

35. Cumulative Impacts

35.1 Introduction

Cumulative impacts are defined in the California Environmental Quality Act (CEQA) *CEQA Guidelines* Section 15355(b) as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.” *CEQA Guidelines* Section 15130 (a) also defines a cumulative impact as “the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time.”

Cumulative impacts are defined under the National Environmental Policy Act (NEPA) (40 *Code of Federal Regulations* 1508.7) as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.” Similar to cumulative impacts evaluated under CEQA, cumulative impacts result from incremental increases in environmental impacts added to the impacts of other past, present, and future projects or policies. This chapter presents the methodology used to evaluate cumulative effects, lists related projects and describes their relationship to the Sites Reservoir Project (Project), identifies cumulative impacts by resource area, and recommends measures to mitigate potentially significant cumulative effects.

The methodology used to identify and evaluate cumulative impacts in this Environmental Impact Report/Environmental Impact Statement (EIR/EIS) was based upon both CEQA and NEPA requirements. A cumulative impact was considered to be a change in the physical environment that would result from the combined implementation of the action alternatives with other projects that would cause related impacts. Cumulative impacts within the Extended, Secondary, and Primary study areas were identified based on (1) information extracted from existing environmental documents or studies for the resource categories potentially affected by each project, (2) investigation of future project plans by other State and federal agencies and private entities, and (3) knowledge of expected effects of similar projects.

The cumulative analysis followed applicable guidance provided by the Council on Environmental Quality guidance for Considering Cumulative Effects under NEPA (Council on Environmental Quality [CEQ], 1997), Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005), Bureau of Reclamation’s (Reclamation’s) NEPA Handbook (Reclamation, 2012), and *CEQA Guidelines*. Based on these resources, the following elements were determined necessary to provide an adequate discussion of potentially significant cumulative impacts:

1. Either (a) a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or (b) a summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect.
2. When utilizing a list, factors to consider when determining whether to include a related project should include the nature of each environmental resource being examined, the location of the project and its type.

3. A definition of the geographic scope of the area affected by the cumulative effect and a reasonable explanation for the geographic limitation used.
4. A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available,
5. A reasonable analysis of the cumulative impacts of the relevant projects, including examining reasonable, feasible options for mitigating or avoiding the project's contribution to any potentially significant cumulative effects.

This cumulative impact assessment is based upon the list approach; on considered projects and programs (“projects”) past, current, and reasonably certain projects included in the assumptions for the Existing Conditions/No Project/No Action Condition; and reasonably foreseeable and probable projects that are not certain to be implemented. The criterion for considering whether a project was reasonably foreseeable and probable was whether a project had been defined in adequate detail based upon publicly available preliminary evaluations, feasibility studies, or draft environmental and engineering documents. Information from these publicly available documents were used to estimate potential impacts. Projects that were only in the development phase without detailed descriptions, operations criteria, or general locations were not considered in the cumulative impact analysis.

35.2 Cumulative Project Selection

As discussed above, the list approach was used to define the basis for the cumulative impact analysis within the Extended, Secondary, and Primary study areas. Past and current projects and reasonably certain projects are included in the Existing Conditions/No Project/No Action Condition and all action alternatives. The future reasonably foreseeable and probable projects are defined in the cumulative impact analysis. Information was obtained from federal, state, and local water resources studies and environmental documentation. Reasonably foreseeable and probable projects that would result in impacts to resources not affected by the action alternatives were not included in the cumulative impact analysis. For example, the action alternatives would not change the environment within Solano County lands. Therefore, the cumulative impact analysis did not consider changes that would occur under the Solano County Multi-Species Habitat Conservation Plan (HCP).

35.2.1 Program List of Related and Reasonably Foreseeable Projects and Actions

Projects considered for the cumulative impact analysis are listed in Table 35-1 and briefly described below. The projects and actions are organized in the following order:

- Water resources projects and actions that are located in or affect water uses and water resources in the Extended and Secondary study areas
- Water supply, water quality, and hydropower projects and actions in the Secondary and Primary study areas (organized geographically from north to south)
- Ecosystem improvement projects and actions in the Secondary and Primary study areas (organized geographically from north to south)

**Table 35-1
Present and Reasonably Foreseeable Future Actions Included in the Cumulative Impacts Analysis, by Resource Area**

	Surface Water Resources and Surface Water Quality	Fluvial Geomorphology and Riparian Habitat	Flood Control and Management	Groundwater Resources and Quality	Aquatic Biological Resources	Botanical Resources	Terrestrial Biological Resources	Wetlands and Other Waters of the U.S.	Geology, Minerals, Soils, and Paleontology	Faults and Seismicity	Cultural Resources	Indian Trust Assets	Land Use	Recreation Resources	Socioeconomics	Environmental Justice	Air Quality	Climate Change and Greenhouse Gas Emissions	Navigation, Transportation, and Traffic	Noise	Public Health and Environmental Hazards	Public Services and Utilities	Visual Resources	Power Production and Energy
Multi-Regional Projects and Actions																								
Bay-Delta Water Quality Control Plan Update	X	X	X	X	X	X	X	X					X	X	X	X								X
Bay Delta Conservation Plan/California WaterFix	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Reclamation and DWR Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP	X			X	X	X	X	X					X	X	X	X								X
NMFS Public Draft Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead	X	X		X	X	X	X	X					X	X	X	X								X
USFWS Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes	X	X		X	X	X	X	X					X	X	X	X								X
Giant Garter Snake Recovery Plan					X																			
San Luis Reservoir Low Point Improvement Project	X								X	X	X					X	X	X	X		X	X	X	X
Water Supply, Water Quality, and Hydropower Projects and Actions in the Secondary and Primary Study Areas (Organized Geographically from North to South)																								
Shasta Lake Water Resources Investigation	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
El Dorado Water & Power Authority Supplemental Water Rights Project*	X				X			X																
El Dorado Irrigation District Folsom Lake Temperature Control Device*	X				X			X	X	X	X					X	X			X	X	X		
Lake Natoma Lower American River Temperature Reduction Project	X				X			X																
North Bay Aqueduct Alternative Intake	X				X			X	X	X	X		X		X	X	X	X	X	X	X	X	X	X
Los Vaqueros Reservoir Expansion Phase II	X						X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
Upper San Joaquin River Basin Storage Investigation (Formerly Temperance Flat Dam)	X		X					X	X	X	X		X		X	X	X	X	X		X	X	X	X
Ecosystem Improvement Projects and Actions in the Secondary and Primary Study Areas (Organized Geographically from North to South)																								
Yolo County Habitat/Natural Community Conservation Plan	X			X	X	X	X	X					X	X	X	X								X
Yolo Bypass Wildlife Area Land Management Plan	X			X	X	X	X	X					X	X	X	X								X
Cache Slough Complex Restoration	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X							X
North Delta Flood Control and Ecosystem Restoration Project		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	
Franks Tract Project	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X		X			X

*Sources: El Dorado Water & Power Authority, 2008a and 2008b

Notes:

- CVP = Central Valley Project
- DWR = Department of Water Resources
- NMFS = National Marine Fisheries Service
- SWP = State Water Project
- USFWS = U.S. Fish and Wildlife Service

This page intentionally left blank.

35.2.2 Multi-region Projects and Actions in the Extended and Secondary Study Areas

The multi-region projects and actions considered in the Extended and Secondary study areas (as shown in Table 35-1) of this cumulative impact assessment include the following:

- Bay-Delta Water Quality Control Plan Update
- Bay Delta Conservation Plan/California WaterFix
- Reclamation and DWR Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP (also referred to as Reconsultation)
- NMFS Public Draft Recovery Plan for Sacramento River Winter run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead
- U.S. Fish and Wildlife Service (USFWS) Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes
- USFWS Recovery Plan for Giant Garter Snake
- San Luis Reservoir Low Point Improvement Project
- Water Transfers

35.2.2.1 Bay-Delta Water Quality Control Plan Update

In accordance with the federal Clean Water Act and the Porter-Cologne Water Quality Control Act, basins plans must be developed for each hydrologic area. Each basin plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act.

In California, the beneficial uses and water quality objectives form the basis of the water quality control standards. In the Bay-Delta, water quality and flow objectives to meet water quality criteria are included in the *Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary* (Bay-Delta WQCP) (State Water Resources Control Board [SWRCB], 2006). The SWRCB and the Central Valley and San Francisco Regional Water Quality Control Boards (RWQCBs) are in the process of updating the Bay-Delta WQCP in four phases (SWRCB, 2016). Initially, the SWRCB and RWQCBs are evaluating new flow objectives for the Lower San Joaquin River and the tributaries of Stanislaus, Tuolumne, and Merced rivers, and southern Delta salinity objectives to protect agricultural beneficial uses and fish and wildlife. Draft results of this evaluation and a Draft Supplemental Environmental Document have been released. Following review of the draft documents, the SWRCB would adopt water quality objectives in the southern Delta to protect beneficial uses. The second phase has been initiated as a separate process, and involves review and consideration of updating portions of the Bay-Delta WQCP including criteria for Delta outflow, Sacramento and non-San Joaquin River tributaries inflow, Suisun Marsh salinity, Delta Cross Channel Gate closure, Delta export limits, and reverse flows in Old and Middle River. The third phase would include implementation of results from Phases 1 and 2 through changes in water rights actions and changes in water quality objectives implemented through water quality actions. Phase 4 would include development and implementation of flow criteria in the

Sacramento River watershed to address tributary-specific public trust needs and other beneficial uses, and would be integrated with Phase 2 efforts.

