 where the groundwater pumping was initiated after January 1, 1985 (see Water Code Section 1215). Water Code Section 1220 prohibits the export of groundwater from the Delta-watershed unless: (1) the pumping is in compliance with an adopted groundwater management plan, and (2) the plan is approved by a vote in the county or portions of counties that overlie the groundwater basin.

Concern over the potential effects of the export of direct groundwater pumping and the requirements enacted for local approval of groundwater extraction transfers have effectively limited the implementation of direct groundwater transfers, particularly from the Delta watershed.

1E.4 Conveyance through Project Facilities

1E.4.1 Water Code Section 1810 Requirements

Export of transfer water from the Delta is primarily accomplished using SWP or CVP facilities, including the North Bay Aqueduct (NBA), Banks, and Jones. The majority of the available export capacity for transfers is at Banks. DWR and Reclamation provide capacity for transfers when the export can be done without impacting Project operations, including all regulatory requirements and, in the case of SWP facilities, after making the specific written findings required under Water Code Section 1810(d).

Water Code Section 1810 et seq. provides that a public entity may not deny a bona fide transferor of water access to available conveyance capacity if the conveyance of transfer water will not adversely affect the beneficial uses or quality of water in the facility and the conveyance can be provided without injuring any other legal user of water, without unreasonably affecting fish, wildlife, or other instream beneficial uses and without unreasonably affecting the overall economy or the environment of the county from which the water is being transferred. The agency's approval must be supported by written findings.

Complying with Water Code Section 1810 requires that DWR evaluate each individual request for conveyance. That review includes an analysis of the specific transfer proposal and a real water determination. The real water determination is required to support a finding that the transfer will not injure any other legal user of water including the Projects. The methods used by DWR and Reclamation to calculate the real water made available for transfer are detailed in the "Draft Technical Information for Preparing Water Transfer Proposals" prepared by DWR and Reclamation and available at http://www.water.ca.gov/watertransfers/.

Information sufficient for DWR to make the findings required under Water Code Section 1810 must be provided with the request for conveyance. The methods detailed in the Draft Technical Document noted above are designed to limit the transfer to only the amount of real water developed by the transfer proposal. Compliance with those methods assists DWR in making the required findings. In the case of a transfer of pre-1914 water, the environmental document prepared by the lead agency can be used to support the required environmental findings if the document is sufficiently detailed to address potential areas of concern. In the case of post-1914 based transfers, the information contained in the SWRCB order approving the transfer can be used to support some of the required findings. An analysis of potential economic impacts to the area from which the water is being transferred required by Section 1810(d) is not necessarily addressed in the environmental document and is not one of the findings required of the SWRCB. The request for conveyance should include sufficient information for DWR to determine that there will be no unreasonable impacts to the economy of the transfer area.

1E.4.2 Operational Considerations

In determining the availability of excess capacity within the SWP or CVP, Project operators analyze annual hydrology, project operations, contractor requests, and regulatory and operational restrictions among other things to determine whether transfers can be conveyed without affecting the Projects.

Project operations are governed by the requirements contained in Water Right Decision 1641 (D1641). A copy of D 1641 may be viewed at http://waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649.shtml. D1641 contains flow and water quality objectives. D1641 also contains specific provisions relating to the use of Project facilities for conveyance of transfer water including water level and water quality response plans.

Other regulatory requirements (in addition to those described above) affect Project operations and the ability of DWR and Reclamation to convey transfer water. On December 15, 2008, the U.S. Fish & Wildlife Service (FWS) issued a biological opinion (BO) on the Long-Term Operational Criteria and Plan (OCAP) for coordination of the CVP and SWP (http://www.fws.gov/sfbaydelta/cvp-swp/cvp-swp.cfm). The OCAP project description includes conveyance of water transfers of up to 360,000 A in most years (the wettest 80 percent of years) and up to 600,000 AF in Critical and some Dry years (approximately the driest 20 percent years). Under the FWS BO, transfer water may be conveyed through project facilities only in the months of July through September without further consultation with the agency.

On June 4, 2009, the National Marine Fisheries Service (NMFS) released its final BO on the long-term operations of the CVP and SWP for the protection of anadromous fisheries, green sturgeon and marine mammal species (http://swr.nmfs.noaa.gov/ocap.htm). The NMFS BO deals with transfers in the same manner as the USFWS BO on delta smelt, namely, allowing transfers during the July through September summer transfer window and requiring additional consultation should transfers be proposed for export during other times of the year.

The maximum daily pumping rate at Banks is controlled by a combination of D-1641, the adaptive management process outlined in the BOs, and permits issued by the U.S. Army Corps of Engineers (COE) that regulate the rate of diversion of water into Clifton Court Forebay (CCF) for pumping at Banks. This diversion rate is normally restricted to 6,680 cubic feet per second (cfs) as a three-day average inflow to CCF and 6,993 cfs as a one-day average inflow to CCF. Additionally, under the COE permit, the SWP can export an additional 500 cfs between July 1 and September 30, which can be used for the purpose of replacing Project export pumping foregone for the benefit of Delta fish species, making the summer limit effectively 7,180 cfs. The 500 cfs has been used to move a portion of the water provided under the Lower Yuba River Accord (Yuba Accord, discussed below) in most years.

Another operational consideration important for transfers moving through the Delta is carriage water. Carriage water is the additional flow necessary to move transfer water across the Delta for export so as not to exceed the objectives contained in D1641. DWR and Reclamation estimate carriage water based on annual hydrology, Project operations and regulatory restrictions among other operational considerations. Carriage water losses are applied to the quantity of transfer water made available above the Delta. This reduces the quantity of water that is actually exported from the Delta. The amount of carriage water required to export transfer water can vary significantly from year to year and can exceed 20% in dryer years. In 2012, carriage water losses for cross Delta transfers were 30%.

In addition to carriage water losses, transfers through Project facilities may also be assessed aqueduct conveyances losses depending on the delivery point.

1E.5 Historic Transfer Programs

This section provides a brief overview of recent water transfer programs in California. Appendix 5C provides additional details on both federal and state water purchase programs, including the programs outlined below.

1E.5.1 DWR Water Purchase Programs

The first large scale water transfer program in California was the 1991 Emergency Drought Water Bank (1991 DWB). The 1991 DWB was established in response to projected critical water supply shortages following 4 years of drought conditions. The 1991 DWB team purchased water from willing sellers in the Delta, Sacramento Valley and Feather River basin areas. Water was made available through crop idling, groundwater substitution and reservoir storage release. The 1991 DWB team executed over 300 contracts with water agencies and individuals to purchase water for critical statewide needs. Water from the 1991 DWB was allocated to 12 municipal and agricultural water users. Drought water banks were implemented again in 1992 and 1994, acquiring water primarily from groundwater substitution.

DWR implemented Dry Year Purchase Programs in 2001 and 2002 in response to dry conditions and reduced SWP and CVP allocations. In 2001 DWR purchased water from willing sellers in Northern California from a combination of crop idling, groundwater substitution and reservoir storage release, for delivery to eight water agencies throughout the State to help offset water shortages. In 2002, DWR acquired water made available through groundwater substitution from Yuba County Water Agency (YCWA) and provided it to four SWP contractors.

DWR implemented a drought water bank in 2009 after a series of three dry years, acquiring about 76,600 acre-feet of transfer water from a combination of crop idling, groundwater substitution and reservoir storage release. An additional 200,000 acre-feet of cross-Delta transfers were executed independently by water agencies and exported through Project facilities. Since 2009, DWR has facilitated water transfer by conveying transfer water through SWP facilities; however, it has not acted as a purchaser or broker.

1E.5.2 Federal Water Acquisition Programs

The Central Valley Project Improvement Act of 1992 (CVPIA) amended previous authorizations of the CVP to include fish and wildlife protection, restoration, and enhancement as project purposes having equal priority with agriculture, municipal and industrial, and power purposes. A major feature of CVPIA is that it requires acquisition of water for protecting, restoring, and enhancing fish and wildlife populations. To meet water acquisition needs under CVPIA, the U.S. Department of the Interior (Interior) has developed a Water Acquisition Program (WAP), a joint effort by Reclamation and the FWS. The major purposes of the WAP are acquisition of water to meet optimal refuge demands and support instream flows. Additional information on Reclamation's water transfer programs is contained in the CVP Water Transfer Program Fact Sheet which can be accessed at http://www.usbr.gov/mp/PA/water/ and the CVPIA Water Acquisition Program Background Information Sheet, November 2003 USDOI which can be accessed at http://www.usbr.gov/mp/cvpia/3406b3_wap/info/index.html.

1E.5.3 Environmental Water Account

The Environmental Water Account (EWA) was established in 2000. The purpose of the EWA program was to provide protection to at-risk native fish species of the Bay-Delta estuary by supporting environmentally beneficial changes in SWP and CVP operations. EWA funds were used to acquire alternative sources of water, called the "EWA assets," which the EWA agencies used to replace the Project water that was not exported from the Delta because of the voluntary fish actions. The EWA program ended in December 2007.

1E.5.4 Yuba River Accord Transfers

In 1989, the State Water Resources Control Board received a complaint regarding fishery protection and water right issues on the lower Yuba River. The SWRCB held hearings on the issues raised in this complaint, and in 1999, issued a draft decision. At the request of YCWA and DFG, subsequent hearings were postponed in order to provide the parties an opportunity to reach a proposed settlement regarding instream flows and further studies. The parties failed to reach agreement on a settlement and the SWRCB held additional hearings in the spring of 2000. A draft decision was issued in the fall of 2000 and was adopted as Decision 1644 on March 1, 2001.

