Chapter 5
Cumulative Impacts

Introduction

The 2000 RDEIR/EIS presented cumulative impacts within each resource section. This chapter consolidates the potential cumulative impacts of the Proposed Project (Alternative 2), organized by resource topic.

State CEQA Guidelines require that the cumulative impacts of a proposed project be addressed in an EIR when the cumulative impacts are expected to be significant and when the project's incremental effect is cumulatively considerable (Guidelines 15130[a]). If an environmental effect is not "cumulatively considerable", a Lead Agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable. (Id.) Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (Guidelines 15355[b]). Such impacts can result from individually minor but collectively significant actions taking place over time.

The cumulative impact analysis determines the combined effect of the Proposed Project and other closely related, reasonably foreseeable, projects. This section describes the methods used to evaluate cumulative effects, lists related projects and describes their relationship to the proposed Project, identifies cumulative impacts by resource area, and recommends mitigation for significant cumulative effects. Section 15130 of the State CEQA Guidelines states that the discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone. The level of detail should be guided by what is practical and reasonable.

According to the State CEQA Guidelines (Section 15130), an adequate discussion of significant cumulative impacts should contain the following elements:

- an analysis of related future projects or planned development that would affect resources in the project area similar to those affected by the proposed project;
- 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; and

- a reasonable analysis of the cumulative impacts of the relevant projects. An EIR must examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

To identify the related projects, the State CEQA Guidelines (15130[b]) recommend either the "list" or "projection" approach. This analysis uses the list approach, which entails listing past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the lead agency. The Lead Agency has not identified any previously approved land use documents that contain a pertinent discussion of cumulative impacts.

Projects to Be Cumulatively Considered

Projects Previously Considered

This analysis incorporates all reasonably foreseeable, relevant projects and focuses on those water management actions or projects that, when combined with the Proposed Project, could contribute to cumulative effects. The 2001 FEIR and 2001 FEIS considered the following projects when analyzing potential cumulative impacts:

- State Water Board Bay-Delta Proceedings
- CALFED Bay-Delta Program
- CVP and SWP Endangered Species Consultations
- Coordinated Operations Agreement
- Banks Pumping Plant Fish Protection Agreement
- Central Valley Project Improvement Act
- DWR Delta Water Management Programs
  - North Delta Program
  - South Delta Program
  - West Delta Program
- DWR Delta Levee Maintenance Program
  - Subventions Program
  - Special Projects
- Delta Ecological Studies
- DWR Offstream Storage South of the Delta
  - Los Banos Grandes
  - Kern Water Bank

- SWP Coastal Branch Project, Phase II
- CCWD Los Vaqueros Project
- Montezuma Wetlands Project
- Delta Water Transfers
- Reoperation of Folsom Dam and Reservoir
- East Bay Municipal Utility District Activities
  - American River Diversions
  - Water Supply Management Program
- Activities of the Metropolitan Water District of Southern California
  - Arvin-Edison/Metropolitan Water District Storage and Exchange Program
  - Domenigoni Reservoir Project

Updated Project List

Because so much time has passed since the cumulative impact analysis was performed for the 2001 FEIR and 2001 FEIS, the above list of programs and projects relevant to the Project that could contribute to cumulative impacts is largely out-of-date. Scoping for this Place of Use EIR and other recent documents was used to update the list of projects considered in this revised cumulative impact analysis. The analysis considers projects that could affect the same resources and, where relevant, in the same time frame as the Proposed Project, resulting in a cumulative impact. The following list contains projects considered for this updated cumulative effects section; each project is then described and its relationship to the resource impacts caused by the Proposed Project is discussed.

- Alternative Intake Project
- Bay Area Water Quality and Water Supply Reliability Program
- Bay Delta Conservation Plan
- CALFED Ecosystem Restoration Program
- CALFED Levee System Integrity Program
- Cecchini Ranch
- City of Stockton Delta Water Supply Project
- Clifton Court Forebay–Jones Pumping Plant Intertie
- Delta Cross Channel Reoperation and Through-Delta Facility
- Delta-Mendota Canal–California Aqueduct Intertie
- Dutch Slough Tidal Marsh Restoration Project

- East Altamont Energy Center Power Plant Project
- Franks Tract Project
- Freeport Regional Water Project
- Ironhouse Sanitary District Wastewater Treatment Plant Expansion
- Level 2 Federal Refuge Water Supply Program
- Liberty Island Conservation Bank
- Los Vaqueros Reservoir Expansion
- Lower San Joaquin River Flood Improvements
- Monterey Plus (Monterey Amendment to the State Water Project Contracts)
- Mountain House Community
- National Marine Fisheries Service Biological Opinion Reasonable and Prudent Alternative for Central Valley Project/State Water Project OCAP
- North Bay Aqueduct Alternative Intake Project
- North Delta Flood Control and Ecosystem Restoration Project
- North-of-Delta Off-Stream Storage (Sites Reservoir)
- Old River and Rock Slough Water Quality Improvement Project
- Red Bluff Diversion Dam Plant Fish Passage Improvement Project
- River Islands at Lathrop Development
- Sacramento Valley Water Management Settlement Agreement (Phase 8)
- San Joaquin River Restoration Program
- San Luis Reservoir Low Point Improvement Project
- Shasta Dam and Reservoir Enlargement
- South Bay Aqueduct Enlargement
- South Bay Salt Ponds Restoration Project
- South Delta Improvements Program
- State Water Project—Oroville Facilities
- Suisun Marsh Management Plan
- SWP Harvey O. Banks Pumping Plant Operations
- Tracy Fish Test Facility
- Two-Gate Fish Protection Demonstration Project
- Upper San Joaquin River Basin Storage

- U.S. Fish and Wildlife Service Biological Opinion Reasonable and Prudent Alternative for Central Valley Project/State Water Project OCAP
- Projects in Contra Costa General Plan
- Projects in San Joaquin County General Plan
- Other Development Projects

Alternative Intake Project

CCWD's Alternative Intake Project (AIP) consists of a new 250 cfs screened intake at Victoria Canal and a pump station; levee improvements; and a conveyance pipeline to CCWD's existing conveyance facilities. CCWD will operate the intake and pipeline together with its existing facilities to better meet its delivered water quality goals and to better protect listed species. Operations with the AIP will be similar to existing operations: CCWD will deliver Delta water to its customers by direct diversion when salinity at its intakes is low enough, and will blend Delta water with releases from Los Vaqueros Reservoir when salinity at its intakes exceeds the delivered water quality goal. Los Vaqueros Reservoir will be filled from the existing Old River intake or the new Victoria Canal intake during periods of high flow in the Delta, when Delta salinity is low. The choice of which intake to use at any given time will be based in large part upon salinity, consistent with fish protection requirements in the biological opinions; salinity at the Victoria Canal intake site is at times lower than salinity at the existing intakes. The no-fill and no-diversion periods will continue as part of CCWD operations, as will monitoring and shifting of diversions among the four intakes to minimize impacts on listed species.

The AIP is a water quality project and will not increase CCWD's average annual diversions from the Delta. However, it will alter the timing and pattern of CCWD's diversions in two ways: winter and spring diversions will decrease while late summer and fall diversions will increase because Victoria Canal salinity tends to be lower in the late summer and fall than salinity at CCWD's existing intakes; and diversions at the unscreened Rock Slough Intake will decrease while diversions at screened intakes will increase. It is estimated that with the AIP, Rock Slough intake diversions will fall to about 10% of CCWD's total diversions, with the remaining diversions taking place at the other screened intakes.

The project was initiated in July 2004 with a two-year planning phase that included an environmental analysis to comply with federal and state requirements (NEPA and CEQA). CCWD and Reclamation released the Draft EIR/EIS in May 2006 and the Final EIR/EIS in October 2006. In November 2006, the CCWD Board of Directors approved the project and certified the EIR. Construction began in 2008 and is expected to be completed by September 2010. Impacts identified in the AIP EIR/EIS include air quality and loss of agricultural land. Additional information is provided at:

<http://www.ccwater-alternativeintake.com/index.htm>.

Bay Area Water Quality and Water Supply Reliability Program

The Bay Area Water Quality and Water Supply Reliability Program would encourage participating Bay Area partners, including Alameda County Water District, Zone 7 Water Agency, Bay Area Water Supply and Conservation Agency, CCWD, EBMUD, San Francisco Public Utilities Commission, and the Santa Clara Valley Water District (SCVWD), to develop and coordinate regional exchange projects to improve water quality and supply reliability. This project would include the cooperation of these agencies in operating their water supplies for the benefit of the entire Bay Area region as well as the potential construction of interconnects between existing water supplies. This program is in the preliminary planning stages.