35.2.2.2 Bay-Delta Conservation Plan/California WaterFix

The Bay-Delta Conservation Plan and the California WaterFix are being developed by federal and State agencies and other stakeholders to achieve the dual goals of a reliable water supply for California and a healthy California Bay-Delta ecosystem that supports the State's economy. The program would construct a new conveyance facility, modify operation of existing CVP and SWP Delta facilities, and reduce ecological stressors that impair the function or the use of the Delta by aquatic and terrestrial resources.

The Draft Bay-Delta Conservation Plan EIR/EIS was issued in December 2013 (DWR et al., 2013). The Recirculated Draft EIR/Supplemental Draft EIS was issued by DWR and Reclamation in July 2015. The Final Bay-Delta Conservation Plan/California WaterFix EIR/EIS was published in December 2016 (DWR and Reclamation, 2016). Alternative Delta conveyance facilities were evaluated as part of the EIR/EIS process. These alternatives included use of an isolated facility that would convey water around or under the Delta for local supply and export through a hydraulically isolated channel or pipeline, with and without use of the existing south Delta intakes, and continuation of the use of the through-Delta conveyance with channel modifications. The preferred project (Alternative 4A) included three north Delta diversions, two tunnels that extend from the north Delta diversions to an expanded Clifton Court Forebay, and conveyance to the existing SWP and CVP pumping plants. The preferred project would be operated in accordance with SWRCB water quality criteria, including those implemented through Decision 1641. The preferred project includes changes to several actions included in the 2009 NMFS Biological Opinion (Reclamation and DWR, 2016b), and suggested studies to modify actions included in the 2008 USFWS Biological Opinion (Reclamation and DWR, 2016a). The operations of the WaterFix facilities would incorporate adaptive management methods and real-time operations related to flows, water quality, and aquatic resource conditions.

The preferred project would convey water under the existing water rights held by DWR and Reclamation; however, DWR and Reclamation have requested changes in the points of diversion for these water rights. The SWRCB application process is ongoing.

Reclamation submitted a biological assessment to USFWS and NMFS in August 2016 in accordance with Section 7 of the Endangered Species Act (Reclamation and DWR, 2016a, 2016b). The biological opinions for the preferred project were issued by USFWS and NMFS in June 2017. The biological opinions incorporated provisions for managing the SWP and CVP Delta operations following construction of the new facilities in accordance with real-time monitoring and adaptive management methods, including criteria related to Delta outflow, and the new permanent Head of Old River Gate, Delta Cross Channel Gates, and Old and Middle River flow criteria. The San Joaquin River inflow/export ratio in the 2009 NMFS Biological Opinion (NMFS, 2009) would be replaced by new operational criteria under the preferred project. The biological opinions address the need for consideration of reconsultation by the end of construction to address several of the more programmatic actions in the preferred project, including operation of the facilities. The existing 2008 USFWS and 2009 NMFS biological opinions will continue to be implemented until construction of the WaterFix is complete and Reclamation has submitted additional information or a request for reconsultation by the end of construction of the preferred project.

35.2.2.3 Reclamation and DWR Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP (Reconsultation)

On August 2, 2016, Reclamation and DWR requested the USFWS and NMFS to reinitiate consultation under Section 7 of the Endangered Species Act of the Long-term Coordinated Operation of the CVP and SWP to review the Reasonable and Prudent Alternative presented in the 2008 USFWS Biological Opinion and 2009 NMFS Biological Opinion, respectively (Reclamation and DWR, 2016a, 2016b). This request for reconsultation was based upon new information collected and analyzed during multiple years of drought, additional data that indicated continued low Delta smelt populations, and new information being developed during ongoing collaborative science processes (e.g., Collaborative Science and Adaptive Management Team and Collaborative Adaptive Management Team processes). Reclamation and DWR also requested that the California Department of Fish and Wildlife participate in this ongoing program.

35.2.2.4 NMFS Public Draft Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead

The NMFS Draft Recovery Plan provides a roadmap that describes the steps, strategy, and actions that should be taken to return winter-run Chinook salmon, spring-run Chinook salmon, and steelhead to viable status in the Central Valley, California, thereby ensuring their long-term persistence and evolutionary potential. The general near-term strategic approach to recovery includes the following elements:

- Secure all extant populations.
- Begin collecting distribution and abundance data for *O. mykiss* in habitats accessible to anadromous fish.
- Minimize straying from hatcheries to natural spawning areas.
- Conduct critical research on fish passage above rim dams, reintroductions, and climate change.

The long-term approach to recovery includes the following elements:

- Ensure that every extant diversity group has a high probability of persistence.
- Until all ESU viability criteria have been achieved, no population should be allowed to deteriorate in its probability of persistence.
- High levels of recovery should be attempted in more populations than identified in the diversity group viability criteria because not all attempts will be successful.
- Individual populations within a diversity group should have persistence probabilities consistent with a high probability of diversity group persistence.
- Within a diversity group, the populations restored/maintained at viable status should be selected.
- Allow for normative meta-population processes, including the viability of core populations, which are defined as the most productive populations.
- Allow for normative evolutionary processes, including the retention of the genetic diversity as well as an increase in genetic diversity through the addition of viable populations in historic habitats.
- Minimize susceptibility to catastrophic events.

35.2.2.5 USFWS Recovery Plan for the Sacramento-San Joaquin Delta Native Fishes

The USFWS Recovery Plan addresses the recovery needs for several fish species that occupy the Delta, including delta smelt, Sacramento splittail, longfin smelt, green sturgeon, Chinook salmon (spring-run, late fall-run, and San Joaquin fall-run), and Sacramento perch (believed to be extirpated). The objective of the plan is to establish self-sustaining populations of these species that will persist indefinitely. This would be accomplished by managing the estuary to provide better habitat for aquatic life in general and for the fish addressed by the plan. Recovery actions include tasks such as increasing freshwater flows; reducing entrainment losses to water diversions; reducing the effects of dredging, contaminants, and harvest; developing additional shallow-water habitat, riparian vegetation zones, and tidal marsh; reducing effects of toxic substances from urban non-point sources; reducing the effects of introduced species; and conducting research and monitoring.

35.2.2.6 Giant Garter Snake Recovery Plan

The Draft Giant Garter Snake Recovery Plan was published by USFWS in 1999, but a final plan was not published. However, USFWS continues to implement the recovery plan with a 5-year analysis that considers threats, conservation measures, and regulatory mechanisms.

The giant garter snake inhabits wetland habitats within the Central Valley. Loss and fragmentation of wetland habitats have extirpated the giant garter snake from the majority of its historic range. The recovery plan also considers several species of concern that occur in Central Valley wetlands that benefit from actions taken to recover the giant garter snake. These species include the tricolored blackbird, white-faced ibis, western pond turtle, and associated waterfowl.

The ultimate goal of the recovery plan is to delist the giant garter snake. Recovery criteria for the giant garter snake are defined for four recovery units in the Central Valley: the Sacramento Valley, Mid-Valley, San Joaquin Valley, and South Valley units. Recovery criteria include the following:

- a) Monitoring shows that in 17 out of 20 years, 90 percent of the subpopulations in four recovery units contain both adults and young.
- b) All extant populations within the recovery unit are protected from threats that limit populations.
- c) Supporting habitat within the recovery unit is adaptively managed and monitored.
- d) Subpopulations are well connected by corridors of suitable habitat.
- e) Repatriation (reintroduction) has been successful at a specified number of suitable sites.

Necessary actions described in the plan include protecting existing populations and habitat; restoring populations to former habitat; surveying to determine species distributions; monitoring populations; conducting necessary research, including studies on demographics, population genetics, and habitat use; and developing and implementing incentive programs, and an outreach and education plan.

35.2.2.7 San Luis Reservoir Low Point Improvement Project

Reclamation and DWR jointly manage San Luis Reservoir for the purpose of storing and reregulating CVP and SWP water from the Sacramento-San Joaquin Delta. San Luis Reservoir is an offstream water storage facility that stores water for both projects. The San Luis Reservoir Low Point Improvement Project is proposed by Reclamation, the Santa Clara Valley Water District, and the San Luis and Delta Mendota Water Authority. The project is designed to address water supply reliability issues in San Luis

Reservoir that result when water levels fall below 369 feet above sea level (corresponding to a reservoir capacity of 300,000 acre-feet) and create water quality degradation that has the potential to interrupt a portion of the San Felipe Division's water supply. The term "low point" refers to a range of minimum pool elevations in San Luis Reservoir. During the late summer months if the reservoir elevation drops below 369 feet above sea level, the conditions in San Luis Reservoir promote the growth of algae in the reservoir. The water quality during the algal blooms is not suitable for agricultural water users with drip irrigation systems in San Benito County or municipal and industrial water users relying on existing water treatment facilities in Santa Clara County. The low point issue increases progressively as the reservoir continues to drop below elevation 369 feet.

The comprehensive plan would involve increasing groundwater recharge and recovery capacity, implementing desalination measures, re-operating Santa Clara Valley Water District's raw- and treated-water systems, and implementing institutional measures. If Pacheco Reservoir were to be enlarged, the reservoir would be filled with Delta water; thus, additional impacts on Delta aquatic species (e.g., juvenile salmonids and delta smelt) could result from an increase in Delta exports (Reclamation et al., 2011).