Subsequent litigation led to withdrawal of Decision 1644 and issuance of Revised Decision 1644 (RD-1644) in July, 2003. These decisions established revised instream flow requirements for the lower Yuba River and required actions to provide suitable water temperatures and habitat for Chinook salmon and steelhead and to reduce fish losses at water diversion facilities.

After the issuance of Revised Decision 1644, the parties involved in the SWRCB proceedings expressed a desire to further negotiate the instream flow, flow fluctuation, and water temperature issues on the lower Yuba River. The parties engaged in a collaborative, interest-based negotiation with numerous stakeholders, reaching a series of agreements now known as the Lower Yuba River Accord (Accord). These negotiations resulted in the agreements outlined below and the SWRCB approval of the flow schedules and water transfer aspects of the Accord on March 18, 2008 with Water Right Order 2008-0014. Several technical revisions to the Order were adopted as part of Water Right Order 2008-0025 on May 20, 2008.

Surface water releases are made available for transfer under the Accord based on the difference between a baseline release rate (the interim flow schedules defined in RD-1644 and in Water Right Order 2008-0014) and the Fisheries Agreement flow schedules. The baseline releases (interim flow schedule in RD-1644) are based on the Yuba River Index as defined in RD-1644. The flow schedules in the Fisheries Agreement are determined based on the North Yuba River Index independent from the Yuba River Index. (There are also some conditions when the YCWD-DFG agreement or the current FERC license control the baseline flows.) As a result, there can be a wide range of possible transfer amounts under the various hydrologic conditions that can occur in the Yuba River watershed in any year.

Groundwater substitution water is made available by individual landowners within seven of the eight YCWA member units that are signatory to the Accord (Cordua Irrigation District has not signed the Accord as of this writing). YCWA reduces its surface diversions to those member units from the Yuba River and regulates storage in Bullards Bar Reservoir to accrue and release the groundwater substitution water on a schedule to allow the releases to be exported in the Delta.

Detailed information on the Accord can be obtained from YCWA's website including the Final Environmental Impact Report/Environmental Impact Statement http://www.hdrprojects.com/engineering/ProposedLowerYubaRiverAccord/ and "The Lower Yuba River Accord, From Controversy to Consensus" published by the Water Education Foundation at http://www.ycwa.com/documents/622.

1E.6 References

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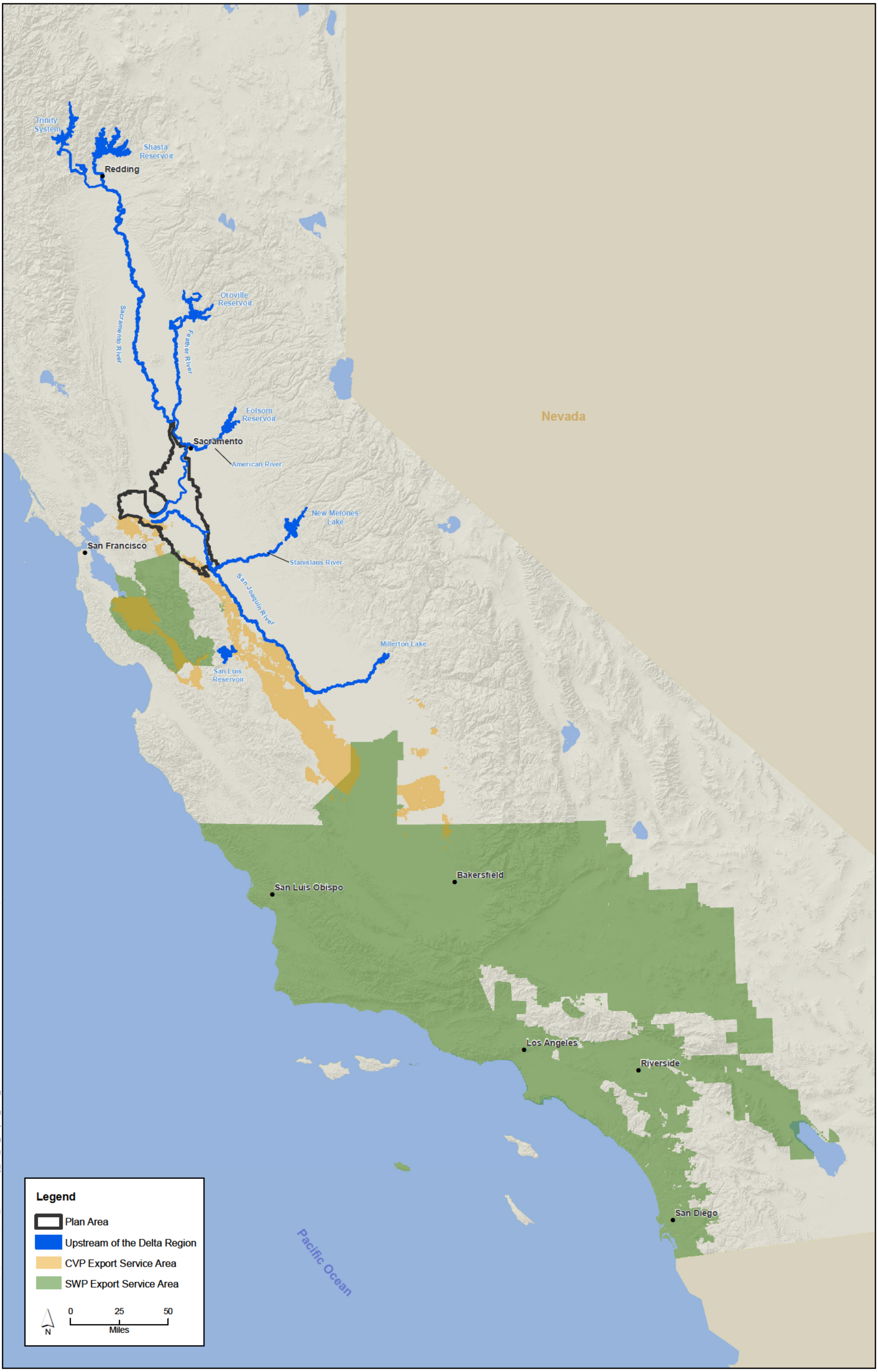

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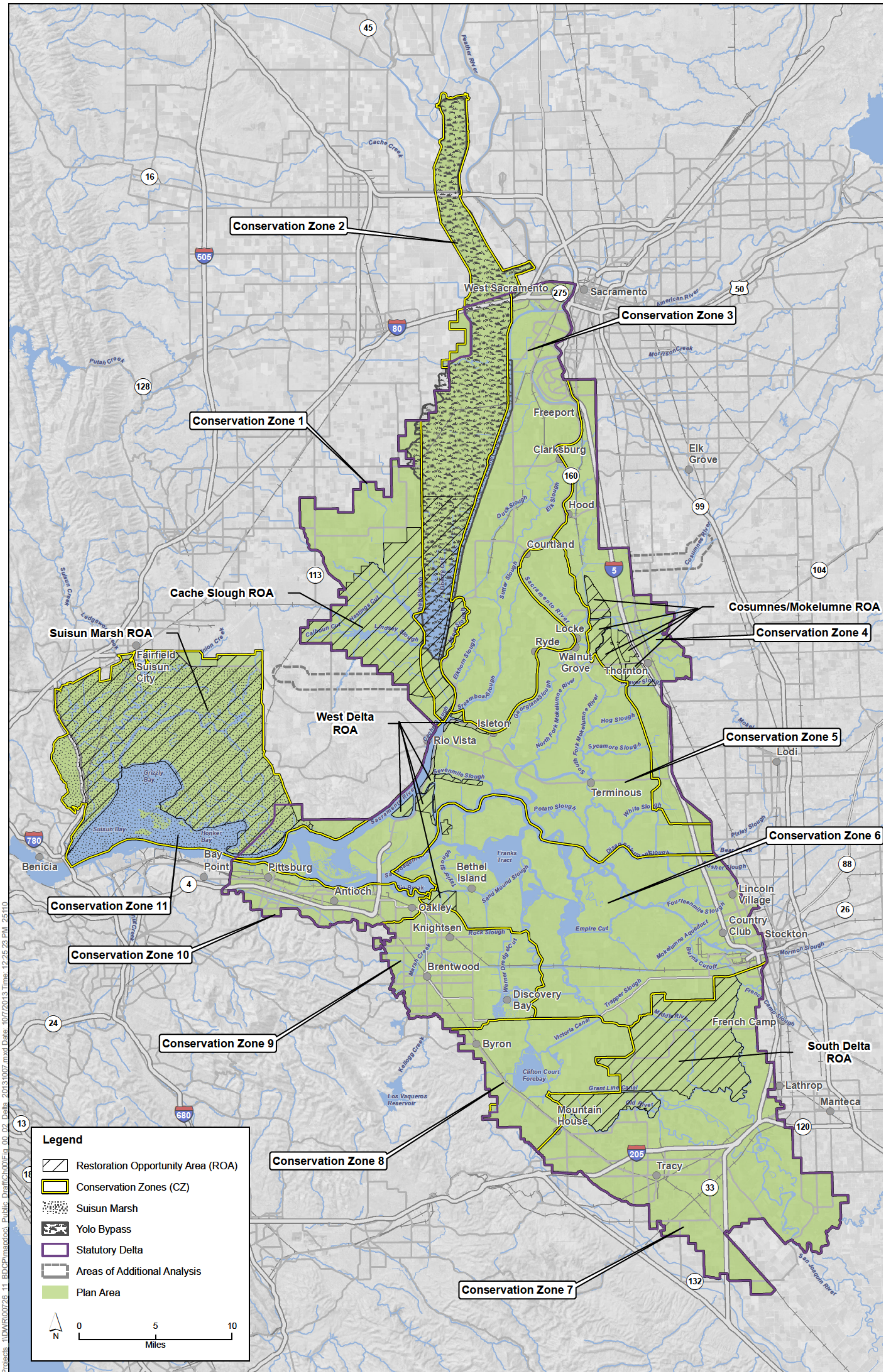
Sources: Plan Area, ICF 2012; SWPCVP Canals/Aqueducts, HDR 2011; CVP Division Entities, USBR 2010; SWP Service Areas, ESA 2007;