Bay Delta Conservation Plan

The BDCP is a plan to provide for the recovery of Endangered, Threatened, and sensitive species and their habitats in the Delta in a way that also will protect and restore water supplies. The BDCP will identify and implement conservation strategies to improve the overall ecological health of the Delta; identify and implement ecologically friendly ways to move freshwater through and/or around the Delta; address toxic pollutants, invasive species, and impairments to water quality; and provide a framework and funding to implement the plan over the next 50 years. The BDCP is being prepared through a collaborative process among state, federal, and local water agencies (e.g., DWR, Reclamation, Westlands Water District); state and federal fish agencies (USFWS, DFG, NMFS); environmental organizations (e.g., The Nature Conservancy, Defenders of Wildlife); other federal agencies (EPA and Corps); and other interested parties.

The BDCP proposes to construct new intakes on the Sacramento River connected to one or more conveyance facilities that would extend south to existing SWP and CVP export systems. Alternatives currently being evaluated comprise the following conveyance options: through-Delta; east alignment (tunnel and canal); west alignment (tunnel and canal); all-tunnel; or dual conveyance (combines portions of east, west, or all-tunnel alignments with some elements of through-Delta alignment) (Delta Habitat Conservation and Conveyance Program 2009). The restoration options include various degrees of restoration in the Delta and Suisun Marsh. Overall, it could contribute to a more stable water supply, improved levee stability, and reduced impacts on fish. The BDCP public review draft is scheduled to be released for public comment in late 2010, and its accompanying EIS/EIR is expected to be complete in 2011.

At present, the all-tunnel alignment is the preferred option because of its smaller footprint. If constructed, the east, west, and all-tunnel alignments would each have a maximum capacity of 15,000 cfs. This project could contribute to cumulative impacts on fish, water supply, hydrodynamics, and loss of

agricultural land. It could also contribute beneficially to habitat improvements for fish and estuarine species in the Delta.

CALFED Ecosystem Restoration Program

The goals of the CALFED Ecosystem Restoration Program (ERP) are to:

- recover 19 at-risk native species and contribute to the recovery of 25 additional species;
- rehabilitate natural processes related to hydrology, stream channels, sediment, floodplains and ecosystem water quality;
- maintain and enhance fish populations critical to commercial, sport, and recreational fisheries;
- protect and restore functional habitats, including aquatic, upland, and riparian, to allow species to thrive;
- reduce the negative impacts of invasive species and prevent additional introductions that compete with and destroy native species; and
- improve and maintain water and sediment quality to better support ecosystem health and allow species to flourish.

The ERP plan, which is now administered and funded by DFG, is divided into the Sacramento, San Joaquin, and Delta and Eastside Tributary regions. This plan includes the following kinds of actions:

- develop and implement habitat management and restoration actions, including restoration of river corridors and floodplains, reconstruction of channel-floodplain interactions, and restoration of Delta aquatic habitats;
- restore habitat that would specifically benefit one or more at-risk species;
- implement fish passage programs and conduct passage studies;
- continue major fish screen projects and conduct studies to improve knowledge of their effects;
- restore geomorphic processes in stream and riparian corridors;
- implement actions to improve understanding of at-risk species;
- develop understanding and technologies to reduce the impacts of irrigation drainage on the San Joaquin River and reduce transport of contaminant (selenium) loads carried by the San Joaquin to the Delta and the Bay; and
- implement actions to prevent, control, and reduce impacts from nonnative invasive species.

ERP actions contribute to cumulative benefits on fish and wildlife species, habitats, and ecological processes. Many of the Delta ERP actions will be included in the BDCP planning and design process.

CALFED Levee System Integrity Program

The Levee System Integrity Program is being implemented by the DWR, DFG and the U.S. Army Corps of Engineers. The goal of the CALFED Levee System Integrity Program is to uniformly improve Delta levees by modifying cross sections, raising levee height, widening levee crown, flattening levee slopes, or constructing stability berms. Estimates are that 520 miles of levees need improvement and maintenance to meet the PL 84-99 standard for Delta levees. The levees program continues to implement levee improvements throughout the Delta, including the south Delta area.

This project could contribute to cumulative impacts on fish, geology and soils, cultural resources, and water quality. It would be considered cumulatively beneficial for water supply because improving Delta levee stability is needed to ensure that Delta waterways are a reliable means for conveying water for in-Delta and export purposes.

Cecchini Ranch

Private Island Homes is planning to develop a planned master community on the 1,100-acre Cecchini Ranch property adjacent to Discovery Bay. This new community would include 4,000 to 6,000 residences; a new marina; commercial and light industrial uses; new parks, schools, and trails; and a Delta interpretive center (Contra Costa County Community Development Department 2007). The land where this development would be built was designated as important agricultural land in Contra Costa County's 2005 general plan. If constructed, this project could have cumulative impacts on water supply, water quality, fish, and loss of agricultural land.

City of Stockton Delta Water Supply Project

Currently under construction, this project proposes to divert water from the San Joaquin River for use as a supplemental water supply for the city of Stockton. The proposed intake location is on the southwestern tip of Empire Tract, adjacent to the Stockton DWSC. The maximum diversion rate for the initial phase of the project would be 46 cfs (33,600 af/yr), which would increase to 248 cfs (125,900 af/yr) under the final (2050) phase of development. This project is designed to fulfill the treated water supply needs of full buildout under the City of Stockton's 1990 general plan. A final program EIR, with the City of Stockton as lead agency, was completed and submitted to the State Clearinghouse in October 2005. (City of Stockton 2005)

As identified in the DEIR, the Delta Water Supply Project would have significant effects on visual resources and air quality, and would contribute to a loss of agricultural land and urban growth. This project would have less-than significant effects on land use, water quality, hazardous materials, groundwater, soils, wetlands, special-status species and sensitive habitats, noise, traffic, utilities,

cultural resources, and fish. This project could contribute to cumulative impacts on water supply, water quality, special-status species and sensitive habits, fish, and loss of agricultural land.

Clifton Court Forebay–Jones Pumping Plant Intertie

This project would construct an intertie between the CVP and the CCF. It would require an increase in the capacity of the proposed CCF screened intake (see description of Banks Pumping Plant Operations, above). This project would provide increased operational flexibility by modifying intake operations to improve the water quality of exports, improve water supply reliability, and minimize impacts on fish entrainment. This project was included in the CALFED ROD and therefore is analyzed in this cumulative impact assessment. This project will likely be necessary as part of the BDCP isolated conveyance facility, if that facility is constructed. It could contribute to cumulative impacts on water supplies and fish.

Delta Cross Channel Reoperation and Through-Delta Facility

As part of the CALFED ROD, changes in the operation of the DCC and the potential for a through-Delta facility (TDF) are being evaluated. Studies are being conducted to determine how changing the operations of the DCC could benefit fish and water quality. This evaluation will help determine whether a screened through-Delta facility is needed to improve fisheries and avoid water quality disruptions. In conjunction with the DCC operations studies, feasibility studies are being conducted to determine the effectiveness of a TDF. The TDF would include a screened diversion on the Sacramento River of up to 4,000 cfs and conveyance of that water into the Delta. These projects will probably be replaced by the BDCP, if that project is constructed.

Both a DCC reoperation and a TDF would change the flow patterns and water quality in the Delta, affecting fisheries, ecosystems, and water supply reliability. Thus, these projects could have cumulative impacts on water supply, water quality, fish, and terrestrial biological resources.

Delta-Mendota Canal–California Aqueduct Intertie

This project would construct an intertie between the CVP's Delta-Mendota Canal and the California Aqueduct just south of the Banks and Jones Pumping Plants. It would allow Reclamation to pump to the full permitted capacity of 4,600 cfs at Jones, resulting in a shift in timing of pumping and therefore filling San Luis Reservoir sooner and potentially increasing the amount of water delivered south of the Delta by an average of 35,000 af/yr. An IS/MND was adopted in 2004 by

the San Luis & Delta Mendota Water Authority, and Reclamation prepared a DEIS in July 2009 and an FEIS in November 2009.

This project is likely to be built and operated as it has been the focus of recent attention to the drought situation for agricultural water users south of the Delta. It could contribute to cumulative impacts on water supplies and associated resources. It could modify the timing and magnitude of upstream reservoir releases in wet years to accommodate this increased conveyance capacity.