35.2.3 Water Supply, Water Quality, and Hydropower Projects and Actions in the Vicinity of the Proposed Sites Reservoir Project Facilities and/or Potentially Affected by SWP and CVP Operations (Organized Geographically from North to South)

The water supply, water quality, and hydropower projects and actions in the Secondary and Primary study areas (as shown in Table 35-1) considered in this cumulative impact assessment include the following:

- Shasta Lake Water Resources Investigation
- El Dorado Water & Power Authority Supplemental Water Rights Project
- El Dorado Irrigation District Folsom Lake Temperature Control Device
- Lake Natoma Lower American River Temperature Reduction Project
- North Bay Aqueduct Alternative Intake
- Los Vaqueros Reservoir Expansion Phase II
- Upper San Joaquin River Basin Storage Investigation (Formerly Temperance Flat Dam)

35.2.3.1 Shasta Lake Water Resources Investigation

The Shasta Lake Water Resources Investigation is currently being conducted by Reclamation to determine the type and extent of federal interest in a multiple purpose plan to modify Shasta Dam and Reservoir to increase the survival of anadromous fish populations in the upper Sacramento River and increase water supplies and water supply reliability for agricultural, municipal, industrial, and environmental purposes. To the extent possible through meeting these objectives, alternatives include features to benefit other identified water and related resource needs including ecosystem conservation and enhancement, improved hydropower generation capability, flood damage reduction, increased recreation opportunities, and improved water quality conditions in the Sacramento River and the Delta. Anticipated alternatives for expansion of Shasta Lake include, among other features, raising the dam from 6.5 to 18.5 feet above current elevation, which would result in additional storage capacity of 256,000 to 634,000 acre-feet, respectively. The increased capacity is expected to improve water supply reliability and increase the cold water pool, which would provide improved water temperature conditions for anadromous fish in the Sacramento River downstream of the dam. The final EIS and Feasibility Study for the project were completed in July/August 2015.

35.2.3.2 El Dorado Water & Power Authority Supplemental Water Rights Project

The El Dorado Water & Power Authority (EDWPA) proposes to establish permitted water rights allowing diversion of water from the American River basin to meet planned future water demands in the El Dorado Irrigation District (EID) and Georgetown Divide Public Utility District service areas, and other areas located within El Dorado County that are outside of these service areas. The EDWPA filed petitions for partial assignment of each of State Filed Applications 5644 and 5645, and accompanying applications allowing for the total withdrawal for use of 40,000 acre-feet per year, consistent with the diversion and storage locations allowed under the El Dorado-Sacramento Municipal Utility District Cooperation Agreement with the SWRCB, Division of Water Rights.

35.2.3.3 El Dorado Irrigation District Folsom Lake Temperature Control Device

The EID, in collaboration with Reclamation, proposes to construct facilities on the bank of Folsom Lake to withdraw water from the warm upper reaches of the lake while preserving the cold water pool at the bottom of the lake to protect downstream aquatic species. The facilities will include a large diameter concrete-lined vertical shaft and five lined horizontal adits extending from the shaft. This structure, known as a Temperature Control Device, will replace EID's five existing raw pump casings that currently extract water from Folsom Lake. The new facility will be sized to accommodate over twice the current capacity.

35.2.3.4 Lake Natoma Lower American River Temperature Reduction Project (Formerly the Lake Natoma Temperature Curtains Pilot Project)

The USFWS, Reclamation, and Sacramento Water Forum are proposing the Lower American River Temperature Reduction Modeling Project. The objective of the project is to develop predictive tools that will (1) reduce uncertainties in the performance of identified temperature control actions that could be implemented to improve the management of cold water resources in the Folsom/Natoma reservoir system and the lower American River, and (2) be available for daily operations, planning, and salmon and steelhead habitat studies by other project operators and other stakeholders.

The project adapted, calibrated, and verified existing thermodynamic and hydrologic mathematical models for application at Folsom Reservoir, Lake Natoma and the lower American River. The models were used to assess the effectiveness of the identified actions individually and in combination and develop a recommendation for development and implementation of one or more actions for the purpose of reducing temperatures in the lower American River. The actions identified to improve transport of cold water through Lake Natoma and reduce the temperature of the lower American River included a Nimbus Dam curtain, a Lake Natoma plunge zone curtain, Nimbus power plant debris wall removal, dredging Lake Natoma, and modifying Folsom Power plant peak loading operation.

35.2.3.5 North Bay Aqueduct Alternative Intake

DWR issued a Notice of Preparation on December 2, 2009 to construct and operate an alternative intake on the Sacramento River, generally upstream of the Sacramento Regional Wastewater Treatment Plant, and connect it to the existing North Bay Aqueduct system by a new segment of pipe. The proposed alternative intake would be operated in conjunction with the existing North Bay Aqueduct Alternative Intake at Barker Slough. The project would be designed to improve water quality and to provide reliable deliveries of SWP supplies to its contractors, the Solano County Water Agency, and the Napa County Flood Control and Water Conservation District (DWR, 2011).

35.2.3.6 Los Vaqueros Reservoir Expansion Phase II

Los Vaqueros Reservoir is an off-stream reservoir in the Kellogg Creek watershed to the west of the Delta. The Los Vaqueros Reservoir initial construction was completed in 1997 as a 100,000 acre-foot off-stream storage reservoir owned and operated by Contra Costa Water District (CCWD) to improve delivered water quality and emergency storage reliability for CCWD's customers. In 2012, the Los Vaqueros Reservoir was expanded to a total storage capacity of 160,000 acre-feet (Phase 1) to provide additional water quality and supply reliability benefits, and to adjust the timing of its Delta water diversions to accommodate the life cycles of Delta aquatic species, thus reducing species impact and providing a net benefit to the Delta environment. An additional expansion up to 275,000 acre-feet (Phase 2) is being evaluated by CCWD. The alternatives considered in the evaluation also consider methods to convey water from Los Vaqueros Reservoir to the South Bay Aqueduct to provide water to Zone 7 Water Agency, Alameda County Water District, and Santa Clara Valley Water District (Reclamation et. al., 2010).

35.2.3.7 Upper San Joaquin River Basin Storage Investigation (Formerly Temperance Flat Dam)

The Upper San Joaquin River Basin Storage Investigation (Formerly Temperance Flat Dam and the Bay-Delta Conservation Plan, formerly the Peripheral Canal) is being conducted by Reclamation and DWR to evaluate alternative plans to increase Upper San Joaquin River Storage to enhance the San Joaquin River restoration efforts and improve water supply reliability for agricultural, municipal and industrial, and environmental uses in the Friant Division, the San Joaquin Valley, and other regions of the state. The investigation will also evaluate integration of conjunctive management and water transfer concepts into project formulations. Additional storage is also expected to provide incidental flood damage reduction benefits.

Reclamation is analyzing alternatives for a new dam and a 1.26 million acre-foot reservoir at San Joaquin River Mile 274, in an area known as Temperance Flat. Primary planning objectives are to (1) increase water supply reliability, and (2) enhance flow and temperature conditions to support the San Joaquin River Restoration Program. To the extent possible, the investigation will explore opportunities to provide other benefits that could include hydropower, flood control, and recreation. Operation variables include reservoir carryover, new or shifting water supply beneficiaries, and alternative conveyance routes. Operations alternatives evaluated in the draft Feasibility Report will be selected from combinations that most economically accomplish the planning objectives.

35.2.3.8 Water Transfers

Water transfer programs have been used historically throughout California, especially among CVP water users, to meet both irrigation and municipal water demands either during drought or to replenish stored surface water or groundwater during wet periods (Reclamation, 2013). Historically, water transfers primarily were in-basin transfers (e.g., Sacramento Valley water seller to Sacramento Valley water user) (Reclamation, 2013; DWR et al., 2013). Implementation of the Central Valley Project Improvement Act (CVPIA) in 1992 facilitated water transfers between CVP water users and with non-CVP water users (including SWP water users). Water transfers also occur between the SWP water users and with non-SWP water users. The SWP and CVP facilities can be used to convey the transferred water, including non-SWP and non-CVP water.

After adoption of CVPIA and CALFED Bay-Delta Program environmental documents in 2000, water transfers from the Sacramento Valley to the areas located south of the Delta increased, and transfers occurred in drier years for up to 298,806 acre-feet per year (not including water transfers under the Environmental Water Account Program in the early 2000s) (DWR et al., 2013).

Most of the water transfers are only designed to provide water for 1 or 2 years during drier periods. In 2008, one of the first long-term water transfer agreements was approved by the SWRCB for the Lower Yuba River Accord. In 2013, Reclamation approved an overall program for a 25-year period (2014 to 2038) to transfer up to 150,000 acre-feet/year of water from the San Joaquin River Exchange Contractors Water Authority to wildlife refuges and/or CVP and SWP water users (Reclamation, 2013). In 2015, Reclamation approved a long-term water transfer program (2015 to 2024) between water sellers in the Sacramento Valley and water users located in the San Francisco Bay Area and south of the Delta (Reclamation, 2014).