Figure ES-1
Project Area



Sources: Plan Area, ICF 2012, Statutory Delta Boundary, DWR 2001; Suisun Marsh, BCDC 2011; Yolo Bypass, SAIC 2008

Figure ES-2
Delta Region (Plan Area)

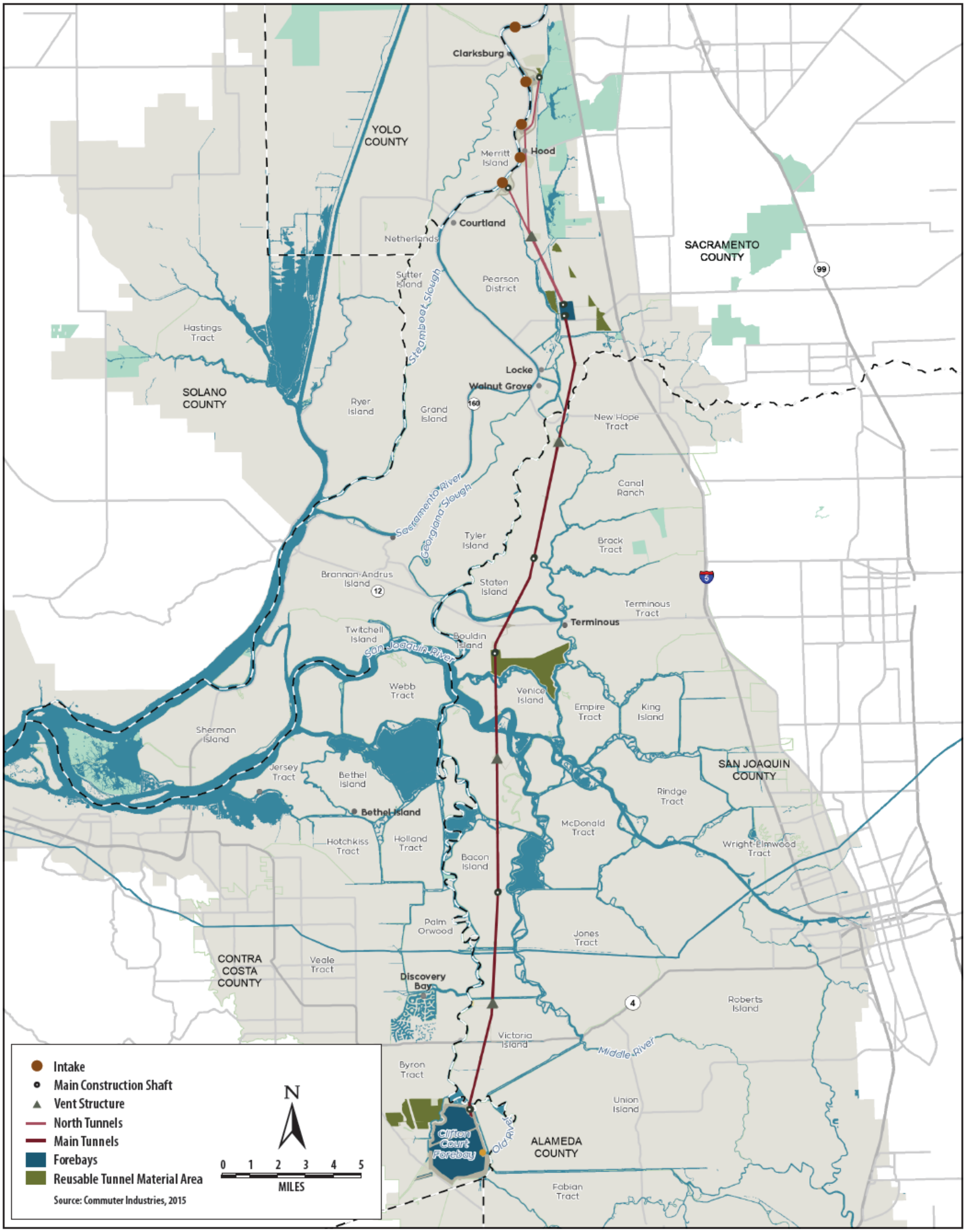


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Figure ES-3
Location of Conveyance Facility Alignment for Alternatives 4, 4A, 2D and 5A

Chapter 5 – Water Supply		Alternative																			
		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
WS-2: Change in SWP/CVP deliveries (average annual total TAF)	SWP	n/a	-4%	6%	6%	6%	2%	2%	2%	6%	H1: 6% H4: 2%	2%	-5%	-5%	-5%	-5%	-9%	-1%	0%	2%	3%
		n/a	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	CVP	n/a	-11%	23%	23%	23%	15%	15%	15%	21%	H1: 17% H4: -3%	8%	-13%	-13%	-13%	-13%	-30%	-1%	5%	15%	9%
		n/a	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

- n/a not applicable
- > greater than
- < less than
- ≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding

- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable
- ND No Determination

NEPA Finding

- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure ES-4
Comparison of Impacts on Water Supply

Chapter 6 – Surface Water		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
SW-2: Changes in Sacramento and San Joaquin River flood flows (% change in flow compared to No Action [LLT for BDCP alternatives and ELT for 4A, 2D, and 5A])	Sacramento River at Freeport	n/a	1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	-1%	3%	3%	3%
		n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
	Sacramento River at Vernalis	n/a	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
		n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
SW-3: Changes in reverse flow conditions in Old and Middle Rivers (Months in which reverse flow conditions are reduced or increased)	Compared to NAA	n/a	n/a	Reduced, except in Apr, May, and Oct	Reduced, except in Apr, May, and Oct	Reduced, except in Apr, May, and Oct	Reduced, except in Apr	Reduced, except in Apr	Reduced, except in Apr	Reduced, except in Apr, May, and Oct	Reduced, except in Apr, May	Reduced, except in Apr, May	Reverse flow would not occur	Reverse flow would not occur	Reverse flow would not occur	Reverse flow would not occur	Reverse flow would not occur	Increased, except in Jun	Reduced, except in Apr, May	Reduced, except in Apr	Reduced, except in Apr
	Compared to EC	n/a	Reduced, except in Apr, May	Reduced Jun-Mar, increased >1% Oct, Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced Jun-Mar, increased >1% Apr, May	Reduced all months	Reduced all months	Reduced all months	Reduced all months	Reduced all months	Increased all months except Jun	Reduced, except increased >1% Apr	Reduced, May–Mar, increased >1% Apr	Reduced, May–Mar, increased >1% Apr
		n/a	LTS/NA	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND	LTS/ND	LTS/ND	LTS/ND	LTS/ND	LTS/ND	ND	ND	ND	ND

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure ES-5
Comparison of Impacts on Surface Water

Chapter 7 – Groundwater		Alternative																			
		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
GW-1: During construction, deplete groundwater supplies or interfere with groundwater recharge, alter groundwater levels, or reduce the production capacity of preexisting nearby wells (Decrease in groundwater in vicinity of intakes / in vicinity of Clifton Court Forebay)		n/a	n/a	10-20 ft/ 20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	<10-20 ft/ <20 ft	<10-20 ft/ <20 ft	<10-20 ft/ <20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	10-20 ft/ 20 ft	<10-20 ft/ <20 ft	n/a	<10-20 ft/ <20 ft	<10-20 ft/ <20 ft	<10-20 ft/ <20 ft
		n/a	n/a	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	LTS/NA	SU/A	SU/A	SU/A
GW-8: During operations, deplete groundwater supplies or interfere with groundwater recharge, alter groundwater levels, or reduce the production capacity of preexisting nearby wells (SWP and CVP deliveries [TAF/yr] to hydrologic regions located south of the Delta)	San Joaquin and Tulare	2,964	2,519	3,070	3,070	3,070	2,846	2,846	2,846	3,023	H1: 2,949 H2: 2,767 H3: 2,781 H4: 2,610	2,709	2,285	2,285	2,285	2,272	2,069	2,529	2,762	3,016	2,928
	Central Coast	47	40	51	51	51	49	49	49	50	H1: 49 H2: 40 H3: 48 H4: 39	45	34	34	34	36	27	43	45	51	48
	Southern California	1,647	1,484	1,853	1,853	1,853	1,711	1,711	1,711	1,821	H1: 1,784 H2: 1,491 H3: 1,668 H4: 1,370	1,613	1,136	1,136	1,136	1,162	803	1,410	1,663	1,819	1,728
		n/a	n/a	B	B	B	LTS/NA	LTS/NA	LTS/NA	LTS/B	SU/A	LTS/NA	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	LTS/B	LTS/B	LTS/B