Dutch Slough Tidal Marsh Restoration Project

This project proposes to restore wetlands and upland habitat and provide public access to the 1,166-acre Dutch Slough, which is currently owned by DWR (California Department of Water Resources and California State Coastal Conservancy 2008). The project is located in the city of Oakley in eastern Contra Costa County. The DEIR for the Dutch Slough restoration project was issued by DWR on November 20, 2008. The FEIR was approved by DWR on March 17, 2010.

In the DEIR, Alternative 1 was selected as the environmentally superior alternative, with significant impacts on hydrology and geomorphology, water quality, geology and soils, terrestrial and wetland biological resources, aquatic biological resources, air quality, recreation, cultural resources, and hazards and hazardous materials. Less-than significant impacts were identified for noise, aesthetics, agricultural resources, transportation, and public services and utilities. Terrestrial and wetland biological resources could be cumulatively affected by the project. This project could also result in cumulative beneficial effects on habitat for aquatic species and on recreation.

East Altamont Energy Center Power Plant Project

Calpine Corporation plans to construct an energy center with the intent to market power from hydroelectric plants, such as Shasta and Folsom Dams, to other entities, such as merchant power plants. The center would be located on a 174-acre parcel of land in Alameda County. The actual footprint of the plant would be approximately 55 acres, with the remainder of the parcel available for agricultural leases. Water for cooling and other power plant processes would be provided by Byron Bethany Irrigation District. The plant is expected to have a 30- to 50-year operating life. Environmental documentation equivalent to an EIS/EIR (Revised Presiding Member's Proposed Decision) was completed in January 2003, and approval from the Energy Commission was granted in August 2003. The project could contribute to cumulative loss of agricultural land.

Franks Tract Project

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 installing operable gates to control the flow of water at key locations (Three Mile Slough and/or West False River) to reduce seawater intrusion, and to positively influence movement of fish species of concern to areas that provide favorable habitat conditions. By protecting fish resources, this project also would improve operational reliability of the SWP and the CVP because curtailments in water exports (pumping restrictions) are likely to be less frequent. The overall purpose of the Franks Tract Project is to modify hydrodynamic conditions to protect and improve water quality in the central and south Delta, protect and enhance conditions for fish species of concern in the western and central Delta, and achieve greater operational flexibility for pump operations in the south Delta. 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.

DWR and Reclamation have conducted 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 the sharply declining populations of delta smelt.

Preparation of a joint EIS/EIR for the project is underway. However, the project schedule is subject to availability of State Bond funds.

This project could contribute to cumulative fish and tidal hydraulic impacts by changing flows in the North Delta to improve migratory conditions.

Freeport Regional Water Project

The Freeport Regional Water Project (FRWP) is a regional water supply project being developed on the Sacramento River near the town of Freeport by the Sacramento County Water Agency (SCWA) and the East Bay Municipal Utility District (EBMUD), in close coordination with the City of Sacramento and Reclamation. The project is designed to help meet future drinking water needs in the central Sacramento County area and supplement water conservation and recycling programs in the East Bay to provide adequate water supply during future drought periods.

FRWP will provide up to 100 mgd of water for EBMUD to use during drought years and 85 mgd for SCWA to use in all years. The project would divert water from the Sacramento River and deliver it to a Sacramento County Treatment Facility and the Folsom South Canal. From the Folsom South Canal, water will be delivered to the Mokelumne Aqueducts. This project includes construction of

fish screens and a pumping plant at the intake on the Sacramento River, a water treatment facility in Sacramento County, and pipeline facilities to transport the water from Freeport to the Mokelumne Aqueducts. The FRWP is under construction and is expected to begin operations in 2010 (it was officially dedicated on April 8, 2010). As such, only operational impacts are considered in this cumulative impact assessment.

The FRWP EIR/EIS identified significant impacts on recreation, vegetation and wetlands, wildlife, noise, visual resources, and cultural resources. Less than significant impacts were identified for water quality, water supply, fish, land use, agricultural resources, and public health. These impacts would occur primarily at the FRWP facilities located at the intake, the pipelines, and on the Mokelumne River. Additional information can be found at:

<http://www.freeportproject.org/index.php>.

Ironhouse Sanitary District Wastewater Treatment Plant Expansion

The Ironhouse Sanitary District (ISD) provides sewage collection, treatment, and disposal service to the city of Oakley, the unincorporated Bethel Island, and unincorporated areas in eastern Contra Costa County. In 1991, ISD proposed to upgrade and expand its wastewater treatment and disposal facilities. In 1994, ISD prepared, circulated, and certified a FEIR (State Clearinghouse Number 92093042) that described the potential impacts on environmental resources for the proposed expansion. (Jones & Stokes 2006)

Since the 1994 FEIR was certified, ISD expanded its treatment capacity from 2.3 mgd to 2.7 mgd, and also developed 396 acres of agricultural land on Jersey Island for irrigation with reclaimed water (treated effluent). In 2006, ISD prepared the *Draft Supplemental Environmental Impact Report for Ironhouse Sanitary District Wastewater Treatment Plant Expansion* to evaluate and disclose potential impacts of their proposed wastewater treatment expansion that were not considered in their 1994 EIR. The Final Supplemental EIR was prepared in January 2007. In that document, ISD selected the alternative that includes a new 8.6 mgd treatment plant on ISD land adjacent to the existing plant (the first phase of the new plant will have a capacity of 4.3 mgd); 114 million gallons of existing storage capacity for treated effluent; a maximum of 510 acres of year-round irrigation lands for disposal of treated effluent; and a new discharge to the San Joaquin River, which will be located off the northern shore of Jersey Island (Contra Costa Local Agency Formation Commission 2007). Ground was broken for the new wastewater treatment plant on April 22, 2009, and construction is expected to be completed by October 2011 (Ironhouse Sanitary District 2010).

As identified in the DEIR, this project would result in less-than significant impacts on agricultural resources (loss of farmland), air quality, cultural resources, hydrology and water quality, fish, vegetation and wildlife, geology, land use, noise, recreation, public services and utilities, public health/hazards,

traffic and circulation, and visual resources. It could contribute to cumulative impacts on fish, water quality, and loss of agricultural lands.

Level 2 Federal Refuge Water Supply Program

The 1992 CVIPA mandated that a secure, reliable source of water be established for wildlife refuges in the Sacramento and San Joaquin Valleys. Since 1992, an average of approximately 400,000 af/yr of Level 2 water has been delivered to these refuges to meet this requirement (U.S. Fish and Wildlife Service 2010). This water derives primarily from CVP water. This program could contribute to cumulative impacts on water supply, and beneficial cumulative impacts on wildlife habitat and fish.

Liberty Island Conservation Bank

Reclamation District 2093 (RD 2093) is acting as the lead agency for the Liberty Island Conservation Bank project located at the intersection of Liberty Cut and Liberty Slough on the northern tip of Liberty Island approximately five miles west of Courtland and 10 miles north of the City of Rio Vista in the southern Yolo Bypass which is part of the Sacramento Delta, located in Yolo County, California. The purpose of the Proposed Project is to restore habitat for Delta native fish species for use as mitigation for impacts to Delta native fish habitat in the region. The project is the creation of a conservation bank which would preserve, create, restore, and enhance habitat for all native Delta fish species including Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, California Central Valley Steelhead, delta smelt, and Central Valley fall- and late fall-run Chinook salmon.

The project consists of creating tidal channels, perennial marsh, and occasionally flooded uplands on the site. The project also includes the breaching of the northernmost east-west levee, and preservation and restoration of shaded riverine aquatic habitat along the levee shorelines of the tidal sloughs. When complete, the site will provide a mosaic of interior tidal channels (i.e., open water) to connect interior island marshes to adjacent tidal channels. Construction on the project is scheduled to be completed in 2009. Other restoration projects are also planned on Liberty Island

Resources for which effects may be cumulatively considerable include agricultural and land use resources, air quality, biological resources (fish and Swainson’s hawk foraging habitat), and hydrology and water quality.

Los Vaqueros Reservoir Expansion

Reclamation, DWR, and CCWD are conducting a feasibility study examining alternatives to improve water quality and water supply reliability for Bay Area water users while enhancing the Delta environment through providing water for

environmental uses, which will include expanding Los Vaqueros Reservoir as well as a variety of other alternatives. Current work has focused on planning-level evaluations of expanding Los Vaqueros Reservoir from 100,000 acre-feet up to 275,000 acre-feet in order to improve Bay Area water quality and water supply reliability, as well as provide water for environmental purposes. An expanded reservoir could require a new or expanded Delta intake. Locations being considered for the new Delta intake include Old River and adjacent channels. Water from an expanded reservoir could be delivered to Bay Area water users through a connection to the South Bay Aqueduct.