Under State law, water transfers cannot result in injury to other legal users of water, unreasonable impacts on fish and wildlife and instream uses, and unreasonable economic or environmental impact on the county in which the transfer water originates (DWR and Reclamation, 2014). Transfer programs generally involve annual crop changes using temporary crop idling or shifting, release of stored water in reservoirs on different patterns for the purchasers' water demands, and/or groundwater substitution. The transfers must be approved by CVP and/or SWP if the transfer involves CVP or SWP water or utilizes CVP or SWP facilities. Water transfers that use SWP and/or CVP conveyance facilities would be implemented to comply with water quality criteria established by the SWRCB, the 2008 USFWS biological opinion (Reclamation and DWR, 2016a), and the 2009 NMFS biological opinion (Reclamation and DWR, 2016b), including the limitation of total volume of transferred water for each water year type. Environmental documentation is required for all water transfers involving CVP and/or SWP water supplies or facilities. Except for water transfers among CVP or SWP water users, most water transfers also require approval from the SWRCB and must be implemented in a manner that does not result in injury to other legal water users, including protection of surface water flows, groundwater conditions, and water quality for the adopted beneficial uses of others.

It is assumed that transfers would continue in a similar manner. The conditions for each water transfer would be determined on a case-by-case basis, including methods to provide the transferred water (such as conservation, groundwater substitution, or reservoir reoperation) and methods to use the water (such as agricultural, municipal and industrial, or wildlife refuges). All water transfers that do not involve transfer of water rights granted prior to 1914 require environmental documentation, including mitigation measures to protect other users of water and the environment. For example, water transfers that involve groundwater substitution as a method to produce transferred water have historically required implementation of groundwater mitigation and monitoring plans to reduce potential impacts to a level of less than significant as compared to current conditions. Therefore, it is assumed in the cumulative impact analysis that water transfers that result in significant adverse impacts would not continue.

35.2.4 Ecosystem Improvement Projects and Actions in the Secondary and Primary Study Areas (Organized Geographically from North to South)

The ecosystem improvement projects and actions in the Secondary and Primary study areas (as shown in Table 35-1) considered in this cumulative impact assessment include the following:

- Yolo County HCP/Natural Community Conservation Plan (NCCP)

- Yolo Bypass Wildlife Area Land Management Plan
- Cache Slough Complex Restoration
- North Delta Flood Control and Ecosystem Restoration Project
- Franks Tract Project

35.2.4.1 Yolo County Habitat/Natural Community Conservation Plan

The Yolo County Habitat Joint Powers Authority, consisting of five local public agencies, launched the Yolo Natural Heritage Program in March 2007. This effort includes the continuing preparation of a joint HCP/NCCP. Member agencies include Yolo County and the Cities of Davis, Woodland, West Sacramento, and Winters.

The HCP/NCCP describes the measures that local agencies will implement in order to conserve biological resources, obtain permits for urban growth and public infrastructure projects, and continue to maintain the agricultural heritage and productivity of Yolo County. The nearly 653,820-acre planning area provides habitat for covered species occurring within five dominant habitats/natural communities. The plan proposes to address 63 covered species, including seven state-listed species: palmate-bracted bird's-beak, Colusa grass, Crampton's tuctoria, giant garter snake, Swainson's hawk, western yellow-billed cuckoo, and bank swallow. Interim conservation activities include acquiring permanent conservation easements for sensitive species habitat in the plan area (Yolo Natural Heritage Program, 2009).

35.2.4.2 Yolo Bypass Wildlife Area Land Management Plan

The Yolo Bypass Wildlife Area consists of approximately 16,770 acres of managed wildlife habitat and agricultural land within the Yolo Bypass. The bypass conveys seasonal high flows from the Sacramento River to help control river stage and protect the cities of Sacramento, West Sacramento, and Davis, as well as other local communities, farms, and lands from flooding. Substantial environmental, social, and economic benefits are provided by the Yolo Bypass, benefiting the people of the State of California.

The stated purposes of the Yolo Bypass Wildlife Area Land Management Plan are to (1) guide the management of habitats, species, appropriate public use, and programs to achieve CDFW's mission; (2) direct an ecosystem approach to managing the Yolo Bypass Wildlife Area; (3) identify and guide appropriate, compatible, public-use opportunities within the Yolo Bypass Wildlife Area; (4) direct the management of the Yolo Bypass Wildlife Area in a manner that promotes cooperative relationships with adjoining private-property owners; (5) establish a descriptive inventory of the sites and the wildlife and plant resources that occur in the Yolo Bypass Wildlife Area; (6) provide an overview of the Yolo Bypass Wildlife Area's operation, maintenance, and personnel requirements to implement management goals, and serve as a planning aid for preparation of the annual budget for the Bay-Delta Region (Region 3); and (7) present the environmental documentation necessary for compliance with State and federal statutes and regulations, provide a description of potential and actual environmental impacts that may occur during plan management, and identify mitigation measures to avoid or lessen these impacts.

35.2.4.3 Cache Slough Complex Restoration

The Cache Slough Complex is located in the northern Delta where Cache Slough and the southern Yolo Bypass meet. It currently includes Liberty Island, Little Holland Tract, Prospect Island, Little Egbert Tract and the surrounding waterways. Levee height on these tracts is restricted and designed to allow overtopping in large flow events to convey water from the upper Yolo Bypass. Since 1983 and 1998 respectively, Little Holland Tract and Liberty Island have remained breached. Restoration is occurring

naturally on the islands. Restoration in the Cache Slough Complex was identified as an Interim Delta Action by Governor Schwarzenegger in July 2007.

The Cache Slough Complex has potential for restoration success because of its relatively high tidal range, historic dendritic channel network, minimal subsidence, and remnant riparian and vernal pool habitat. Restoration efforts would support native species, including delta smelt, longfin smelt, Sacramento splittail, and Chinook salmon, by creating or enhancing natural habitats and improving the food web fish require. Surrounding lands that are at elevations that would function as floodplain or marsh if not separated by levees could also be included in the Cache Slough Area. This broader area includes roughly 45,000 acres of existing and potential open water, marsh, floodplain, and riparian habitat. The goals of restoration in the Cache Slough Complex are to (1) re-establish natural ecological processes and habitats to benefit native species, (2) contribute to scientific understanding of restoration ecology, and (3) maintain or improve flood safety. Three restoration actions are being considered in the Cache Slough Complex, including restoration actions at Calhoun Cut, Little Holland Tract, and Prospect Island.

35.2.4.4 North Delta Flood Control and Ecosystem Restoration Project

The North Delta Flood Control and Ecosystem Restoration Project is proposed near the confluence of the Cosumnes and Mokelumne rivers by DWR and encompasses approximately 197 square miles. The project is intended to improve flood management and provide ecosystem benefits in the North Delta area through actions such as construction of setback levees and configuration of flood bypass areas to create quality habitat for species of concern. These actions are focused on McCormack-Williamson Tract and Staten Island. The project would implement flood control improvements in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. Flood control improvements are needed to reduce damage to land uses, infrastructure, and the Bay-Delta ecosystem resulting from overflows caused by insufficient channel capacities and catastrophic levee failures in the 197 square-mile project study area.

The Project as described in the Final EIR included levee modifications to allow controlled flow across McCormack-Williamson Tract and to mitigate hydraulic impacts; channel dredging to increase flood conveyance capacity; an off-channel detention basin on Staten Island; ecosystem restoration where floodplain forests and marshes would be developed at McCormack-Williamson Tract and the Grizzly Slough property; setback levee on Staten Island to expand the floodway conveyance; opening up the southern portion of McCormack-Williamson Tract to boating; improving the Delta Meadows property; providing access and interpretive kiosks for wildlife viewing; and providing restroom, circulation, parking, and signage infrastructure to support such uses (DWR, 2010).

35.2.4.5 Franks Tract Project

DWR and Reclamation are conducting studies to evaluate the feasibility of modifying the hydrodynamic conditions near Franks Tract to improve Delta water quality and enhance the aquatic ecosystem. The results of these studies have indicated that modifying the hydrodynamic conditions near Franks Tract may substantially reduce salinity in the Delta and protect fishery resources, including populations of delta smelt, a federally listed and State-listed species that is endemic to the Delta. As a result, DWR and Reclamation propose to implement the Franks Tract Project to improve water quality and fisheries conditions in the Delta. DWR and Reclamation are evaluating the installation of operable gates to control the flow of water at key locations (Threemile Slough and/or West False River) to reduce sea water intrusion, and to positively influence movement of fish species of concern to areas that provide favorable habitat conditions. The project gates would be operated seasonally and during certain hours of the day, depending on fisheries and tidal conditions. Boat passage facilities would be included to allow for passing

of watercraft when the gates are in operation. The Franks Tract Project is consistent with ongoing planning efforts for the Delta to help balance competing uses and create a more sustainable system for the future. By protecting fish resources, this project also could improve operational reliability of the SWP and CVP because curtailments in water exports (pumping restrictions) are likely to be less frequent. Franks Tract was previously evaluated as part of DWR's Flooded Island Pre-Feasibility Study Report (DWR, 2007).

35.3 Cumulative Effects Analysis by Resource

The potential for implementation of the action alternatives to result in a cumulatively considerable incremental contribution was determined for each resource based upon the significance criteria for each resource, as described in Chapters 6 through 31. To reduce any cumulatively considerable incremental contributions from the action alternatives, feasible mitigation measures are proposed for all potentially substantial adverse direct and indirect effects. In some cases, no feasible mitigation could be applied to reduce effects. In these cases, the cumulative effects are considered to be substantial and unavoidable.