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-6
Comparison of Impacts on Groundwater

Chapter 8 – Water Quality	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
WQ-5: Bromide (CM1) - Percent increase in long-term average concentration at Barker Slough	-	-2%	38/43%	38/43%	38/43%	22/26%	22/ 26%	22/ 26%	34/38%	40/44%	23/27%	19/22%	19/22%	19/22%	-2/1%	4/8%	19/23%	-2/2%	-2/2%	-4/0%
		LTS	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A[a]	S/A[a]	S/A	LTS/NA	LTS/NA	LTS/NA
WQ-7: Chloride - Percent of years when 150 mg/L water quality objective exceeded at CCPP#1[b]	7%	0	13%	13%	13%	13%	13%	13%	7%	7%	13%	13%	13%	13%	20%	13%	13%	0%	0%	0%
		S	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA
WQ-11: EC- Percent of days Emmaton objective would be exceeded	6%	14	31%	31%	31%	26%	26%	26%	30%	27-29%[c]	25%	32%	32%	32%	19%	22%	18%	16%[c]	7%[c]	10%[c]
		S	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA
WQ-13: Mercury (CM1) - Maximum percent increase in fish tissue concentrations at Delta locations	6%	6%	8/10%	8/10%	8/10%	13/11%	13/11%	13/11%	6/8%	15/12%	8/7%	64/58%	64/58%	64/58%	45/39%	46/41%	66/59%	8/7%	10/9%	5/3%
		LTS	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA

Notes

[a] While the long-term average increases in bromide would be low, the drought period increases would be 34% for Alternative 7 and 50% for Alternative 8, relative to Existing Conditions and the No Action Alternative. These increases in the drought period were considered significant/adverse.

[b] Water quality degradation as measured by use of available assimilative capacity also played a significant role in determining effects by alternative, and degradation varied by alternative.

[c] Alternative 4 does not include a change in compliance location from Emmaton to Threemile Slough, but the modeling used to evaluate the alternative did include the change. Thus, although the percent of days the Emmaton objective was exceeded is high, it is expected that under the alternative it would be similar to the No Action.

Key

Level of significance or effect **before** mitigation
(Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

Bromide - Percent increase (%)	<0	1 - 20	21 - 40	>40
Chloride - % of years objective exceeded (%)	0	1-12	13-19	>20
EC - percent of days objective exceeded (%)	<10	11 - 20	20 - 30	>30
Mercury (CM1) - Percent increase (%)	<10	10 - 20	21 - 50	>50
Mercury (CM2-CM22) - restoration acres	0	1 - 100	25,000	65,000
Organic Carbon (CM1) - mg/L	<0.1	0.1 - 0.5	0.6 - 1.0	>1.0
Organic Carbon (CM2-CM21) - restoration acres	0	1 - 100	25,000	65,000
Selenium - Exceedance Quotient	0.87	0.88 - 0.93	0.94 - 0.99	>1.0
Microcystis - relative rank	1	2	3	4

Level of significance or effect **after** mitigation
(CEQA Finding / NEPA Finding)

CEQA Finding		**NEPA Finding**	
NI	No Impact	B	Beneficial
LTS	Less than significant	NE	No Effect
S	Significant	NA	Not Adverse
SU	Significant and unavoidable	A	Adverse

n/a not applicable
> greater than
< less than
≈ about equal to

Continued on Figure ES-7b

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Figure ES-7a
Comparison of Impacts on Water Quality

Chapter 8 – Water Quality (continued)	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
WQ-14: Mercury(CM2-CM21) - Amount (acres) of new tidal habitat restoration that could contribute additional methylmercury	0	0	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	25,000	65,000	65,000	65,000	65,000	65,000	65,000	59	65	55
		-- [d]	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
WQ-17: Organic Carbon (CM1) - Maximum increase in long-term average DOC (mg/L) at interior Delta locations	--	<0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.2	0.4	0.2	1.2	1.2	1.2	0.8	0.8	0.7	0.2	0.2	0.1
		LTS	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA
WQ-18: Organic Carbon (CM2-CM21) - Amount (acres) of new tidal habitat restoration that could contribute additional DOC	0	0	65,000	65,000	65,000	65,000	65,000	65,000	65,000	65,000	25,000	65,000	65,000	65,000	65,000	65,000	65,000	59	65	55
		-- [d]	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA
WQ-25: Selenium (CM1) - High threshold exceedance quotient for whole body sturgeon (concentration divided by threshold) during drought period	.87	0.87	0.89	0.89	0.89	0.92	0.92	0.92	0.89	0.93	0.89	1.1	1.1	1.1	1.1	1.1	1.2	0.91	0.89	0.90
		LTS	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA
WQ-32 and 33: Microcystis (CM1-CM21) - potential for increased production in Delta [e]	--	2	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	2	2	2
		5	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	LTS/NA	LTS/NA	LTS/NA

Notes

[d] CM2-CM21 are not a component of Existing Conditions or the No Action Alternative, thus, no impact call was made for this effect in the EIR/EIS.

[e] The Microcystis was qualitative. Thus, the severity of the impact was established as a rank from 1 to 4, with the rankings based on the alternative-specific factors that would contribute to increased Microcystis production, including restoration area, diversions of Sacramento River water at the north intakes, and net Delta outflow.

Key

Level of significance or effect **before** mitigation
(Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance →

Bromide - Percent increase (%)	<0	1 - 20	21 - 40	>40
Chloride - % of years objective exceeded (%)	0	1-12	13-19	>20
EC - percent of days objective exceeded (%)	<10	11 - 20	20 - 30	>30
Mercury (CM1) - Percent increase (%)	<10	10 - 20	21 - 50	>50
Mercury (CM2-CM22) - restoration acres	0	1 - 100	25,000	65,000
Organic Carbon (CM1) - mg/L	<0.1	0.1 - 0.5	0.6 - 1.0	>1.0
Organic Carbon (CM2-CM21) - restoration acres	0	1 - 100	25,000	65,000
Selenium - Exceedance Quotient	0.87	0.88 - 0.93	0.94 - 0.99	>1.0
Microcystis - relative rank	1	2	3	4

Level of significance or effect **after** mitigation
(CEQA Finding / NEPA Finding)

CEQA Finding		**NEPA Finding**	
NI	No Impact	B	Beneficial
LTS	Less than significant	NE	No Effect
S	Significant	NA	Not Adverse
SU	Significant and unavoidable	A	Adverse

n/a not applicable
\> greater than
< less than
≈ about equal to

Figure ES-7b
Comparison of Impacts on Water Quality (continued)

Chapter 9 – Geology and Seismology	Alternative																		
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
GEO-3: Loss of Property, Personal Injury, or Death from Ground Settlement during Construction of Water Conveyance Features (number of segments that pose greatest risk of settlement per alternative)	n/a	n/a	2	6	1	2	6	1	2	2	2	2	6	1	2	2	2	2	2	2
	n/a	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

Figure ES-8
Comparison of Impacts on Geology and Seismology

Chapter 10 – Soils	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
SOILS-2: Loss of topsoil from excavation, overcovering, and inundation as a result of constructing the proposed water conveyance facilities (Acres)	n/a	3,618	7,771	21,832	18,039	7,771	21,832	18,039	<7,771	7,590	>7,771	7,771	21,832	18,039	<7,771	<7,771	<7,771	7,590	>7,590	<7,590
	n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
SOILS-7: Loss of Topsoil from Excavation, Overcovering, and Inundation Associated with Restoration Activities as a Result of Implementing the Proposed Conservation Measures (Acres)	n/a	1,352	77,600	77,600	77,600	77,600	77,600	77,600	77,600	77,600	<77,600	77,600	77,600	77,600	87,600	77,600	77,600	1,176	>1,000	≈1,000
	n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure ES-9
Comparison of Impacts on Soils