A draft planning report, including an evaluation of the environmental impacts of an expanded Los Vaqueros Reservoir on the Delta, was released in May 2003 (U.S. Bureau of Reclamation, Contra Costa Water District, and Western Area Power Administration 2010). Studies conducted for the draft planning report show that there would be no significant effect on water levels for current Delta water users, or on river velocities. An expanded Los Vaqueros could change the timing of diversions from the Delta. Passage of Measure N in March 2004 allowed further environmental and engineering studies to continue, with environmental review public scoping meetings held in 2006. The DEIR/EIS was released in February 2009.

The FEIS/EIR for this project was certified by CCWD on March 31, 2010, with Alternative 4 identified as the environmentally superior alternative under CEQA and as Reclamation's preferred alternative (Reclamation will identify their environmentally preferable alternative in the ROD). This alternative would increase storage capacity from 100 taf to 160 taf and does not include a new Delta intake and pump station. Construction is scheduled to begin in 2011. (U.S. Bureau of Reclamation, Contra Costa Water District, and Western Area Power Administration 2010).

The Los Vaqueros Reservoir Expansion could contribute to cumulative effects on water supplies and associated resources and could increase water supplies available for export in those years when Los Vaqueros Reservoir otherwise would have spilled. It also could modify the timing and magnitude of upstream reservoir releases in wet years and would reduce Delta outflow during diversions needed to fill the reservoir.

Lower San Joaquin Flood Improvements

The primary objective of the Lower San Joaquin Flood Improvements project is to "design and construct floodway improvements on the lower San Joaquin River and provide conveyance, flood control, and ecosystem benefits" (CALFED ROD). This potential project would construct setback levees in the South Delta Ecological Unit along the San Joaquin River between Mossdale and Stockton, and convert adjacent lands to overflow basins and nontidal wetlands or land designated for agricultural use. The levees are necessary for future urbanization and will be compatible with the Sacramento and San Joaquin River Basins comprehensive study.

If implemented, the potential project also may include the restoration of riparian and riverine aquatic habitat, increased riparian habitat, restrictions on dredging and sediment disposal, reduction of invasive plants, and protection and mitigation of effects on Threatened or Endangered species. Progress has been delayed indefinitely with no scheduled date for completion.

This potential project could contribute to ecosystem improvements in the lower San Joaquin River.

Monterey Plus (Monterey Amendment to the State Water Project Contracts)

In 1994, DWR and six water agencies (Kern County Agency, Tulare Lake Basin Water Storage District, Coachella Valley Water District, Metropolitan, Central Coast Water Authority, and Solano County Water Agency) established a set of principles, known as the *Monterey Agreement*, to settle long-term water allocation disputes and create a new management structure for the SWP. The Final EIR for the Monterey Agreement was completed in October 1995 and certified in November 1995. Subsequently, this EIR was challenged in a lawsuit, and on September 15, 2000, the California Third District Court of Appeals ruled the EIR failed to analyze certain impacts relating to water reallocation among contractors in the event of a permanent water shortage, and ordered a new EIR to be prepared. (California Department of Water Resources 2007)

As a result of the court's ruling, a new DEIR and FEIR, for a project now dubbed the *Monterey Amendment*, were prepared, and the FEIR was certified on February 10, 2010. According the DEIR, the primary elements of the Monterey Amendment comprise the following:

- Altered water allocation procedures
- Permanent Table A water transfers and retirements
- New water supply management practices (California Department of Water Resources 2007).

Significant impacts were identified in the draft Monterey Plus EIR for terrestrial biological resources; visual resources; air quality; geology, soils, and mineral resources; recreation; and cultural resources. Less-than significant impacts were identified for surface water hydrology, water quality, and water supply; groundwater; agricultural resources; geology, soils, and mineral resources; land use and planning; hazards and hazardous materials; noise; public services and utilities; traffic and transportation; and energy. The Monterey Plus project could contribute to cumulative impacts on water supply; water quality; and fish species, including special-status species.

Mountain House Community

Trimark Communities has started development of a new community in the western portion of San Joaquin County along the Alameda–San Joaquin County line north of Interstate 205. At full buildout, 16,105 residential units on 4,784 acres would be developed. Mountain House is located directly south of Old River and west of Patterson Pass Road and will include residential, commercial, and some industrial development. It has been designed to accommodate all the needs of the expected 43,522 residents, including housing, jobs, retail, commercial, open space, and public services, such as schools, emergency services, and roads. The EIR was completed in 1994. Construction began in 2003. This project would contribute to cumulative urbanization and associated impacts on water supply, water quality, and fish. It would also cumulatively contribute to loss of agricultural land.

National Marine Fisheries Service Biological Opinion Reasonable and Prudent Alternative for Central Valley Project/State Water Project OCAP

NMFS determined (June 2009) that for the OCAP, an RPA is necessary for the protection of salmon, steelhead, and green sturgeon. The RPA includes measures to improve habitat, reduce entrainment, and improve salvage, through both operational and physical changes in the system. Additionally, the RPA includes development of new monitoring and reporting groups to assist in water operations throughout the CVP and SWP systems and a requirement to study passage and other migratory conditions. The more substantial actions of the RPA include:

- providing fish passage at Shasta, Nimbus, and Folsom Dams;
- providing adequate rearing habitat on the lower Sacramento River and Yolo Bypass through alteration of operations, weirs, and restoration projects;
- establishing new San Joaquin River flows in April and May with reduced exports in April and May to protect San Joaquin River steelhead and Chinook salmon;
- reducing reverse OMR flows from January to June to protect Chinook salmon, steelhead, and green sturgeon;
- engineering projects to further reduce hydrologic effects and indirect loss of juveniles in the interior Delta; and
- technological modifications to improve temperature management in Folsom Reservoir.

Overall, the RPA is intended to avoid jeopardizing listed species or adversely modifying their critical habitat, but not necessarily to achieve recovery. Nonetheless, the RPA would result in benefits to salmon, steelhead, green

sturgeon, and other fish and species that use the same habitats. Additional information is provided at:

<http://swr.nmfs.noaa.gov/ocap.htm>.

North Bay Aqueduct Alternative Intake Project

The North Bay Aqueduct Alternative Intake Project would construct a new intake for the North Bay Aqueduct to increase the flow in the aqueduct. It will involve the construction of pipeline corridors and connection points to the existing North Bay Aqueduct. This project would construct and operate an alternative intake on the Sacramento River and connect it to the existing North Bay Aqueduct system by a new pipe segment. Proposed project facilities would be located in generally rural areas in Solano and Yolo Counties, west of the Sacramento River and north of Barker Slough. The new intake would be operated in conjunction with the existing North Bay Aqueduct located at Barker Slough. The proposed alternative intake and pumping station would be designed to accommodate the projected peak flow needs of up to 240 cfs. (California Department of Water Resources 2009.)

The Notice of Preparation for the alternative intake project was issued by DWR (lead agency) on November 24, 2009. The public comment period ended on January 8, 2010. The project could contribute to cumulative impacts on water supplies and associated resources. It could modify the timing and magnitude of upstream reservoir releases in wet years to accommodate this increased conveyance capacity. It could also contribute to considerable cumulative impacts on water quality, fish, and loss of agricultural land.

North Delta Flood Control and Ecosystem Restoration Project

The purpose of the North Delta Flood Control and Ecosystem Restoration Project is to implement flood control improvements in the northeast Delta in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. The North Delta project area includes the North and South Fork Mokelumne Rivers and adjacent channels downstream of I-5 and upstream of the San Joaquin River. Components being considered for flood control include bridge replacement, setback levees, dredging, island bypass systems, and island detention systems. The project will involve ecosystem restoration and science actions in this area, and improving and enhancing recreation opportunities. Many of the elements of this project are currently being considered in the BDCP planning and design process.

In support of the environmental review process, an NOP/NOI was prepared and public scoping was held in 2003. An EIR was prepared in 2008, but the project is not currently funded for implementation. The EIR identified significant impacts on flood control, water quality, groundwater, geology and soils, air quality, noise,

vegetation and wetlands, fish, wildlife, land use, public health, and cultural resources. Less-than significant impacts were identified on the following resources: geomorphology, water supply, transportation, population and housing, utilities, energy, and visual resources. If constructed, this project could contribute to cumulative impacts on geology and soils, loss of agricultural land, and cultural resources.