35.3.1 Surface Water Resources (All Alternatives)

Anticipated changes in reservoir storage, stream flow downstream of the reservoirs, diversions, in-Delta flows, and Delta outflow in comparison to the Existing Conditions/No Project/No Action Condition are presented in Chapter 6 Surface Water Resources, to provide a basis for understanding changes in CVP and SWP exports and deliveries. However, no specific environmental impacts/environmental consequences were presented in Chapter 6 because the environmental effects of these changes under CEQA and NEPA are related to conditions of surface water quality (see Chapter 7), geomorphology (Chapter 8), flood control (Chapter 9), groundwater (Chapters 10 and 11), biological resources (Chapters 12 through 15), recreation (Chapter 21), socioeconomics (Chapter 22), environmental justice (Chapter 23), and hydroelectric generation potential (see Chapter 31). Specific impact analyses and mitigation measures related to changes in these resources that were a result of changes in surface water and water supply conditions are provided in those chapters as appropriate. Therefore, the cumulative analysis of changes in those surface water factors are discussed in the specified related environmental resources below.

Impact Water Supply-CII: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on deliveries of water.

35.3.1.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

Under all action alternatives, water deliveries to CVP and SWP water users, senior water rights holders, and refugees would be similar or greater (primarily in dryer years) as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of most of the projects considered in the cumulative impact analysis would not affect water deliveries. Several of the projects are being developed in accordance with project objectives to improve water supply reliability to water users in many locations of the State in the same manner as the action alternatives (e.g., Shasta Lake Water Resources Investigation). Other projects are being developed to improve local water supply reliability (e.g., North Bay Aqueduct Alternative Intake), or would not change water supply reliability (e.g., North Delta Flood Control and Ecosystem Restoration Project).

Implementation of the Bay Delta Water Quality Update and the Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP could result in changes in patterns and volume of water deliveries. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to water supply deliveries that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small or beneficial and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.2 Surface Water Quality

Impact SW Quality-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on surface water quality.

35.3.2.1 Extended Study Area (All Alternatives)

Water quality changes in the Extended Study Area would be related to the potential for algal in the San Luis Reservoir and salinity in the Delta. As described in Chapter 7 Surface Water Quality, the potential for algal growth in the San Luis Reservoir under the action alternatives would be similar to the Existing Conditions/No Project/No Action Condition, and the impact would be **less-than-significant impact**. Salinity in San Luis Reservoir under the action alternatives would less or similar to the Existing Conditions/No Project/No Action Condition, and the impact would be **less-than-significant impact**.

Implementation of most of the projects considered in the cumulative impact analysis would not affect water quality. Several of the projects are being developed in accordance with project objectives to improve water quality in many locations of the State in the same manner as the action alternatives (e.g., Bay Delta Water Quality Update and Shasta Lake Water Resources Investigation). Other projects are being developed to improve local water quality (e.g., North Bay Aqueduct Alternative Intake), or would not change water quality associated with the action alternatives.

Implementation of the Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP could result in changes in water quality in the Delta and tributaries to the Delta. This project is ongoing and the results are not known at this time. Regardless of whether this project results in adverse impacts to water quality in the Extended Study Area, that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.2.2 Secondary Study Area (All Alternatives)

Water quality changes in the Secondary Study Area would be related to changes in flows in the rivers and storage in the reservoirs that would occur due to implementation of the action alternatives. As described in Chapter 7 Surface Water Quality, implementation of the action alternatives would result in either no impacts or less-than-significant impacts as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of most of the projects considered in the cumulative impact analysis would not affect water quality. Several of the projects are being developed in accordance with project objectives to

improve water quality in many locations of the State in the same manner as the action alternatives (e.g., Bay Delta Water Quality Update and Shasta Lake Water Resources Investigation). Other projects are being developed to improve local water quality (e.g., North Bay Aqueduct Alternative Intake), or would not change water quality associated with the action alternatives.

Implementation of the Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP could result in changes in water quality in the Delta and tributaries to the Delta. This project is ongoing and the results are not known at this time. Regardless of whether this project results in adverse impacts to water quality in the Secondary Study Area, that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.2.3 Primary Study Area (All Alternatives)

As described in Chapter 3 Description of the Sites Reservoir Project Alternatives, construction and operations and maintenance activities would be implemented in accordance with Stormwater Pollution Prevention Permits (SWPPPs) issued by the Central Valley RWQCB to protect water quality. The SWPPPs would include monitoring and rapid response programs to address construction activities and unanticipated spills or accidents. Therefore, impacts related to construction within natural surface water bodies under the action alternatives would not be anticipated to cause or contribute to water quality degradation at the construction site or in the adjacent water bodies, or adversely affect beneficial uses in water bodies; therefore, the impact would be less than significant as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of the projects considered in the cumulative impact analysis would not directly affect water quality in the Primary Area. Several of the projects would affect water quality in the Sacramento River and, therefore, would affect the quality of the water stored in the Sites Reservoir. The cumulative impact analysis includes projects being developed in accordance with project objectives to improve water quality in many locations of the State in the same manner as the action alternatives (e.g., Bay Delta Water Quality Update and Shasta Lake Water Resources Investigation). Other projects are being developed to improve local water quality (e.g., North Bay Aqueduct Alternative Intake), or would not change water quality associated with the action alternatives. Regardless of whether these projects result in adverse impacts to water quality in the Primary Study Area, that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.3 Fluvial Geomorphology and Riparian Habitat

Impact Geom-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on fluvial geomorphology and riparian habitat.

35.3.3.1 Extended, Secondary, and Primary Study Area (All Alternatives)

Fluvial geomorphology and riparian habitat changes in the Extended, Secondary, and Primary study areas would be related to the changes in stream flow. As described in Chapter 8 Fluvial Geomorphology and Riparian Habitat, fluvial geomorphology and riparian habitat conditions under the action alternatives would be similar to the Existing Conditions/No Project/No Action Condition in the Extended and Secondary study areas.

In the Primary Study Area, changes due to suspended sediment diverted at the intakes and changes in flows in the Sacramento River due to implementation of the action alternatives would result in similar conditions under that action alternatives and the Existing Conditions/No Project/No Action Condition, and the impacts would be less than significant.

Implementation of most of the projects considered in the cumulative impact analysis would not affect fluvial geomorphology and riparian habitat in the Extended, Secondary, and Primary study areas. Several of the projects are being developed in accordance with project objectives to improve flow patterns in the Sacramento River and other streams in the same manner as the action alternatives (e.g., Shasta Lake Water Resources Investigation). Other projects would affect specific streams (e.g., North Delta Flood Control and Ecosystem Restoration Project).

Implementation of several of the cumulative impact projects could affect fluvial geomorphology and riparian habitat (e.g., Bay Delta Water Quality Update and the Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP). These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to fluvial geomorphology and riparian habitat conditions that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small or beneficial and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.4 Flood Control and Management

Impact Flood-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on flood control management.

35.3.4.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

Flood control management changes in the Extended, Secondary, and Primary study areas would be related to the changes in stream flow. As described in Chapter 9 Flood Control and Management, flood management conditions under the action alternatives would be similar to the Existing Conditions/No Project/No Action Condition in the Extended Study Area.

In the Secondary Study Area, the action alternatives would not increase flood risks due to significantly higher water surface elevations in flood control reservoirs during Wet and Above Normal water year types when flooding occurs. Therefore, compared to the Existing Conditions/No Project/No Action

Condition, the action alternatives would result in a less-than-significant impact due to increased flooding risks, including potential flooding due a levee or dam failure, within the Secondary Study Area.

In the Primary Study Area, construction of facilities in the surface waters would be constructed to manage flows during construction to not increase the downstream flood potential, resulting in a less-than-significant impact when compared to the Existing Conditions/No Project/No Action Condition. Operation and maintenance of Sites Reservoir under the action alternatives would result in a beneficial effect by reducing the amount and rate of surface water runoff that has historically flooded areas downstream of the dams, when compared to the Existing Conditions/No Project/No Action Condition.

In addition, operation of Golden Gate and Sites dams would be monitored by instrumentation measuring such parameters as seepage, settlement, and earthquake-induced accelerations, which could provide early warning signs of potential dam failure. With modern design criteria, construction practices, and post-construction monitoring, the probability of dam failure and subsequent impacts is extremely small. An emergency flood response plan would also be developed to notify potentially affected residents of the unlikely potential for a dam failure. Therefore, Sites Reservoir and dams would result in a less-than-significant impact on the risk of loss, injury, or death due to flooding caused by dam failure, when compared to the Existing Conditions/No Project/No Action Condition. The Terminal Regulating Reservoir design which would be designed to allow emergency releases first to the Glenn-Colusa Irrigation District Main Canal, and then to Funks Creek via the Funks Creek Pipeline. Although these releases would increase creek flows, releases would be controlled with an energy dissipater and small concrete structure at the terminal end of the pipeline to avoid exceeding the capacity of the creek channel. In addition, the risk of an event requiring such an emergency release remains very small. Therefore, the Terminal Regulating Reservoir facilities would result in a less-than-significant impact on existing drainage patterns, stream courses, or surface runoff, when compared to the Existing Conditions/No Project/No Action Condition. Most of the appurtenant facilities to be constructed in the Primary Study Area under the action alternatives either would not be developed within a 100-year flood hazard area or developed in a manner that would not alter existing drainage patterns or the course of streams. Therefore, their construction, operation, and maintenance would result in no impact on 100-year flood flows, when compared to the Existing Conditions/No Project/No Action Condition.