Chapter 11 – Fish and Aquatic Resources		Alternative																	
		1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
South Delta Entrainment of Adult Delta Smelt (% actual change in fish entrained compared to baseline, % relative change in entrainment compared to baseline)	Existing Condition	-2.3, -30	-2.3, -30	-2.3, -30	-2.2, -29	-2.2, -29	-2.2, -29	-1.2, -15	H1: -1.7, -22 H2: ≈H4 H3: -1.7, -22 H4: -1.8, -24	-0.4, -6	-2.3, -30	-2.3, -30	-2.3, -30	-3, -39	-4, -52	Lowest entrainment of all alternatives (not quantitatively analyzed)	H3:-1.7, -22 H4:-1.8, -23	-2.2, -28	-0.3, -4
	No Action	-2.1, -28	-2.1, -28	-2.1, -28	-2, -27	-2, -27	-2, -27	-1, -13	H1: -1.5, -20 H2: ≈H4 H3: -1.5, -20 H4: -1.6, -22	-0.3, -3	-2.1, -28	-2.1, -28	-2.8, -28	-2.8, -38	-3.8, -51		H3:-1.7, -22 H4:-1.8, -23	-2, -28	-0.3, -4
South Delta Entrainment of Larval/ Juvenile Delta Smelt (% actual change in fish entrained compared to baseline, % relative change in entrainment compared to baseline)	Existing Condition	2.1, 17	2.1, 17	2.1, 17	1.5, 12	1.5, 12	1.5, 12	3.7, 30	H1: 1.8, 15 H2: ≈H4 H3: 1.8, 15 H4: -0.6, -4	2.9, 23	2.1, 17	2.1, 17	2.1, 17	-2.9, -24	-6.1, -50	Lowest entrainment of all alternatives (not quantitatively analyzed)	H3:0.6, 5 H4:-1.7, -14	0.3, 3	1.4, 12
	No Action	-0.3, -2	-0.3, -2	-0.3, -2	-0.8, -5	-0.8, -5	-0.8, -5	1.3, 9	H1: -0.5, -3 H2: ≈H4 H3: -0.5, -3 H4: -2.9, -20	0.6, 4	-0.3, -2	-0.3, -2	-0.3, -2	-5.2, -36	-8.4, -58		H3:-0.4, -3 H4:-2.7, -20	-0.7, -5	0.5, 3
Effects of Water Operations on Rearing Habitat for Delta Smelt (Avg. abiotic habitat index across all years, % change in abiotic habitat index) [a]	Existing Condition	840, 21	840, 21	840, 21	2325, 58	2325, 58	2325, 58	867, 22	H1: 821, 20.6 H2: 821, 20.6 H3: 2335, 59 H4: 2289, 57.5	2264, 57	3302, 83	3302, 83	3302, 83	3037, 76	2325, 58	2109, 53	H3:1150, 29 H4:1184, 30	1133, 28	1036, 26
	No Action	-46, -1	-46, -1	-46, -1	1439, 30	1439, 30	1439, 30	-18, 0	H1: -155, -3 H2: -155, -3 H3: 1449, 30 H4: 1453, 28	1378, 28	2416, 50	2416, 50	2416, 50	2152, 44	1439, 30	1224, 25	H3:99 , 2 H4:132, 3	82, 2	-15, 0
Effects of Water Operations on Spawning, Egg Incubation, and Rearing Habitat for Longfin Smelt (Avg. fall midwater trawl index across all water year types, % change in fall midwater trawl index across all water year types) [b]	Existing Condition	-1,501, -31	-1,501, -31	-1,501, -31	-1665, -32	-1665, -32	-1665, -32	-1724, -33	H1: -2879, -32 H2: -2959, -33 H3: -2959, -33 H4: -2879, -32	-1606, 31	-915, -18	-915, -18	-915, -18	-730, -14	204, 4	-1238, -24	H3:-1502, -17 H4:-622, -7	-1627, -18	-1433, -16
	No Action	-304, -8	-304, -8	-304, -8	-188. -5	-188. -5	-188. -5	-247, -7	H1: 157, 3 H2: 77, 1 H3: 77, 1 H4: 157, 3	-129, -3	561, 15	561, 15	561, 15	747, 20	1680, 46	239, 6	H3: -475, -6 H4: 404, 5	601, -8	-407, -5
Juvenile Winter-Run Chinook Salmon Through-Delta Survival (% raw change in survival rate across all water year types, % relative survival rate across all water year types)	Existing Condition	-1.6, -5	-1.6, -5	-1.6, -5	-1.9, -5	-1.9, -5	-1.9, -5	-1.4, -4	H1: -1.6, 5 H2: ≈H4 H3: -1.6, 5 H4: -1.6, 5	-1.2, -3	-1.3, -4	-1.3, -4	-1.3, -4	-1.6, -4	-1.4, -4	1.5, 4	H3: -2.1, -6 H4: -1.7, -5	-2.1, -7	-1.4, -4
	No Action	-0.9, -3	-0.9, -3	-0.9, -3	-1.2, -4	-1.2, -4	-1.2, -4	-0.7, -2	H1: -0.9, -3 H2: ≈H4 H3: -1, -3 H4: -0.9, -3	-0.6, -2	-0.7, -2	-0.7, -2	-0.7, -2	-0.9, -3	-0.8, -2	1.9, 6	H3: -2.0, -6 H4: 1.7, -5	-1.6, -5	-0.9, -3

Notes

[a] For more information on abiotic habitat, see Table 11-15 in Section 11.3.2, Methods for Analysis.

[b] The fall midwater trawl is an annual fish sampling survey conducted in the upper estuary during September through December by the California Department of Fish and Wildlife. Abundance indices are calculated from survey results for several pelagic species, including delta smelt, longfin smelt, threadfin shad, American shad, splittail and Age-0 striped bass.

Figure ES-10
Comparison of Impacts on Fish and Aquatic Resources

Chapter 11 – Fish and Aquatic Resources (continued)		Alternative																	
		1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
Juvenile Spring-Run Chinook Salmon Through-Delta Survival (% raw change in survival rate across all water year types, % relative survival rate across all water year types)	Existing Condition	-1.9, -5	-1.9, -5	-1.9, -5	-2.3, -7	-2.3, -7	-2.3, -7	-1.8, -6	H1: -2.2, -7 H2: ≈H4 H3: -2.2, -7 H4: -0.6, -2	-1.6, -5	-2.3, -7	-2.3, -7	-2.3, -7	-2.3, -7	-0.9, -3	1.4, 4	H3: -2.5,-8 H4: -0.7, -2.2	-2.5, -7	-1.8, -5
	No Action	-1.0, -2	-1.0, -2	-1.0, -2	-1.4, -5	-1.4, -5	-1.4, -5	-0.9, -3	H1: -1.2, -4 H2: ≈H4 H3: -1.3, -4 H4: 0.4, 1	-0.6, -2	-1.4, -5	-1.4, -5	-1.4, -5	-1.4, -5	0, 0	2.3, 8	H3: -2.5,-8 H4: -0.7, -2.2	-1.9, -6	-1.2, -4
Juvenile Sac. R. Fall-Run Chinook Salmon Through-Delta Survival (% raw change in survival rate across all water year types, % relative survival rate across all water year types)	Existing Condition	-1.4, -6	-1.4, -6	-1.4, -6	-1.5, -6	-1.5, -6	-1.5, -6	-1.2, -5	H1: -1.4, -6 H2: ≈H4 H3: -1.4, -1 H4: -0.3, -1	-1.2, -4	-1.9, -7	-1.9, -7	-1.9, -7	-2, -8	-0.9, -4	2.3, 9	H3: -1.5,-6 H4: -0.1, -0.4	-4.3, -12	0, 2
	No Action	-0.3, -1	-0.3, -1	-0.3, -1	-0.3, -1	-0.3, -1	-0.3, -1	-0.1, <-1	H1: -0.3, -1 H2: ≈H4 H3: -0.2, -1 H4: 0.8, 3	0, 0	-0.8, -3	-0.8, -3	-0.8, -3	-0.8, -3	0.2, 1	3.4, 14	H3: -1.5,-6 H4: 0.1, -0.4	-2.8, -8	-0.3, 0
Upstream flow and temperature-related effects to winter-run Chinook salmon [c]	(vs. NAA)																		
	(vs. EC)																		
	CEQA/NEPA finding (spawning, rearing, migration)	S/A, S/A, S/A	S/A, S/A, S/A	S/A, S/A, S/A	S/A, LTS/NA, S/A	S/A, LTS/NA, S/A	S/A, LTS/NA, S/A	S/A, S/A LTS/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, S/A, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	S/A, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA
Upstream flow and temperature-related effects to spring-run Chinook salmon	(vs. NAA)																		
	(vs. EC)																		
	CEQA/NEPA finding (spawning, rearing, migration)	S/A, LTS/NA, S/A	S/A, LTS/NA, S/A	S/A, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	S/A, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, S/A, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA

Notes

[c] Upstream effects are based on the combination of all analyses of impacts to spawning, rearing, and migration. As such, this summary cannot conform to the format for in-Delta results and is, therefore, presented differently here.

Figure ES-10
Comparison of Impacts on Fish and Aquatic Resources (continued)

Chapter 11 – Fish and Aquatic Resources (continued)		Alternative																	
		1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
Upstream flow and temperature-related effects to steelhead	(vs. NAA)																		
	(vs. EC)																		
	CEQA/NEPA finding (spawning, rearing, migration)	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, S/A, S/A	LTS/NA, S/A, S/A	LTS/NA, S/A, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, S/A, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, S/A, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA
Upstream flow and temperature-related effects to green sturgeon	(vs. NAA)																		
	(vs. EC)																		
	CEQA/NEPA finding (spawning, rearing, migration)	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, S/A	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA	LTS/NA, LTS/NA, LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-10
Comparison of Impacts on Fish and Aquatic Resources (continued)