North-of-Delta Off-Stream Storage (Sites Reservoir)

Reclamation and DWR are studying several off-stream storage locations, including Sites Reservoir, located 70 miles northwest of Sacramento, as possible options for additional storage north of the Delta. With a potential maximum capacity of 1.8 maf, Sites Reservoir could increase the reliability of water supplies for a large portion of the Sacramento Valley and could improve fish migration by reducing water diversions on the Sacramento River.

Sites reservoir, as an off-stream project, would be filled primarily by pumped diversions from the Sacramento River. Water would be diverted into the reservoir during peak flow periods in winter months. To minimize potential impacts of existing diversions on Sacramento River fisheries, Sites would release water back into the valley conveyance systems (such as the Glenn Colusa Irrigation District Canal and Tehama Colusa Canal) in exchange for water that would otherwise have been diverted from the Sacramento River. This undiverted summer water could become available for other downstream uses in the Bay-Delta.

A new Sites Reservoir could contribute to cumulative effects on water supplies and associated resources. It could increase water supplies available for export in those years when water otherwise would have been unavailable for storage and export, and modify the timing and magnitude of upstream reservoir releases in wet years.

A Notice of Preparation/Notice of Intent (NOP/NOI) for this project was issued in November 2001, and public scoping for the environmental document took place in January 2002. The initial alternatives information report was issued in May 2006 and a plan formulation report was issued in May 2009. The EIS/EIR and feasibility study are scheduled for completion in 2010.

Old River and Rock Slough Water Quality Improvement Project

CCWD completed the Old River and Rock Slough Water Quality Improvement Project in 2006. This project was designed to minimize salinity and other constituents of concern in drinking water by relocating or reducing agricultural drainage in the south Delta. CCWD intake facilities are located on Rock Slough and Old River, which also receive agricultural drainage water discharged from adjacent agricultural lands. Agricultural drainage water can adversely affect water quality entering the CCWD system.

Drainage from Veale Tract, which used to discharge directly into Rock Slough, is now discharged outside of Rock Slough in an area where strong currents quickly dilute the drainage without re-directing impacts. The Old River project modified an agricultural drain discharge from Byron Tract by lengthening the outfall 150 feet further out into Old River. Previously, the outfall extended only to the immediate bank of the river where channel velocities are slow and dilution of the discharge was minimal. This project could have a cumulative impact on fish, including special-status species.

Red Bluff Diversion Dam Plant Fish Passage Improvement Project

The Fish Passage Improvement Project includes construction of a pumping plant near the existing Tehama-Colusa headworks with an initial installed capacity of 2,180 cfs, with capability of adding pumps that will allow expansion to 2,500 cfs. Tehama-Colusa Canal Authority (TCCA) certified the EIR on June 4, 2008, and Reclamation signed the ROD on July 16, 2008.The changed operations of the Red Bluff Diversion Dam (RBDD) will improve upstream fish passage. The new pumping plant will allow the RBDD gates to remain out (open) for approximately 10 months of the year. The pumping plant upstream from the dam will augment existing capabilities for diverting water into the Tehama-Colusa Canal during times when gravity diversion is not possible because the RBDD gates are out.

The new pumping plant would be capable of operating throughout the year, providing additional flexibility in dam gate operation and water diversions for the TCCA customers. In order to improve adult green sturgeon passage during their spawning migrations (generally March through July) the gates could remain open during the early part of the irrigation season and the new pumping plant could be used alone or in concert with other means to divert water to the Tehama-Colusa and Corning Canals.

Green sturgeon spawn upstream of the diversion dam, and the majority of adult upstream and downstream migrations occur prior to July and after August. After the new pumping plant has been constructed and is operational, Reclamation proposes to operate the RBDD with the gates in during the period from 4 days prior to the Memorial Day weekend to 3 days after the holiday weekend (to facilitate the Memorial Day boat races in Lake Red Bluff), and between July 1 and the end of the Labor Day weekend. This operation would provide improved sturgeon and salmon passage.

The project is expected to be operational by spring of 2012.

This project could contribute beneficially to a cumulative impact on fish. Additional information is provided at:

<http://www.usbr.gov/projects/Facility.jsp?fac_Name=Red+Bluff+Diversion+Dam&groupName=Overview>.

River Islands at Lathrop Development

The Cambay Group, Inc. is proposing to develop approximately 4,990 acres of agricultural land and open space known as the River Islands at Lathrop Project. The project applicant intends to build a mixed-use residential/commercial development on Stewart Tract and Paradise Cut. Stewart Tract is an inbound island bounded by Paradise Cut, the San Joaquin River, and Old River. Paradise Cut is a flood control bypass connecting the San Joaquin River and Old River in the Delta. This mixed-use development is expected to include a town center, employment center, dock facilities, residences, and golf courses. It is expected to generate 31,680 residents and 16,751 jobs at full buildout. The Draft Subsequent EIR was completed in October 2002, Buildout of the development is planned for 2025. It could contribute to cumulative impacts on visual resources and loss of agricultural land.

Sacramento Valley Water Management Settlement Agreement (Phase 8)

The State Water Board has held proceedings regarding the responsibility for meeting the flow-related water quality standards in the Delta established by the Delta WQCP (D-1641). The State Water Board hearings have focused on which users should provide this water, and Phase 8 focuses on the Sacramento Valley users. The Sacramento Valley Water Management Settlement Agreement (SVWMSA) is an alternative to the State Water Board's Phase 8 proceedings. The SVWMSA, entered into by DWR, Reclamation, Sacramento water users, and export water users, provides for a variety of local water management projects that will increase water supplies cumulatively. An environmental document is being prepared for the program.

San Joaquin River Restoration Program

The SJRRP is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from restoration flows. The Program is a direct result of a Stipulation of Settlement (Settlement) reached in September 2006 after more than 18 years of litigation of the lawsuit challenging the renewal of a long-term water service contract between the United States and CVP Friant Division contractors. The Settling Parties include U.S. Departments of the Interior and Commerce, the Natural Resources Defense Council (NRDC), and the Friant Water Users Authority (FWUA). The Settlement received Federal court approval in October 2006. The San Joaquin River Restoration Settlement Act (Act), included in the Omnibus Public Land Management Act of 2009, was signed by the President on March 30, 2009, and became Public Law 111-11. The Act authorizes and directs the Secretary of the Interior to fully implement the Settlement. The Settlement is based on two goals: to restore and maintain fish

populations in "good condition" in the mainstem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish; and to reduce or avoid adverse water supply impacts on all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement. The program is scheduled to have a draft Programmatic EIS/EIR by late 2009.

This program could contribute beneficially to cumulative fish impacts.

San Luis Reservoir Low Point Improvement Project

Reclamation, along with the San Luis & Delta-Mendota Water Authority and SCVWD, is preparing a Feasibility Study for the San Luis Reservoir Low Point Improvement Project (Project). The Project would use one or a combination of alternatives, including treatment options, bypasses, and other storage options, to reduce the risk of "low point" water levels. High temperatures and factors in San Luis Reservoir create conditions that foster algae growth. The water quality in areas of the algal blooms is not suitable for agricultural water users with drip irrigation systems in San Benito County or for municipal and industrial water users relying on existing water treatment facilities in Santa Clara County. Typically, low point conditions occur when water levels in San Luis Reservoir reach an elevation of 369 feet msl or approximately 300 taf when the water is approximately 35 feet above the top of the Lower Pacheco Intake. If water levels fall below 369 feet, the San Felipe Division's use of CVP supplies could be limited by algae-related water quality effects. San Luis Reservoir is the only delivery route for the San Felipe Division's CVP supplies authorized under their current CVP Water Service Contracts.

The alternatives being considered to avoid water quality problems SCVWD in and to increase the effective storage capacity of the reservoir include, but are not limited to:

- conjunctive use with administrative actions,
- lowering the San Felipe Division intake facilities, and
- expanding Pacheco Reservoir.

An NOP/NOI to prepare an EIS/EIR was published in August 2008, and the EIS/EIR is expected to be released in 2010. Implementation of this project would provide flexibility in operation of the San Luis Reservoir and improve reliability of water deliveries to CVP contractors.

This project could contribute to cumulative impacts on water supply and water quality.