Implementation of most of the projects considered in the cumulative impact analysis would not affect flood control and management in the Extended, Secondary, and Primary study areas. Several of the projects are being developed in accordance with project objectives to improve flood control and management (e.g., North Delta Flood Control and Ecosystem Restoration Project).

The effects of implementation of other cumulative impact projects on flood control and management are not known at this time. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to flood control and management that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small or beneficial and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.5 Groundwater Resources

Impact GW-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on groundwater.

35.3.5.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

Groundwater changes in the Extended, Secondary, and Primary study areas would be related to changes in groundwater withdrawals associated changes in water supply reliability, and changes in groundwater elevation due to changes in surface water flows in adjacent streams.

As described in Chapter 10 Groundwater Resources, groundwater conditions under the action alternatives would be similar or improved as compared to the Existing Conditions/No Project/No Action Condition in the Extended and Secondary study areas because the surface water deliveries would be similar or increased; therefore, water users would use surface water supplies and reserve the groundwater supplies for drought conditions. Changes in groundwater elevations adjacent to the Sacramento River due to implementation of the action alternatives and related changes in stream flows would be negligible, and the impacts would be less than significant. Therefore, there would be no impacts or beneficial groundwater impacts under the action alternatives as compared to the Existing Conditions/No Project/No Action Condition in the Extended or Secondary study areas.

In the Primary Study Area, groundwater conditions under the action alternatives would be similar to the Existing Conditions//No Project/No Action Condition at most construction sites, including Sites Reservoir, recreation areas, overhead power lines, and other appurtenant structures. Seepage rates from Sites and Holhouse reservoirs to surrounding groundwater would occur at rates that would be beneficial to groundwater elevations without adversely affecting surrounding land uses.

Seepage rates at the Terminal Regulating Reservoir would be higher than at Sites and Holhouse reservoirs due to soil conditions. Therefore, the Terminal Regulating Reservoir would be constructed with a polyvinylchloride or high-density polyethylene liner to minimize seepage. Due to the inclusion of liner, the construction, operation, and maintenance of these facilities under the action alternatives would have no impact on groundwater resources in the Primary Study Area when compared to the Existing Conditions/No Project/No Action Condition.

As described in Chapter 10 Groundwater Resources, dewatering activities at construction sites in the Primary Study Area would result in less-than-significant effects on the groundwater elevations as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would not affect groundwater conditions as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects are being developed in accordance with project objectives to improve water supply reliability and/or stream flows in the same manner as the action alternatives (e.g., Shasta Lake Water Resources Investigation) and, therefore, would result in beneficial or **less-than-significant impacts** to groundwater as surface water becomes more available and is used by water users to conserve groundwater for drier periods.

Implementation of the Bay Delta Water Quality Update and the Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP could result in changes in surface water deliveries which could change groundwater use, and surface water flows which could change groundwater elevations adjacent to the streams. These projects are ongoing and the results are not known

at this time. Regardless of whether these projects result in adverse impacts to groundwater as compared to the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small or beneficial and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None needed.

35.3.6 Groundwater Quality

Impact GW-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on deliveries of groundwater quality.

35.3.6.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

Adverse effects to groundwater quality are caused by depletion of groundwater supplies that result in groundwater quality changes or contamination during construction and operation of new facilities. As described in Chapter 11 Groundwater Quality, groundwater conditions in the Extended and Secondary study areas would be similar or beneficial as compared to the Existing Conditions/No Project/No Action Condition because there would be no construction and groundwater quality could improve if less groundwater is withdrawn as more surface water becomes available.

In the Primary Study Area, seepage from Sites and Holthouse reservoirs could beneficially alter shallow groundwater chemistry in and immediately around the reservoirs. Therefore, reservoir inundation could have a beneficial or less-than-significant effects on groundwater quality as compared to the Existing Conditions/No Project/No Action Condition. During construction and operation and maintenance, use of chemicals, materials, and fuels could result in hazardous materials spills or direct contamination of groundwater during dewatering operations. Potential contamination of groundwater would be less than significant through the implementation of SWPPPs during construction and operation and maintenance as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would not affect groundwater conditions as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects are being developed in accordance with project objectives to improve water supply reliability (e.g., Shasta Lake Water Resources Investigation) and, therefore, would result in beneficial or less-than-significant impacts to groundwater as surface water becomes more available and is used as compared to more saline groundwater.

Implementation of the Bay Delta Water Quality Update and the Request for Reinitiation of Section 7 Consultation Addressing the Long-term Operation of the CVP and SWP could result in changes in surface water deliveries which could change groundwater use, and surface water flows which could change groundwater quality adjacent to the streams. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to groundwater quality as compared to the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small or beneficial and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant.

Mitigation: None needed.

35.3.7 Aquatic Biological Resources

Impact Fish-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on aquatic resources.

35.3.7.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

Adverse effects to aquatic biological resources are caused by degraded water quality, habitat modification, interference with fish passage, and predation risk. As described in Chapter 12 Aquatic Biological Resources, implementation of the action alternatives would result in less-than-significant impacts to reservoir cold-water and warm-water fish species in the SWP/CVP reservoirs in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. In the Secondary Study Area, the action alternatives would result in less-than-significant impacts on coho salmon and Pacific Lamprey in the Trinity River watershed; beneficial or less-than-significant impacts on winter-run and spring-run Chinook salmon in the Sacramento River, Feather River, American River, and the Delta; less-than-significant impacts on Central Valley fall-run Chinook salmon, steelhead, green sturgeon, and Pacific Lamprey in Sacramento River, Feather River, American River, and the Delta; less-than-significant impacts on river lamprey and hardhead in the Sacramento River, Clear Creek, Feather River, and American River; and similar or less-than-significant impacts on Delta smelt, longfin smelt, Sacramento splittail, striped bass, American shad, and largemouth bass in the Delta as compared to the Existing Conditions/No Project/No Action Condition. Because the action alternatives would result in beneficial or less-than-significant impacts on coho salmon and Chinook salmon, the impacts on the Southern Resident Killer Whale would be less than significant as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, implementation of the action alternatives would result in potentially significant and less-than-significant impacts on fish and aquatic habitats related to overall construction and operations and maintenance activities, including pile driving, aquatic habitat modifications, excavation, installation of cofferdams, and use of hazardous materials as compared to the Existing Conditions/No Project/No Action Condition. Potentially significant impacts due to inundation of Stone Corral and Funks creeks would become less than significant with the implementation of habitat restoration actions. Potentially significant impacts due to aquatic habitat modification and potential entrainment and entrapment of fish at the Delevan Pipeline Intake/Discharge Facilities would become less than significant with the implementation of standard habitat restoration actions, fish screen design criteria developed in coordination with USFWS and NMFS, and a fish salvage program during construction. Potentially significant impacts due to in-water pile driving during daylight hours would become less than significant with the implementation of standard daily and seasonal time constraints and technologies to reduce vibrations and sound waves.

Implementation of most of the projects considered in the cumulative impact analysis would be implemented to improve aquatic resources in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects are being developed in accordance with project objectives to improve aquatic resources (e.g., USFWS Recovery Plan for Sacrament-San Joaquin Delta Native Species) and, therefore, would result in beneficial or less-than-significant impacts to aquatic resources as compared to the Existing Conditions/No Project/No Action Condition.

Several of the projects considered in the cumulative impact analysis could affect aquatic resources in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation). These projects

are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to aquatic resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small or beneficial and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant.

Mitigation: Mitigation measures described in Chapter 12 Aquatic Biological Resources would be implemented for the action alternatives.

Impact Significance after Mitigation: The impacts would be **less than significant**.

35.3.8 Botanical Resources

Impact Bot-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on botanical resources.

35.3.8.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 13 Botanical Resources, implementation of the action alternatives would result in beneficial or less-than-significant impacts on botanical resources along the water edges at the CVP and SWP reservoirs and along the banks of rivers downstream of those reservoirs in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, implementation of the action alternatives would result in less-than-significant impacts in the annual grasslands and Valley foothill riparian vegetation as compared to the Existing Conditions/No Project/No Action Condition. However, potentially significant impacts would occur under the action alternatives related to disturbance of special-status plant species that may occur in grasslands, seasonal wetland habitats, Fremont cottonwood-dominated riparian forest areas, blue oak woodland, chamise, ponds, and Valley-foothill riparian habitats as compared to the Existing Conditions/No Project/No Action Condition. Potentially significant impacts due to habitat modification would become less than significant with the implementation of compensatory mitigation measures for vegetation community impacts, watershed hydrologic studies to evaluate relationship of grassy uplands to provide water supplies to alkaline wetland swales and alkaline marshes, pre-construction surveys for special-status plants, implementation of weed control plans, and avoidance measures in areas adjacent to the Delevan National Wildlife Refuge.

Implementation of most of the projects considered in the cumulative impact analysis would be implemented to improve riparian and reservoir habitats in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Several of the projects considered in the cumulative impact analysis could affect botanical resources in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation). These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to botanical resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant.

Mitigation: Mitigation measures described in Chapter 13 Botanical Resources would be implemented for the action alternatives.