Chapter 12 – Terrestrial Biological Resources		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
Direct Effects of Alternatives on Natural Communities and Cultivated Lands in the Terrestrial Biological Resources Study Area	**BIO-6:** Tidal Freshwater Emergent Wetland (total acres)	n/a	n/a	21	28	10	20	33	10	18	20	18	21	28	10	20	20	194	1	1	1
		n/a	S/A (longterm)	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
	BIO-9: Valley/Foothill Riparian (total acres)	n/a	n/a	893	897	933	897	914	933	883	868	882	893	897	933	890	890	1,116	48	55	42
		n/a	S/A (longterm)	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	LTS/NA	LTS/NA	LTS/NA
	BIO-15: Nontidal Freshwater Perennial Emergent Wetland (total acres)	n/a	n/a	127	136	130	127	137	130	127	131	127	127	136	130	127	127	150	3	3	3
		n/a	S/A (longterm)	B/B, LTS/NA	B/B, LTS/NA	B/B, LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
	BIO-21: Vernal Pool Complex (total acres)	n/a	n/a	375	376	438	375	376	438	375	394	375	375	376	438	375	375	372	44	44	44
		n/a	S/A (longterm), NI/NE	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
BIO-176: Fill of Wetlands and Other Waters of the United States from Construction of Water Conveyance Facilities (total acres)		n/a	n/a	426	803	799	449	855	799	376	698	355	426	803	799	390	390	1,004	698	827	750
		n/a	S/A (longterm)	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

≤9 | 10-14 | 15-19 | ≥20

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-11
Comparison of Impacts on Terrestrial Biological Resources

Chapter 13 – Land Use	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
LU-1: Incompatibility with Applicable Land Use Designations, Goals, and Policies as a Result of Constructing the Proposed Water Conveyance Facility (Total acres)	n/a	n/a	7,160	21,992	17,362	7,695	22,552	17,362	6,557	7,957	6,352	7,160	21,992	17,362	< 1A	< 1A	4,884	7,957	8,064	7,303
	n/a	n/a	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE	NI/NE
LU-2: Conflicts with existing land uses as a result of constructing the proposed water conveyance facility (CM1) (Estimated total conflicts with existing structures)	n/a	n/a	207	412	726	225	434	726	147	76	126	207	409	726	146	146	255	76	114	61
	n/a	n/a	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
\> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

Figure ES-12
Comparison of Impacts on Land Use

Chapter 14 – Agricultural Resources		Alternative																			
		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
AG-1: Temporary conversion, short-term conversion, and permanent conversion of Important Farmland or of farmland under Williamson Act contracts or in Farmland Security Zones as a result of constructing the proposed water conveyence facility.	Temporary and Short-term Conversion of Important Farmland (Acres)	n/a	40	1,329	2,144	3,170	1,826	2,669	3,170	953	1,495	833	1,329	2,144	3,170	1,105	1,105	559	1,495	981	902
		n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
	Permanent Conversion of Important Farmland (Acres)	n/a	65	4,984	18,875	13,014	4,992	18,868	13,019	4,838	3,909	4,770	4,984	18,875	13,014	4,883	4,883	2,459	3,909	4,040	3,452
		n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
	Temporary and Short-term Conversion of Williamson Act and Farmland Security Zone (Acres)	n/a	415	787	1,326	1,243	1,272	1,877	1,243	722	1,132	632	787	1,326	1,243	744	744	790	1,132	657	617
		n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
	Permanent Conversion of Williamson Act and Farmland Security Zone (Acres)	n/a	30	2,857	14,080	7,647	2,910	14,125	7,646	2,813	2,035	2,753	2,857	14,080	7,647	2,847	2,847	2,347	2,035	1994	1,836
		n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure ES-13
Comparison of Impacts on Agricultural Resources

Chapter 15 – Recreation	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
REC-1: Permanent displacement of existing well-established public use or private commercial recreation facility available for public access as a result of the location of the proposed water conveyence facilities (Number of sites)	n/a	n/a	0	3	0	0	0	0	0	2	0	0	3	0	0	0	6	2	2	2
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	SU/A	LTS/NA	LTS/NA	LTS/NA
REC-2: Result in long-term reduction of recreation opportunities and experiences as a result of constructing the proposed water conveyence facilities (Number of sites)	n/a	--	7	18	11	7	18	11	5	8	7	7	18	11	8	8	3	8	8	8
	n/a	LTS/NA	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-14
Comparison of Impacts on Recreation

Chapter 16 – Socioeconomics		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
				Alternative																	
ECON-1: Temporary effects on regional economics and employment in the Delta region during construction of the proposed water conveyance facilities.	Total FTE jobs during construction (peak year)	n/a	n/a	12,716	12,985	11,698	≈Alt1A	≈Alt1B	≈Alt1C	10,297	8,673	5,073	≈Alt1A	≈Alt1B	≈Alt1C	11,018	11,018	6,371	8,673	9,818	7,528
	Total FTE jobs - Agriculture (over 14-year construction period)	n/a	n/a	-100	-340	-240	-100	-340	-240	-88	-47	-83	-100	-340	-240	-94	-94	-38	-47	-44	-37
		n/a	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
ECON-6: Effects on agricultural economics in the Delta region during construction of the proposed water conveyance facilities.	Total Crop Acreage Change from EC and NAA during Construction (thousand acres)	n/a	n/a	-5.6	-19.6	-14.3	-5.6	-19.6	-14.3	-5.1	-4.7	-5	-5.6	-19.6	-14.3	-5.3	-5.3	-2.6	-4.7	-4.9	-4.3
		n/a	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
ECON-7: Permanent regional economic and employment effects in the Delta region during operation and maintenance of the proposed water conveyance facilities.	Total FTE jobs during Operations and Maintenance	n/a	n/a	269	294	269	269	294	269	269	183	269	269	294	269	269	269	177	183	183	183
	Total FTE jobs - Agriculture during Operations and Maintenance	n/a	n/a	-86	321	-216	-86	-321	-216	-86	-39	-86	-86	-321	-216	-86	-86	-36	-39	-39	-39
		n/a	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
ECON-12: Permanent effects on agricultural economics in the Delta region during operation and maintenance of the proposed water conveyance facilities.	Total Crop Acreage Change from EC and NAA during Operation (thousand acres)	n/a	n/a	-4.4	-17.7	-11.7	-4.4	-17.7	-11.7	-4.3	-3.4	-4.3	-4.4	-17.7	-11.7	-4.4	-4.4	-2.3	-3.4	-3.4	-3.4
		n/a	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation
(Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation
(CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

00139.14 EIR-EIS Ex Summ 1-20-2016 (tm)

Figure ES-15
Comparison of Impacts on Socioeconomics

Chapter 17 – Aesthetics and Visual Resources		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
				Alternative																	
AES-2, 3, and 4: Permanent impacts after construction is complete.	Overall number of Very Noticeable effect on viewers	n/a	n/a	16	14	13	16	14	13	16	10	16	16	14	13	16	16	6	10	13	6
	Overall number of Noticeable effect on viewers	n/a	n/a	1	1	1	1	1	1	1	0	1	1	1	1	1	1	7	0	0	0
	Overall number of Moderately Noticeable effect on viewers	n/a	n/a	3	1	0	3	1	0	3	2	3	3	1	0	3	3	0	2	2	2
	Overall number of Minimally Noticeable effect on viewers	n/a	n/a	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
		n/a	LTS/NA	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
AES-5: Substantial alteration in existing visual quality or character during operation.		n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure ES-16
Comparison of Impacts on Aesthetics and Visual Resources

Chapter 18 – Cultural Resources		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
		Alternative																			
CUL-1: Effects on Known Archaeological Sites	Number of sites affected	0	--	7	17	12	6	16	12	6	10	5	7	17	12	6	6	4	10	10	7
	Total acreage of each alternative with high potential for buried archaeological sites (acres)	0	--	9,176	22,163	18,482	9,947	23,007	18,487	8,483	10,865	8,274	9,176	22,163	18,482	8,699	8,699	4,875	10,865	10,010	8,829
		n/a	A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
CUL-5: Effects on Historic Structures (Number of structures affected)		0	--	24	24	22	24	24	22	20	10	17	24	24	24	19	19	13	10	10	10
		n/a	A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A

Key

Quantifiable impact (number of sites, structures, acres, etc. affected)

Increasing level of quantifiable impacts

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-17
Comparison of Impacts on Cultural Resources

Chapter 19 – Transportation		Alternative																			
		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
TRANS-1: Increased construction vehicle trips resulting in unacceptable LOS conditions (Number of roadway segments with unacceptable LOS conditions)		n/a	n/a	47	48	56	47	48	56	47	38	47	47	48	56	47	47	56	38	45	33
		n/a	n/a	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
TRANS-2: Increased construction vehicle trips exacerbating unacceptable pavement conditions (Number of segments that could experience substantial pavement condition effects)		n/a	n/a	46	48	43	46	48	43	46	46	46	46	48	43	46	46	42	46	41	42
		n/a	n/a	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
TRANS-4: Disruption of marine traffic during construction	Number of barge unloading facilities	n/a	n/a	6	1	2	6	1	2	6	7	6	6	1	2	6	6	7	7	7	7
	Number of barge trips	n/a[a]	n/a	n/a[a]	n/a[a]	n/a[a]	n/a[a]	n/a[a]	n/a[a]	n/a[a]	11,800	n/a[a]	n/a[a]	n/a[a]	n/a[a]	n/a[a]	n/a[a]	n/a[a]	11,800	11,800	11,800
		n/a	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
TRANS-10: Increased traffic volumes during implementation of CM2-CM22 (Number of roadways estimated to be affected)		n/a	n/a	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	<15	<15	<15
		n/a	n/a	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A

[a] Tugboats and barges would be used during construction of the Clifton Court forebay, intakes, tunnel reaches 6 and 7, and the combined pumping plant, as applicable.