Shasta Dam and Reservoir Enlargement

The CALFED ROD includes enlargement of Shasta Reservoir as an option to increase storage north of the Delta. Alternatives to expand Shasta Reservoir by raising the height of the dam by 6.5 to 18.5 feet would inundate a segment of McCloud River, protected under the California Wild and Scenic Rivers Act, as well as portions of the Pit River and Upper Sacramento River. The alternatives include modifications to the dam and reservoir re-operations. This project is in the planning stages, with an initial alternatives information report issued in 2004. A Plan Formulation Report was issued in 2008, and a DEIS is expected in winter 2010.

Shasta Enlargement could contribute to cumulative effects on water supplies and associated resources and could increase water supplies available for export in those years when Shasta Reservoir otherwise would have spilled. It also could modify the timing and magnitude of upstream reservoir releases in wet years.

South Bay Aqueduct Enlargement

The purpose of the South Bay Aqueduct (SBA) Enlargement Project is to increase the capacity of the SBA from 270 cfs to 430 cfs to meet Zone 7 Water Agency's future needs and provide operational flexibility to reduce SWP peak power consumption. The Project includes the addition of four 45-cfs pumps to the South Bay Pumping Plant, including expanding the plant structure, a new service bay, and a new switchyard; constructing a third (Stage 3) Brushy Creek Pipeline and surge tank parallel to the existing two barrels; constructing a 500-acre-foot reservoir (425 acre-feet of active storage) to be served by the Stage 3 Brushy Creek Pipeline; raising the height of the canal embankments, canal lining, and canal overcrossing structures and bridges along the Dyer, Livermore, and Alameda Canals and at the Patterson Reservoir; modifying check structures and siphons along the Dyer, Livermore, and Alameda Canals; and constructing new drainage overcrossing structures to eliminate drainage into the canals. Currently, construction is proceeding to enlarge the South Bay Pumping Plant to make room for the four new pump units being fabricated. Final completion is expected in fall 2010.

The SBA Enlargement Project could contribute to cumulative impacts on water supplies and associated resources. It could modify the timing and magnitude of upstream reservoir releases in wet years to accommodate this increased conveyance capacity.

South Bay Salt Ponds Restoration Project

The South Bay Salt Pond Restoration Project is the largest tidal wetland restoration project on the West Coast. When complete, the project will restore 15,100 acres of industrial salt ponds in the south San Francisco Bay to a mosaic of tidal wetlands and other habitats.

The project is being implemented by DFG and USFWS, in collaboration with the Coastal Conservancy. The goals are to restore and enhance a mix of wetland habitats, to provide wildlife-oriented public access and recreation, and to provide for flood management in the South Bay. An FEIS/EIR was released in December 2007. The project has begun to design and construct habitat, recreation and flood protection features at each of the pond complexes.

The Project could cumulatively increase tidal wetlands in the bay area and reduce habitats for species dependent on the salt marshes.

South Delta Improvements Program

The SDIP is a series of proposed actions that improve water quality and protect salmon in the southern part of the Sacramento-San Joaquin Delta while allowing the State Water Project to operate more effectively to meet California's existing and future water needs. The SDIP is divided into Stages 1 and 2. Stage 1 includes the construction and operation of permanent operable gates (to replace the temporary barriers), dredging in portions of the south Delta, and extension of some agricultural diversion structures by 2012. The operation of the gates is included in the OCAP analysis. The head of Old River gate would be operated between April 15 and May 15 and in the fall. The remaining three agricultural gates would be operated April 15 through the agricultural season. The gates would maintain south Delta water levels above 0.0 msl for channels upstream of the operable gates. Stage 2 addresses the proposed operational component to increase water deliveries south of the Delta by increasing the permitting diversion amount at CCF to 8,500 cfs. All of SDIP was evaluated in an EIS/EIR, finalized in 2006. DWR and Reclamation are preparing a supplemental document for Stage 1. Neither agency intends to pursue Stage 2 in the near future, nor is it likely to occur in the near future due to POD, but it is included in the cumulative analysis because it is foreseeable if Delta conditions improve and DWR or Reclamation decides to pursue it.

The SDIP has the potential to affect nearly all the same resources as are affected by the Project applicant, and could be implemented during the 50-year life of the Proposed Project. Specifically, the SDIP would result in impacts related to geology and soils, air quality, fish, vegetation and wetlands, wildlife, visual resources, and cultural resources. Other less than significant changes in tidal hydraulics, water quality, recreation, levee stability, agricultural resources, public health and traffic would also occur. These impacts would occur primarily in the south Delta. Stage 1 would improve water supply for in-Delta diverters, while Stage 2 would improve water supply for south-of-Delta users. Additional information is provided at:

<http://baydeltaoffice.water.ca.gov/sdb/sdip/index_sdip.cfm>.

State Water Project—Oroville Facilities

Lake Oroville and Oroville Dam are part of a complex which includes Hyatt Powerplant, Thermalito Diversion Dam and Powerplant, the Feather River Fish Hatchery, Thermalito Power Canal, Thermalito Forebay, Thermalito Pumping-Generating Plant, Thermalito Afterbay, and the Lake Oroville Visitors Center.

The SWP Oroville facility operations are regulated by FERC and the State Water Board. A new license from FERC is being sought by DWR. Until FERC issues the new license for the Oroville Project, DWR will not significantly change the operations of the facilities and when the FERC license is issued, it is assumed that downstream of Thermalito Afterbay Outlet, the future flows will remain the same. There is a great deal of uncertainty as to when the license will be issued and what conditions will be imposed by FERC and the State Water Board.

The process that DWR has to go through to get the new license is as follows.

DWR finalized the Final EIR in July 2008; the State Water Board will prepare the CWA Section 401 Certification for the project, which may take up to a year and the 401 Certification may have additional requirements for DWR operations of Oroville. Once the 401 Certification is issued, FERC can issue the new license; in the interim, however, the documents or process may be challenged in court. When the new FERC license is issued, additional flow or temperature requirements may be required. At this time, DWR assumes that the flow and temperature conditions required will be those in the FERC Settlement Agreement (SA); therefore, those are what DWR proposes for the near-term and future Oroville operations.

The proposed future operations in the SA include 100–200 cfs increase in flows in the low-flow channel of the Lower Feather River and reduced water temperatures at the Feather River Hatchery and in the low-flow channel. It is unlikely that either the proposed minor flow changes in the low-flow channel or the reduced water temperatures will affect conditions in the Sacramento River downstream of the confluence, but if they were detectable, they would be beneficial to anadromous fish in the Sacramento River.

The SA includes habitat restoration actions such as side-channel construction, structural habitat improvement such as boulders and large woody debris, spawning gravel augmentation, a fish counting weir, riparian vegetation and floodplain restoration, and facility modifications to improve coldwater temperatures in the low and high flow channels. These actions are designed to improve conditions for Chinook salmon and steelhead in the Feather River.

As such, this project could contribute beneficially to cumulative fish impacts. Additional information is provided at:

<http://www.water.ca.gov/orovillerelicensing/>.

Suisun Marsh Management Plan

Reclamation, USFWS, and DFG are NEPA and CEQA lead agencies in the development of a management plan to restore 5,000 to 7,000 acres of tidal wetlands and enhance existing seasonal wetlands in Suisun Marsh. The plan would be implemented over 30 years and is expected to contribute to the recovery of many terrestrial and aquatic species. The EIS/EIR for the plan is expected to be complete in 2010. It could contribute to cumulative recreation, fish, levee stability, and terrestrial species impacts.

SWP Harvey O. Banks Pumping Plant Operations

Banks Pumping Plant has a physical export pumping capacity of 10,300 cfs; however, current permit terms limit the diversion of water to CCF to 6,680 cfs. Implementation of the SDIP, as described above, would have increased allowable diversions at CCF from 6,680 cfs to 8,500 cfs. Although Banks Pumping at 10,300 cfs was included in the CALFED ROD, given the POD and other major challenges that are occurring with the currently permitted amount, it is unlikely that this capacity will ever be attained. Additional future changes in the CCF or the Skinner Fish facility or the Banks Pumping Plant are being considered by DWR within the overall BDCP planning and design process.