Impact Significance after Mitigation: The impacts would be **less than significant**.

35.3.9 Terrestrial Biological Resources

Impact Wild-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on terrestrial biological resources.

35.3.9.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 14 Terrestrial Biological Resources, implementation of the action alternatives would result in beneficial or less-than-significant impacts on terrestrial resources at the CVP and SWP reservoirs and along the banks of rivers downstream of those reservoirs in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, implementation of the action alternatives would result in potentially significant impacts in the annual grasslands, blue oak woodland, dryland grain and seed crop, irrigated row and field crops, rice, pasture, deciduous orchard, chamise-redshank chaparral habitat, mixed chaparral, barren, Valley foothill riparian, fresh emergent wetland, lacustrine, and Eucalyptus habitats, and to migratory birds, bats, bald eagle, golden eagle, Valley elderberry longhorn beetle, western burrowing owl, western pond turtle, giant garter snake, bank swallow, ringtail, and western yellow-billed cuckoo as compared to the Existing Conditions/No Project/No Action Condition. Potentially significant impacts due to habitat modification would become less than significant with the implementation of pre-construction surveys, development of management and monitoring plans to protect identified habitats, plans to encourage birds (e.g., bank swallows) to not nest near the construction locations, prevention of construction near nests until end of nesting period, and protection of habitats from construction disturbances. The mitigation measures would minimize impacts to golden eagle, but loss of local foraging habitat would result in remaining potentially significant and unavoidable impacts.

Implementation of most of the projects considered in the cumulative impact analysis would be implemented to improve riparian and reservoir habitats in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis could affect terrestrial resources in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation). These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to terrestrial resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts except effects on golden eagle and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant. Because the action alternatives would result in potentially substantial and unavoidable effects in the Primary Study Area to the golden eagle, the action alternatives could result in a cumulatively considerable incremental contribution to an overall cumulative potentially significant adverse effect.

Mitigation: Mitigation measures described in Chapter 14 Terrestrial Biological Resources would be implemented for the action alternatives.

Impact Significance after Mitigation: The impacts would be **less than significant except as related to impacts to the golden eagle, which would be potentially significant and unavoidable**.

35.3.10 Wetlands and Other Waters

Impact Wet-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on wetlands and other waters of the United States.

35.3.10.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 15 Wetlands and Other Waters, implementation of the action alternatives would result in less-than-significant impacts to wetlands and other waters of the United States in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, construction and operation and maintenance activities under the action alternatives would result in potentially significant impacts at wetlands and other waters of the United States in the inundation area of Sites, Holthouse, and Terminal Regulating reservoirs; along portions of the new road corridors; at the Delevan Pipeline Intake/Discharge Facilities, along the Delevan Pipeline alignment; and along portions of the buffer zone. Potentially significant impacts to wetlands and other waters of the United States would become less than significant with the implementation of compensatory measures to conserve, enhance, restore, or create wetlands; and rerouting of drainage ditches and other conveyance facilities to maintain wetlands and other waters of the United States.

Implementation of most of the projects considered in the cumulative impact analysis would be implemented to improve wetland habitats in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis could affect wetlands and other waters of the United States in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation). These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to wetlands and other waters of the United States that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant.

Mitigation: Mitigation measures described in Chapter 15 Wetlands and Other Waters would be implemented for the action alternatives.

Impact Significance after Mitigation: The impacts would be **less than significant**.

35.3.11 Geology, Minerals, Soils, and Paleontology

Impact Geo/Min/Soils/ Paleo-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on geology, minerals, soils, and paleontology.

35.3.11.1 Extended, Secondary, and Primary Study Areas

Alternatives A, B, C, C₁, and D

As described in Chapter 16 Geology, Minerals, Soils, and Paleontology, implementation of the action alternatives would result in less-than-significant impacts to geology, minerals, soils, and paleontology in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, construction and operation and maintenance activities under the action alternatives would result in less-than-significant impacts to geology, minerals, and soils. Construction under the action alternative would result in deep excavations that could result in potentially significant impacts to potentially fossiliferous members of the Great Valley Sequence and into moderately sensitive rock units with paleontological resources. Potentially significant impacts to paleontological resources would become less than significant with consultation with qualified Paleontological resource specialists prior to and during construction to prepare and conduct a monitoring and mitigation plan and conduct awareness training.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to geology, minerals, soils, and paleontology in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect geology, minerals, soils, and paleontology resources. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to geology, minerals, soils, and paleontology resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant.

Mitigation: Mitigation measures described in Chapter 16 Geology, Minerals, Soils, and Paleontology would be implemented for the action alternatives.

Impact Significance after Mitigation: The impacts would be **less than significant**.

35.3.12 Faults and Seismicity

Impact Seis-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on risks associated with faults and seismicity.

35.3.12.1 Extended, Secondary, and Primary Study Areas

Alternatives A, B, C, C₁, and D

For the action alternatives, risks associated with faults and seismicity are related to exposure of people or structures to risks during and after a seismic event and associated with liquefaction or landslides; inundation by seiches or tsunamis; and increase risk due to reservoir-induced seismic events. As described in Chapter 17 Faults and Seismicity, implementation of the action alternatives would result in less-than-significant impacts to risks associated with faults and seismicity in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, construction and operation and maintenance activities under the action alternatives would result in less-than-significant impacts to risks associated with faults and seismicity because the new facilities would be constructed in accordance with design criteria developed specifically for the local faults and seismicity conditions, including the dams that form the proposed Sites Reservoir.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to risks associated with faults and seismicity in the Extended and Secondary study areas as compared to the

Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation). It is anticipated that these facilities also would be constructed in accordance with design criteria to reduce risks associated with faults and seismicity. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to risks associated with faults and seismicity that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.

35.3.13 Cultural/Tribal Cultural Resources

Impact Cul-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on cultural resources.

35.3.13.1 Extended, Secondary, and Primary Study Areas

Alternatives A, B, C, C₁, and D

As described in Chapter 18 Cultural/Tribal Cultural Resources, implementation of the action alternatives would result in less-than-significant impacts to cultural resources in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, historical and cultural resources surveys would be completed during the design phase. Until these studies are completed, it is expected that the construction, operation, and maintenance of the facilities under all of the action alternatives in the Primary Study Area would result in a potentially significant impact on historical and archaeological sites, traditional cultural properties, and tribal cultural resources. Two cemeteries are known to exist within the inundation area of the proposed Sites Reservoir Complex area. Evidence also indicates that there are likely unmarked cemeteries or burial places associated with Native American sites (prehistoric, ethnohistoric, and historic-era) within the reservoir area. As a result, the filling of Sites Reservoir and its operation and maintenance may have a potentially significant impact on cemeteries that are historical resources, when compared to the Existing Conditions/No Project/No Action Condition. Operation and maintenance of the proposed facilities in the action alternatives would have no impact on historical resources or historic properties that are archaeological sites, when compared to the Existing Conditions/No Project/No Action Condition, because any impacts on those resources would have been mitigated during construction.

Potentially significant impacts on cultural resources would be reduced with the implementation of measures to avoid impacts to these resources, conduct field surveys, conduct archaeological data recovery efforts, conduct archaeological construction monitoring and immediately halt construction if cultural resources or human remains are discovered, protection of subsurface cultural resources by capping the sites, and relocate dedicated or known cemeteries. Implementation of the mitigation measures would reduce the level of significance of most construction impacts of the action alternatives on cultural resources to a level of no impact or a less-than-significant impact; however, some impacts could remain potentially significant and unavoidable.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to

cultural resources in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect cultural resources. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to cultural resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant.

Mitigation: Mitigation measures described in Chapter 18 Cultural/Tribal Cultural Resources would be implemented for the action alternatives.

Impact Significance after Mitigation: The level of significance would be reduced due to the mitigation measures; however, **some impacts could be potentially significant and unavoidable.**

35.3.14 Indian Trust Assets

Impact ITA-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on Indian Trust Assets.

35.3.14.1 Extended, Secondary, and Primary Study Areas

Alternatives A, B, C, C₁, and D

As described in Chapter 19 Indian Trust Assets, implementation of the action alternatives would result in no impacts to Indian Trust Assets in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to Indian Trust Assets in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect Indian Trust Assets depending upon the location of the effects. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to Indian Trust Assets that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant.**

Mitigation: None.

35.3.15 Land Use

Impact Land-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on land use.

35.3.15.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 20 Land Use, implementation of the action alternatives would result in less-than-significant impacts to land use in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, construction and operation and maintenance activities under the action alternatives would result in less-than-significant impacts at specific locations of proposed facilities. However, the Project is not consistent with properties in Glenn and Colusa counties that are zoned for agricultural uses and would result in a conflict with the counties' general plans and zoning plans, and potentially significant impacts when compared to the Existing Conditions/No Project/No Action Conditions. Potentially significant impacts to land uses would become less than significant through coordination with Glenn and Colusa counties to modify or amend the related general plans and/or zoning ordinances to bring lands into consistency with the Project land uses; acquire lands through coordination with land owners or through eminent domain to acquire properties and pay any cancellation fees associated with removing lands from Williamson Act contracts; and permanently remove acquired lands from Williamson Act contracts, and seek County approvals to enter into Open Space Contracts or Open Space Easements. There is no feasible mitigation for land use changes in the town of Sites, so it is considered potentially significant and unavoidable. If working with the counties does not result in the Project being consistent with the counties' general plans, impacts associated with general plan land use designations, or zoning designations would result in remaining potentially significant and unavoidable impacts.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to land use in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect land use. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to land use that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts except for land use impacts to the community of Sites, land use conflicts with county general plans, and conversion of farmland and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less-than-significant. Because the action alternatives would result in potentially substantial and unavoidable effects in the Primary Study Area to the community of Sites, land use conflicts with county general plans, and the conversion of farmland, the action alternatives could result in a cumulatively considerable incremental contribution to an overall cumulative potentially significant adverse effect.