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
\> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-18
Comparison of Impacts on Transportation

Chapter 20 – Public Services and Utilities		Alternative																			
		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
UT-6: Effects on regional or local utilities as a result of constructing the proposed water conveyance facilities.	Number of transmission lines, pipelines, aqueducts, or wells interfered	n/a	0	29	28	33	29	28	34	29	30	29	29	28	33	29	29	6	30	30	30
	Miles of agricultural canals affected	n/a	0	38	136	124	41	138	124	38	43	37	38	136	124	38	38	27	43	43	43
		n/a	LTS/NA	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding

NI	No Impact
LTS	Less than significant
S	Significant
SU	Significant and unavoidable

NEPA Finding

B	Beneficial
NE	No Effect
NA	Not Adverse
A	Adverse

00139.14 EIR-EIS Ex Summ 1-20-2016 (tm)

Figure ES-19
Comparison of Impacts on Public Services and Utilities

Chapter 21 – Energy	Alternative																				
	Existing Condition	No Action ELT	No Action LLT	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
ENG-1: Total electric energy use for construction (GWh)	n/a	0	0	1,428	407	791	1,428	407	791	1,321	H1: 2,132 H2: 2,132 H3: 2,132 H4: 2,132	730	1,428	407	791	1,357	1,357	186	2,132	2,148	2,116
	n/a		LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
ENG-2: Total electric energy use for Conveyance (GWh/yr)	n/a	0	0	291	176	297	328	190	322	122	H1: 62 H2: 54 H3: 61 H4: 54	78	421	244	413	193	185	18	61	107	26
	n/a		LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

00139.14 EIR-EIS Ex Summ 1-20-2016 (tm)

Figure ES-20
Comparison of Impacts on Energy

Chapter 22 – Air Quality	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
AQ-1: Generation of criteria pollutants in excess of the **SMAQMD** regional thresholds during construction of the proposed water conveyance facility (Max Daily NOx emissions from any year, lb/day)	n/a	n/a	4,992	3,652	684	4,992	3,652	684	2,920	1,273	2,231	4,992	3,652	684	3,529	3,529	4,980	1,273	3,573	1,230
	n/a	S/A	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-2: Generation of criteria pollutants in excess of the **YSAQMD** regional thresholds during construction of the proposed water conveyance facility (Max Daily NOx emissions from any year, lb/day)	n/a	n/a	454	447	3,620	454	447	3,620	225	174	142	454	447	3,620	292	292	n/a	174	224	124
	n/a	S/A	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-3: Generation of criteria pollutants in excess of the **BAAQMD** regional thresholds during construction of the proposed water conveyance facility (Max Daily NOx emissions from any year, lb/day)	n/a	n/a	1,174	932	3,619	1,174	932	3,619	960	1,700	909	1,174	932	3,619	927	927	1,424	1,700	1,728	1,671
	n/a	S/A	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-4: Generation of criteria pollutants in excess of the **SJVAPCD** regional thresholds during construction of the proposed water conveyance facility (Max Yearly NOx emissions from any year, tons/year) *	n/a	n/a	217	327	n/a	217	217	217	171	112	168	217	217	n/a	190	190	69	112	112	112
	n/a	S/A	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-9: Exposure of Sensitive Receptors to Health Hazards from Localized Particulate Matter in Excess of SMAQMD's HealthBased Concentration Thresholds (PM10 Annual/24-hr; PM2.5 Annual/24-hr)	n/a	n/a	0.5/11 0.09/1.7	0.5/21.1 0.1/3.5	0.13/6.7 0.02/1.13	0.5/11 0.09/1.7	0.5/21.1 0.1/3.5	0.13/6.7 0.02/1.13	<0.5/11 <0.09/1.7	0.4/3.2 0.06/0.52	<0.5/11 <0.09/1.7	0.5/11 0.09/1.7	0.5/21.1 0.1/3.5	0.13/6.7 0.02/1.13	<0.5/11 <0.09/1.7	<0.5/11 <0.09/1.7	2.9/131 0.45/21	0.4/3.2 0.06/0.52	<0.5/11 <0.09/1.7	<0.4/3.2 <0.06/0.52
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

* SJVAPCD is listed in tons/year rather than lbs/day because SJVAPCD requires analyses based on a yearly duration, while the other air districts require a daily duration.

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
\> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

Continued on Figure 21-b
See Figure 21-c for Key

Figure ES-21a
Comparison of Impacts on Air Quality

Chapter 22 – Air Quality (continued)	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
AQ-10: Exposure of Sensitive Receptors to Health Hazards from Localized Particulate Matter in Excess of YSAQMD's HealthBased Concentration Thresholds (PM10 Annual/24-hr; PM2.5 Annual/24-hr)	n/a	n/a	0.3/7 0.04/1	0.2/6.6 v0.03/1.1	0.55/8.7 0.08/1.4	0.3/7 0.04/1	0.2/6.6 0.03/1.1	0.55/8.7 0.08/1.4	<0.3/7 <0.04/1	0.6/2.5 0.01/0.4	<0.3/7 <0.04/1	0.3/7 0.04/1	0.2/6.6 0.03/1.1	0.55/8.7 0.08/1.4	<0.3/7 <0.04/1	<0.3/7 <0.04/1	n/a	0.6/2.5 0.01/0.4	<0.3/7 <0.04/1	<0.6/2.5 <0.01/0.4
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-11: Exposure of Sensitive Receptors to Health Hazards from Localized Particulate Matter in Excess of BAAQMD's HealthBased Concentration Thresholds (PM10 Annual/24-hr; PM2.5 Annual/24-hr)	n/a	n/a	0.33/31 0.07/6	0.2/53 0.04/9	1.1/108 0.2/19	0.33/31 0.07/6	0.2/53 0.04/9	1.1/108 0.2/19	<0.33/31 <0.07/6	0.21/37 0.04/6	<0.33/31 <0.07/6	0.33/31 0.07/6	0.2/53 0.04/9	1.1/108 0.2/19	<0.33/31 <0.07/6	<0.33/31 <0.07/6	0.2/18 0.05/4	0.21/37 0.04/6	0.21/37 0.04/6	0.21/37 0.04/6
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-12: Exposure of Sensitive Receptors to Health Hazards from Localized Particulate Matter in Excess of SJVAPCD's HealthBased Concentration Thresholds (PM10 Annual/24-hr; PM2.5 Annual/24-hr)	n/a	n/a	0.1/37.1 0.07/6.1	0.7/88 0.1/13	n/a	0.1/37.1 0.07/6.1	0.7/88 0.1/13	n/a	<0.1/37.1 <0.07/6.1	0.09/6.9 0.02/1.1	<0.1/37.1 <0.07/6.1	0.1/37.1 0.07/6.1	0.7/88 0.1/13	n/a	<0.1/37.1 <0.07/6.1	<0.1/37.1 <0.07/6.1	0.11/25.8 0.02/18.3	0.09/6.9 0.02/1.1	0.09/6.9 0.02/1.1	0.09/6.9 0.02/1.1
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-14: Exposure of Sensitive Receptors to Health Hazards from Diesel Particulate Matter in Excess of SMAQMD's Chronic NonCancer and Cancer Risk Thresholds (Chronic Health Hazard/Cancer Health Risk Max Values)	n/a	n/a	0.003/9	0.003/9	0.001/3	0.003/9	0.003/9	0.001/3	<0.003/9	0.001/5	<0.003/9	0.003/9	0.003/9	0.001/3	<0.003/9	<0.003/9	0.019/57	0.001/5	0.001/5	<0.001/5
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

- n/a not applicable
- > greater than
- < less than
- ≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding

- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding

- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

Continued on Figure 21-c
See Figure 21-c for Key

00139.14 EIR-EIS Ex Summ 1-27-2016 (tm)

Figure ES-21b
Comparison of Impacts on Air Quality (continued)

Chapter 22 – Air Quality (continued)	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
AQ-15: Exposure of Sensitive Receptors to Health Hazards from Diesel Particulate Matter in Excess of **YSAQMD's** Chronic NonCancer and Cancer Risk Thresholds (Chronic Health Hazard/Cancer Health Risk Max Values)	n/a	n/a	0.002/5	0.0014/4	0.003/9	0.002/5	0.0014/4	0.003/9	<0.002/5	0.0003/1	<0.002/5	0.002/5	0.0014/4	0.003/9	<0.002/5	<0.002/5	n/a	0.0003/1	0.0003/1	<0.0003/1
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
AQ-16: Exposure of Sensitive Receptors to Health Hazards from Diesel Particulate Matter in Excess of **BAAQMD's** Chronic NonCancer and Cancer Risk Thresholds (Chronic Health Hazard/Cancer Health Risk Max Values)	n/a	n/a	0.004/13	0.0017/5	0.006/18	0.004/13	0.0017/5	0.006/18	<0.004/13	0.001/5	<0.004/13	0.004/13	0.0017/5	0.006/18	<0.004/13	<0.004/13	0.019/57	0.001/5	0.001/5	0.001/5
	n/a	LTS/NA	SU/A	LTS/NA	SU/A	SU/A	LTS/NA	SU/A	SU/A	LTS/NA	SU/A	SU/A	LTS/NA	SU/A	SU/A	SU/A	LTS/NA	LTS/NA	SU/A	SU/A
AQ-17: Exposure of Sensitive Receptors to Health Hazards from Diesel Particulate Matter in Excess of **SJVAPCD's** Chronic NonCancer and Cancer Risk Thresholds (Chronic Health Hazard/Cancer Health Risk Max Values)	n/a	n/a	0.001/3	0.004/15	0.006/18	0.001/3	0.004/15	n/a	<0.001/3	0.0008/3	< 0.001/3	0.004/15	0.006/18	n/a	<0.001/3	<0.001/3	0.003/11	0.0008/3	0.0008/3	0.0008/3
	n/a	LTS/NA	LTS/NA	SU/A	LTS/NA	LTS/NA	SU/A	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	SU/A	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-21c
Comparison of Impacts on Air Quality (continued)