Tracy Fish Test Facility

The Tracy Fish Test Facility, to be constructed near Byron, California, will develop and implement new fish collection, holding, transport, and release technology to significantly improve fish protection at the major water diversions in the south Delta. DWR and Reclamation will use results of the Tracy Fish Test Facility to design the CCF Fish Facility, an element of the 10,300 cfs project described above, and improve fish protection at the Jones Pumping Plant facility as required by the CVPIA. The test facility, unlike conventional fish screening facilities, will require fish screening, holding, sorting, transport and stocking capabilities. The facility would be designed to screen about 500 cfs of water at an approach velocity of 0.2 feet per second and meet other appropriate fish agency criteria. The facility would have the structural and operational flexibility to optimize screening operations for multiple species in the south Delta. However, construction of the facility has been delayed by shortfalls in funding. The South Delta Fish Facilities Forum, a CALFED workgroup, is evaluating the cost effectiveness and cost sustainability of the fish facilities strategy. According to the federal budget for Reclamation for 2010 and 2011, this project has $0 allocated for fiscal years 2010 and 2011 (Office of Management and Budget 2010). If eventually constructed, the Tracy Fish Test Facility would not affect current CVP and SWP operations, nor would it contribute considerable cumulative effects.

Two-Gates Fish Protection Demonstration Project

The Two-Gate Project has been proposed by Delta exporters in coordination with Reclamation as a physical and operational measure to help reduce potential delta smelt entrainment and to reduce the water costs associated with such protection. This project would involve the installation and operation of two gate systems in the central Delta: one on the Old River between Holland Tract and Bacon Island, and one on Connection Slough near Middle River between Bacon Island and Mandeville Island. These gates would not interfere with Proposed Project operations.

The project would be implemented in two phases. Phase 1 (a 5-year pilot period) would involve the installation and operation of temporary gates constructed from barge modules with top-mounted butterfly gates. This barge-gate system and temporary sheetpile walls connecting them to the river channel levees would be set in place seasonally from mid-December through June, and then removed until the following December. If operation of these gates proves successful during the pilot phase, Phase 2 would involve the installation and operation of an inflatable bladder gate system or equivalent system.

Both the Phase 1 and Phase 2 gate installations would be operated under protocols developed to protect delta smelt; this would include real-time monitoring elements to determine when to operate the gates, and an evaluation process to assess operational success. In effect, the Old River and Connection Slough gates would provide hydraulic separation of the Franks Tract area from the effects of reverse flows of Old River and Middle River and would be operated in a manner to allow vessel passage.

A draft Environmental Assessment/Finding of No Significant Impact was released by Reclamation on October 19, 2009. Three public meetings were subsequently held by Reclamation to provide information about the project. A 30-day public review and comment period for this project ended on November 30, 2009.

This project could contribute to cumulative beneficial impacts on fish.

Upper San Joaquin River Basin Storage

The Upper San Joaquin River Basin Storage Investigation is a feasibility study by Reclamation and DWR. The purpose of the investigation is to determine the type and extent of federal, state and regional interests in a potential project in the upper San Joaquin River watershed to expand water storage capacity; improve water supply reliability and flexibility of the water management system for agricultural, urban, and environmental uses; and enhance San Joaquin River water temperature and flow conditions to support anadromous fish restoration efforts.

DWR, Reclamation, and their partners have developed a two-phase Plan of Study. Phase 1 will identify water resource opportunities and issues in the Upper San Joaquin River watershed. This phase will include an appraisal of opportunities to increase surface storage and conjunctive uses for groundwater. Phase 2 will be more detailed and will begin with public meetings to determine the scope of the study.

Progress and results of the Investigation are being documented in a series of interim reports that will culminate in a Feasibility Report and an EIS/EIR. The first of a series of reports analyzing alternatives was completed in 2003, with a second report, an initial alternatives information report, completed in spring 2005, and a plan formulation report completed in October 2008. A final feasibility report and environmental review are expected to be complete in 2011.

This project could contribute to cumulative impacts related to water supplies and associated resources including fish and terrestrial species.

U.S. Fish and Wildlife Service Biological Opinion Reasonable and Prudent Alternative for Central Valley Project /State Water Project OCAP

The USFWS determined (December 2008) that for the CVP-SWP Operations and Criteria Plan (OCAP), an RPA is necessary for the protection of delta smelt. The RPA includes measures to: (1) prevent/reduce entrainment of delta smelt at Jones and Banks Pumping Plants; (2) provide adequate habitat conditions that will allow the adult delta smelt to successfully migrate and spawn in the Bay-Delta; (3) provide adequate habitat conditions that will allow larvae and juvenile delta smelt to rear in the Bay-Delta; (4) provide suitable habitat conditions that will allow successful recruitment of juvenile delta smelt to adulthood; and (5) monitor delta smelt abundance and distribution through continued sampling programs through the IEP. The RPA comprises the following actions:

Action 1: To protect pre-spawning adults, exports would be limited starting as early as December 1 (depending on monitoring triggers) so that the average daily OMR flow is no more negative than -2,000 cfs for a total duration of 14 days.

Action 2: To further protect pre-spawning adults, the range of net daily OMR flows will be no more negative than -1,250 to -5,000 cfs (as recommended by smelt working group) beginning immediately after Action 1 as needed.

Action 3: To protect larvae and small juveniles, the net daily OMR flow will be no more negative than -1,250 to -5,000 cfs (as recommended by the smelt working group) for a period that depends on monitoring triggers (generally March through June 30).

Action 4: To protect fall habitat conditions, sufficient Delta outflow will be provided to maintain average X2 for September and October no greater (more

eastward) than 74 km (Chipps Island) in the fall following wet years and 81 km (Collinsville) in the fall following above-normal years.

Action 5: The head of Old River barrier will not be installed if delta smelt entrainment is a concern. If installation of the head of Old River barrier is not allowed, the agricultural barriers would be installed as described in the Project Description.

Action 6: A program to create or restore a minimum of 8,000 acres of intertidal and associated subtidal habitat in the Delta and Suisun Marsh will be implemented within 10 years. A monitoring program will be developed to focus on the effectiveness of the restoration program.

These actions are intended to ensure that operations of the CVP and SWP do not lead to jeopardy of this species. Since delta smelt spend their entire life-cycle in the Delta, these actions are expected to significantly improve conditions for this population compared to previous operational scenarios. This RPA would contribute beneficially to a cumulative impact on delta smelt.

Additional information on this RPA and the associated BO is provided at:

<http://www.fws.gov/sacramento/es/delta_smelt.htm>.

Projects in Contra Costa General Plan

The *Contra Costa General Plan 2005–2020* (2005) states that East Contra Costa County (unincorporated Bethel Island, Discovery Bay, Brentwood, Oakley) is projected to add 29,600 homes, which would result in approximately 97,800 more people by 2020 (Contra Costa County 2005). Bethel Island; the land north, south, and east of Discovery Bay; and the land between Discovery Bay and Brentwood/Oakley are considered important agricultural areas. This development would contribute to cumulative urbanization and associated impacts on water supply, water quality, and fish. This development would also cumulatively contribute to loss of agricultural land.

Projects in San Joaquin County General Plan

The *San Joaquin County General Plan* is currently being updated; this update began in June 2008 and is scheduled for completion in June 2011. The most recent version of the complete general plan is from 1992, but information from this version was not used for cumulative analysis due to the likelihood of it being out of date.

However, a revised Housing Element for San Joaquin County was adopted by the county board of supervisors on January 12, 2010. According to this document, planned development in the vicinities of Stockton and Tracy would convert agricultural lands to residential uses. This development would contribute to

cumulative urbanization and associated impacts on water supply, water quality, and fish. It would also cumulatively contribute to loss of agricultural land.

Other Development Projects

The Cities of Tracy, Stockton, Byron, and Brentwood, as well as the Town of Discovery Bay, each have proposed multiple development projects ranging in size and impacts. Developments include new residential and commercial areas and associated infrastructure; updating, expanding, or creating water treatment and delivery systems; and waste management facilities such as landfills and recycling centers. It also is likely that future conditions will include additional development beyond what is currently identified. These projects could contribute to cumulative impacts on water quality, loss of agricultural land, and visual resources, as well as construction-related impacts for air quality, noise, and traffic.

Summary of Impacts

Table 5-1 provides a summary and comparison of the impacts and mitigation measures from the 2001 FEIR and 2001 FEIS and this 2010 Place of Use EIR. Some of the cumulative impacts have not changed and do not require an updated discussion below. For these impacts, the cumulative impact discussion from the 2001 FEIR and 2001 FEIS is hereby incorporated by reference and summarized in the discussion sections below for each resource.