Mitigation: Mitigation measures described in Chapter 20 Land Use would be implemented for the action alternatives.

Impact Significance after Mitigation: The impacts would be **less than significant except as related to land use impacts to the community of Sites, land use conflicts with county general plans, and the conversion farmland, which would be significant and unavoidable.**

35.3.16 Recreation Resources

Impact Rec-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on recreation.

35.3.16.1 Extended, Secondary, and Primary Study Areas

Alternatives A, B, C, C₁, and D

As described in Chapter 21 Recreation Resources, implementation of the action alternatives would result in no impact or less-than-significant impacts to recreation in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of all of the projects considered in the cumulative impact analysis either would directly increase recreation opportunities (e.g., Shasta Lake Water Resources Investigation), or indirectly increase recreation opportunities associated with sport fishing through improvements to aquatic resources habitats (e.g., USFWS Recovery Plan for Sacramento-San Joaquin Delta Native Species) and, therefore, would not result in significant impacts to recreation in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to recreation that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.

35.3.17 Socioeconomics

Impact Socio-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on socioeconomics.

35.3.17.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 22 Socioeconomics, implementation of the action alternatives would result in less-than-significant or beneficial impacts to socioeconomics in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would only result in indirect changes to socioeconomics as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and would result in both direct and indirect changes to socioeconomics. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to socioeconomics that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives

would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be beneficial or **less than significant**.

Mitigation: None.

35.3.18 Environmental Justice

Impact Env Jus-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on environmental justice.

35.3.18.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 23 Environmental Justice, implementation of the action alternatives would result in no impact or no disproportional impacts related to environmental justice in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would only result in indirect changes related to environmental justice as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and would result in both direct and indirect changes related to environmental justice. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts related to environmental justice that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would result in no impact or **no disproportional impacts related to environmental justice**.

Mitigation: None.

35.3.19 Air Quality

Impact Air Qual-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on air quality.

35.3.19.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 24 Air Quality, implementation of the action alternatives would result in less-than-significant impacts to air quality in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, impacts to air quality would be potentially significant due to the estimated construction-related emissions that would exceed air quality criteria under the action alternatives as compared to the Existing Conditions/No Project/No Action Condition. Impacts associated with exposure of sensitive receptors to substantial pollutant concentrations and odors would be less than significant under the action alternatives as compared to the Existing Conditions/No Project/No Action Condition.

Potentially significant impacts on air quality would be reduced with the implementation of measures to develop and implement a fugitive dust control plan, and measures to reduce equipment and vehicle exhaust emissions. Implementation of the mitigation measures would reduce the level of significance of

most construction impacts of the action alternatives on air quality to a level of less-than-significant impact; however, some impacts could remain potentially significant and unavoidable.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities or major changes in operations that would increase vehicular traffic (e.g., USFWS Recovery Plan for Sacramento-San Joaquin Delta Native Species) and, therefore, would not result in significant impacts to air quality in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect air quality. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to air quality that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for most impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be less than significant for most impacts; however, some impacts associated with construction equipment and vehicle emissions would be potentially significant and unavoidable.

Mitigation: Mitigation measures described in Chapter 24 Air Quality would be implemented for the action alternatives.

Impact Significance after Mitigation: The level of significance would be reduced due to the mitigation measures; however, **some impacts would be potentially significant and unavoidable.**

35.3.20 Climate Change and Greenhouse Gas Emissions

Impact GHG-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects due to greenhouse gas emissions.

35.3.20.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 25 Climate Change and Greenhouse Gas Emissions, implementation of the action alternatives would result in less-than-significant impacts due to greenhouse gas emissions in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, impacts due to greenhouse gas emissions would be potentially significant due to construction and operation and maintenance activities under the action alternatives as compared to the Existing Conditions/No Project/No Action Condition. The action alternatives would not contribute to adverse effects on climate change.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities or major changes in operations that would increase greenhouse gas emissions (e.g., USFWS Recovery Plan for Sacramento-San Joaquin Delta Native Species) and, therefore, would not result in significant impacts to greenhouse gas emissions as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect greenhouse gas emissions. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to greenhouse gas emissions that would occur under the Existing Conditions/No Project/No Action Condition, the changes resulting from the action alternatives would remain significant

and unavoidable and, therefore, would be cumulatively considerable related to past, present, and probable future projects. The overall result would be potentially significant and unavoidable.

Mitigation: None available.

Impact Significance after Mitigation: The level of significance would be **potentially significant and unavoidable**.

35.3.21 Navigation, Transportation, and Traffic

Impact Nav/Trans-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on navigation, transportation, and traffic.

35.3.21.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 26 Navigation, Transportation, and Traffic, implementation of the action alternatives would result in no impacts or less-than-significant impacts to navigation, transportation, and traffic in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to navigation, transportation, and traffic in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect navigation, transportation, and traffic. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to navigation, transportation, and traffic that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.

35.3.22 Noise

Impact Noise-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on noise.

35.3.22.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 27 Noise, implementation of the action alternatives would result in no impacts or less-than-significant impacts to noise in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. In the Primary Study Area, the action alternatives would result in no impacts or less-than-significant impacts to noise and ground-borne vibrations as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to noise and ground-borne vibrations in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact

analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect noise and ground-borne vibrations. These projects are ongoing and the results are not known at this time. However, regardless if these projects result in adverse impacts to noise and ground-borne vibrations that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.

35.3.23 Public Health and Environmental Hazards

Impact Pub Health-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects related to public health and environmental hazards.

35.3.23.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 28 Public Health and Environmental Hazards, implementation of the action alternatives would result in no impacts or less-than-significant impacts related to public health and environmental hazards in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts related to public health and environmental hazards as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could result in impacts related to public health and environmental hazards. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts related to public health and environmental hazards that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.

35.3.24 Public Services and Utilities

Impact Services-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on public services.

35.3.24.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 29 Public Services and Utilities, implementation of the action alternatives would result in no impacts or less-than-significant impacts to public services in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to public services in the Extended and Secondary study areas as compared to the Existing Conditions/No

Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect public services. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to public services that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.

35.3.25 Visual Resources

Impact Visual-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on visual resources.

35.3.25.1 Extended, Secondary, and Primary Study Areas (All Alternatives)

As described in Chapter 30 Visual Resources, implementation of the action alternatives would result in less-than-significant impacts to cultural resources in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition.

In the Primary Study Area, construction and operation of most of the facilities associated with the action alternatives would result in no impact or less-than-significant impact to visual resources as compared to the Existing Conditions/No Project/No Action Condition. However, during operations, the Terminal Regulating Reservoir would create a moderate to high visual contrast when compared to the Existing Conditions/No Project/No Action Condition, the facility would have the potential to degrade the moderate visual quality of the area although views from adjacent residents and roads of scenic undeveloped hills to the west would have limited potential to be obstructed during operations depending on their distance from the proposed facilities and viewing angle. Therefore, the facilities would result in a potentially significant impact as compared to the Existing Conditions/No Project/No Action Condition. No mitigation measures would be available to reduce this impact.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to visual resources as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect visual resources. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to visual resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes resulting from the action alternatives would remain small for all impacts, except for visual resources related to the areas near the Terminal Regulating Reservoir. Therefore, Project impacts would not be cumulatively considerable related to past, present, and probable future projects, and the overall result would be less than significant, except for visual resources related to the areas near the Terminal Regulating Reservoir.

Mitigation: None.

Impact Significance after Mitigation: The level of significance would remain **less than significant except for visual resources related to the areas near the Terminal Regulating Reservoir, which would be potentially significant and unavoidable**.

35.3.26 Power Production and Energy

Impact Power-CI-1: The project alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on power production and energy.

35.3.26.1 Extended, Secondary, and Primary Study Areas

Alternatives A, B, C, C₁, and D

As described in Chapter 31 Power Production and Energy, implementation of the action alternatives would result in less-than-significant impacts related to power production and energy resources in the Extended, Secondary, and Primary study areas as compared to the Existing Conditions/No Project/No Action Condition.

Implementation of many of the projects considered in the cumulative impact analysis would be implemented without construction activities and, therefore, would not result in significant impacts to power production and energy resources in the Extended and Secondary study areas as compared to the Existing Conditions/No Project/No Action Condition. Several of the projects considered in the cumulative impact analysis would include construction in the Extended and Secondary study areas (e.g., Shasta Lake Water Resources Investigation) and could affect power production and energy resources. These projects are ongoing and the results are not known at this time. Regardless of whether these projects result in adverse impacts to power production and energy resources that would occur under the Existing Conditions/No Project/No Action Condition, the changes due to the action alternatives would remain small for all impacts and, therefore, would not be cumulatively considerable related to past, present, and probable future projects and the overall result would be **less than significant**.

Mitigation: None.