Chapter 23 – Noise		Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
		Alternative																			
NOI-1: Exposure of Noise-Sensitive Land Uses to Noise from Construction of Conveyance Facilities (County: Number of residential parcels affected daytime/nighttime)	Intakes:	n/a	n/a	S:121/121 Y: 4/98	S:120/120 Y: 4/98	S: 48/122 Y: 15/107	S: 3/112 Y: 4/98	S: 3/112 Y: 4/98	S: 48/122 Y: 15/107	Y: 4/98	S: 87/106 Y: 27/71	0	S:121/121 Y: 4/98	S:120/120 Y: 4/98	S: 48/122 Y: 15/107	S:3/112 Y: 4/98	S:3/112 Y: 4/98	S:197/234 SJ: 15/18	S:87/106 Y: 27/71	S:121/121 Y: 27/71	S:121/121 Y: 27/71
	Conveyance Facilities:	n/a	n/a	S:121/121 Y: 4/98	S: 99/99 Y: 21/125 SJ: 9/26	S: 27/107 Y: 23/129 CC: 1,098 /2,851	S: 105/121 Y: 0/89 SJ: 9/18	S: 100/100 Y: 21/125 SJ: 9/26	S: 27/107 Y: 23/129 CC: 1,098 /2,851	S: 116/119 Y: 0/89 SJ: 9/18	S: 118/120 Y: 10/105 SJ: 8/18	S: 116/119 Y: 0/89 SJ: 9/18	S: 116/119 Y: 0/89 SJ: 9/18	S: 99/99 Y: 21/125 SJ: 9/26	S: 27/107 Y: 23/129 CC: 1,098 /2,851	S:116/119 Y: 0/89 SJ: 9/18	S:116/119 Y: 0/89 SJ: 9/18	S:197/234 SJ: 15/18	S:118/120 Y: 10/105 SJ: 8/18	S:119/120 Y: 11/95 SJ: 8/18	S:119/121 Y: 11/95 SJ: 8/18
		n/a	LTS/NA	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A
NOI-2: Land Use Affected by Vibrations from Pile Driving During Construction of Intakes (County: Number of residential parcels affected)		n/a	n/a	S: 88 Y: 1 SJ: 13	S: 80 Y: 1 SJ: 4	S: 1 Y: 85 So: 2	S: 79 Y: 1 SJ: 13	S: 76 Y: 1 SJ: 4	S: 1 Y: 85 SJ: 2	S: 41 Y: 1 SJ: 13	S: 62 SJ: 7 CC: 1	S: 28 Y: 1 SJ: 13	S: 88 Y: 1 SJ: 13	S: 80 Y: 1 SJ: 4	S: 1 Y: 85 So: 2	S: 40 SJ: 13	S: 88 Y: 1 SJ: 13	0	S: 62 SJ: 7 CC: 1	S: 75 SJ: 3 CC: 1	S: 24 SJ: 7 CC: 1
		n/a	LTS/NA	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	LTS/NA	SU/A	SU/A	SU/A
NOI-3: Land Use Affected by Noise from Operation of Pumping Plants (County, Number of residential parcels affected daytime/nighttime)		n/a	n/a	S:108/121	S:108/121	S:2/71 Y: 0/6	0	0	S: 2/71 Y: 0/6	0	0	0	S:108/121	S:108/121	S: 2/71 Y: 0/6	0	0	0	0	0	0
		n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a	not applicable
>	greater than
<	less than
≈	about equal to

CC	Contra Costa County
S	Sacramento County
SJ	San Joaquin County
So	Solano County
Y	Yolo County

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding

NI	No Impact
LTS	Less than significant
S	Significant
SU	Significant and unavoidable

NEPA Finding

B	Beneficial
NE	No Effect
NA	Not Adverse
A	Adverse

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Figure ES-22
Comparison of Noise Impacts

Chapter 24 – Hazards and Hazardous Materials	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
HAZ-3: Potential to conflict with a known hazardous materials site and, as a result, create a significant hazard to the public or environment (Number of sites of concern within 0.5 miles of conveyance alignment)	n/a	n/a	4	9	9	4	9	9	4	3	4	4	9	9	4	4	4	3	3	3
	n/a	LTS/NA	NI/NE	LTS/NA	LTS/NA	NI/NE	LTS/NA	LTS/NA	NI/NE	NI/NE	NI/NE	NI/NE	LTS/NA	LTS/NA	NI/NE	NI/NE	LTS/NA	NI/NE	NI/NE	NI/NE

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-23
Comparison of Impacts on Hazards and Hazardous Materials

Chapter 25 – Public Health	Existing Condition	No Action	Alternative 1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
PH-1: Increase in surface water in Plan Area that could result in increase in vector-borne diseases as a result of construction and operation of the water conveyance facilities (Number of lagoons/basins/forebays/ inundation areas)	n/a	0	28	26	26	23	21	26	11	24	7	23	26	26	15	18	0	24	26	22
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA
PH-5: Increase in surface water in Plan Area that could result in increase in vector-borne diseases as a result of implementing CM2-CM7, CM10 and CM11 (Acres of restoration)	n/a	0	83,839	83,839	83,839	83,839	83,839	83,839	83,839	83,839	43,839	83,839	83,839	83,839	93,839	83,839	83,839	15836	18,097	15,516
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

00139.14 EIR-EIS Ex Summ 1-20-2016 (tm)

Figure ES-24
Comparison of Impacts on Public Health

Chapter 26 – Mineral Resources	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
MIN-2: Loss of availability of extraction potential from natural gas fields as a result of constructing the water conveyance facilities (Number of acres of non-abandoned natural gas field affected)	n/a	0	296	924	880	296	924	880	296	352	296	296	924	880	296	296	32	352	352	352
	n/a	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA	LTS/NA

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

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Figure ES-25
Comparison of Impacts on Minerals

Chapter 27 – Paleontological Resources	Alternative																			
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
PALEO-1: Amount of excavation that could potentially result in the destruction of unique or significant paleontological resources as a result of construction of water conveyance facilities (thousand cubic yards of material excavated for borrow, tunnels, and canals)	n/a	n/a	28,197	238,902	228,660	28,197	238,902	228,660	<28,197	56,000	<28,197	28,197	238,902	228,660	56,000	56,000	4,608	56,000	>56,000	<56,000
	n/a	S/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	SU/A	LTS/NA	SU/A	SU/A	SU/A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
NI No Impact
LTS Less than significant
S Significant
SU Significant and unavoidable

NEPA Finding
B Beneficial
NE No Effect
NA Not Adverse
A Adverse

Figure ES-26
Comparison of Impacts on Paleontological Resources

Chapter 28 – Environmental Justice	Alternative																	
	Existing Condition	No Action	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
Number of impacts that could potentially result in adverse EJ effects	0	2	20	20	19	20	21	19	18	22	18	19	22	20	22	21	19	18	20	19
	n/a	n/a	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Key

Level of significance or effect **before** mitigation (Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a not applicable
> greater than
< less than
≈ about equal to

Level of significance or effect **after** mitigation (CEQA Finding / NEPA Finding)

CEQA Finding
- NI No Impact
- LTS Less than significant
- S Significant
- SU Significant and unavoidable

NEPA Finding
- B Beneficial
- NE No Effect
- NA Not Adverse
- A Adverse

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Figure ES-27
Comparison of Impacts on Environmental Justice

Chapter 30 – Growth	Alternative																				
	Existing Conditons Deliveries (TAF/yr)	No Action Alternative (ELT) Deliveries (TAF/yr)	No Action Alternative (LLT) Deliveries (TAF/yr)	1A	1B	1C	2A	2B	2C	3	4	5	6A	6B	6C	7	8	9	4A	2D	5A
Change in south-of-Delta CVP/SWP water deliveries that could remove obstacles to growth in comparison to Existing Conditions	4,940	n/a	n/a	338	338	338	-48	-48	-48	253	H1: 138 H2: -376 H3: -164 H4: -671	-304	-1274	-1274	-1274	-1256	-1879	-704	-157	247	97
Change in south-of-Delta CVP/SWP water deliveries that could remove obstacles to growth in comparison to No Action Alternative (ELT or LLT)	n/a	4,690	4,290	988	988	988	602	602	602	903	H1: 788 H2: 274 H3: 486 H4: -21	346	-624	-624	-624	-606	-1229	-54	93	497	347

Key

Level of significance or effect **before** mitigation
(Quantity of impact: number of sites, structures, acres, etc. affected)

Increasing level of significance

n/a	not applicable
>	greater than
<	less than
≈	about equal to

Level of significance or effect **after** mitigation
(CEQA Finding / NEPA Finding)

CEQA Finding

NI	No Impact
LTS	Less than significant
S	Significant
SU	Significant and unavoidable

NEPA Finding

B	Beneficial
NE	No Effect
NA	Not Adverse
A	Adverse

Figure ES-28
Comparison of Impacts on Growth