Table 5-1. Comparison between Delta Wetlands Project 2010 Place of Use EIR Cumulative Impacts and 2001 FEIR Cumulative Impacts

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Water Supply	
Impact A-4: Reduction in Delta Consumptive Use (B) **Mitigation:** No mitigation is required.	**Impact CUM-1:** Reduction in Delta Consumptive Use (B) **Mitigation:** No mitigation is required. No change.
	Impact CUM-2: Increased Water Supplies Available for Export (B) **Mitigation:** No mitigation is required. Please see the discussion of this new cumulative impact below.
Hydrodynamics	
Impact B-7: Cumulative Hydrodynamic Effects on Local Channel Velocities and Stages during Maximum DW Diversions (NCC) **Mitigation:** No mitigation is required.	**Impact CUM-3:** Cumulative Hydrodynamic Effects on Local Channel Velocities and Stages during Maximum Project Diversions (NCC) **Mitigation:** No mitigation is required. This cumulative impact has not changed. Please refer to Chapter 3B in the 2001 FEIS for a description of this impact.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact B-8: Cumulative Hydrodynamic Effects on Local Channel Velocities and Stages during Maximum DW Discharges (NCC) **Mitigation:** No mitigation is required.	**Impact CUM-4:** Cumulative Hydrodynamic Effects on Local Channel Velocities and Stages during Maximum Project Discharges (NCC) **Mitigation:** No mitigation is required. This cumulative impact has not changed. Please refer to Chapter 3B in the 2001 FEIS for a description of this impact.
Impact B-9: Cumulative Hydrodynamic Effects on Net Channel Flows (NCC-M) **Mitigation Measure B-1:** Operate the DW Project to Prevent Unacceptable Hydrodynamic Effects in the Middle River and Old River Channels during Flows That Are Higher Than Historical Flows	**Impact CUM-5:** Cumulative Hydrodynamic Effects on Net Channel Flows (NCC-M) **Mitigation Measure CUM-MM-1:** Operate the Project to Prevent Unacceptable Hydrodynamic Effects in the Middle River and Old River Channels during Flows That Are Higher Than Historical Flows This cumulative impact has not changed. Please refer to Chapter 3B in the 2001 FEIS for a description of this impact and mitigation measure.
Water Quality	
Impact C-17: Salinity (EC) Increase at Chipps Island during Months with Applicable EC Objectives under Cumulative Conditions (NCC) **Mitigation Measure C-1:** Restrict DW Diversions to Limit EC Increases at Chipps Island	This is no longer considered a cumulative impact. Effects on salinity at Chipps Island are addressed in Section 4.1, Water Quality, under Impact WQ-1, and are not expected to be any different under cumulative conditions.
Impact C-18: Salinity (EC) Increase at Emmaton under Cumulative Conditions (NCC-M) **Mitigation Measure C-2:** Restrict DW Diversions to Limit EC Increases at Emmaton	This is no longer considered a cumulative impact. Effects on salinity at Emmaton are addressed in Section 4.1, Water Quality, under Impact WQ-2, and are not expected to be any different under cumulative conditions.
Impact C-19: Salinity (EC) Increase at Jersey Point under Cumulative Conditions (NCC-M) **Mitigation Measure C-3:** Restrict DW Diversions to Limit EC Increases at Jersey Point	This is no longer considered a cumulative impact. Effects on salinity at Jersey Point are addressed in Section 4.1, Water Quality, under Impact WQ-3, and are not expected to be any different under cumulative conditions.
Impact C-20: Salinity (Chloride) Increase in Delta Exports under Cumulative Conditions (NCC) **Mitigation Measure C-4:** Restrict DW Diversions or Discharges to Limit Chloride Concentrations in Delta Exports	This is no longer considered a cumulative impact. Effects on salinity in Delta exports are addressed in Section 4.1, Water Quality, under Impact WQ-4, and are not expected to be any different under cumulative conditions.
Impact C-21: Elevated DOC Concentrations in Delta Exports (CCWD Rock Slough, SWP Banks, CVP Tracy) under Cumulative Conditions (NCC-M) **Mitigation Measure C-5:** Restrict DW Discharges to Prevent DOC Increases of Greater Than 0.8 mg/l in Delta Exports	This is no longer considered a cumulative impact. Effects on DOC concentrations in Delta exports are addressed in Section 4.1, Water Quality, under Impact WQ-6, and are not expected to be any different under cumulative conditions.
Impact C-22: Elevated THM Concentrations in Treated Drinking Water from Delta Exports (CCWD Rock Slough, SWP Banks, CVP Tracy) under Cumulative Conditions (NCC-M) **Mitigation Measure C-6:** Restrict DW Discharges to Prevent Increases of More Than 16 µg/l in THM Concentrations or THM Concentrations of Greater than 72 µg/l in Treated Delta Export Water	This is no longer considered a cumulative impact. THM is no longer evaluated because THM concentration would depend on DOC concentrations and operations at each water treatment plant. Effects on THM concentrations in drinking water from the Delta are tracked in the WQMP and addressed in Section 4.1, Water Quality, under Impact WQ-6 for DOC, and are not expected to be any different under cumulative conditions.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact C-23: Changes in Other Water Quality Variables in Delta Channel Receiving Waters under Cumulative Conditions (NCC-M) **Mitigation Measure C-7:** Restrict DW Discharges to Prevent Adverse Changes in Delta Channel Water Quality	This is no longer considered a cumulative impact. Effects on other water quality variables in Delta channel receiving waters are addressed in Section 4.1, Water Quality, under Impact WQ-8, and are not expected to be any different under cumulative conditions.
Impact C-24: Increase in Pollutant Loading in Delta Channels (CCU) **Mitigation Measure C-9:** Clearly Post Waste Discharge Requirements, Provide Waste Collection Facilities, and Educate Recreationists regarding Illegal Discharges of Waste **Mitigation Measure RJ-1:** Reduce the Number of Outward Boat Slips Located at the Proposed Recreation Facilities	**Impact CUM-6:** Increase in Pollutant Loading in Delta Channels Associated with Recreational Boating (CCU) **Mitigation Measure CUM-MM-2:** Clearly Post Waste Discharge Requirements, Provide Waste Collection Facilities, and Educate Recreationists regarding Illegal Discharges of Waste **Mitigation Measure REC-MM-1:** Reduce the Size or Number of Recreation Facilities No change.
	Impact CUM-7: Improved CVP and SWP Water Quality Resulting from Increased Use of Sacramento River Water (B) **Mitigation:** No mitigation is required. Please see the discussion of this new cumulative impact below.
Flood Control	
Impact D-12: Decrease in Cumulative Flood Hazard in the Delta (B) **Mitigation:** No mitigation is necessary.	**Impact CUM-8:** Decrease in Cumulative Flood Hazard in the Delta (B) **Mitigation:** No mitigation is necessary. This cumulative impact has not changed. However, an updated impact discussion is provided below.
Impact D-13: Decrease in the Need for Public Financing of Levee Maintenance and Repair on the DW Project islands (B) **Mitigation:** No mitigation is necessary.	**Impact CUM-9:** Decrease in the Need for Public Financing of Levee Maintenance and Repair on the Project islands (B) **Mitigation:** No mitigation is necessary. No change.
Utilities and Highways	
Impact E-27: Cumulative Decrease in the Risk of Structural Failure of Roadways and Utilities (B) **Mitigation:** No mitigation is required.	**Impact CUM-10:** Cumulative Decrease in the Risk of Structural Failure of Roadways and Utilities (B) **Mitigation:** No mitigation is required. No change.
Fishery Resources	
Impact F-17: Alteration of Habitat under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.
Impact F-18: Potential Increase in Accidental Spills of Fuel and Other Materials under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact F-19: Potential Increase in the Mortality of Chinook Salmon Resulting from the Indirect Effects of DW Project Diversions and Discharges on Flows under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.
Impact F-20: Reduction in Downstream Transport and Increase in Entrainment Loss of Striped Bass Eggs and Larvae, Delta Smelt Larvae, and Longfin Smelt Larvae under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.
Impact F-21: Change in Area of Optimal Salinity Habitat under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.
Impact F-22: Increase in Entrainment Loss of Juvenile Striped Bass and Delta Smelt under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.
Impact F-23: Increase in Entrainment Loss of Juvenile American Shad and Other Species under Cumulative Conditions (NCC) **Mitigation:** No mitigation is required.	The cumulative fish impacts have been consolidated into Impact CUM-11. See discussion of this impact below.
	Impact CUM-11: Cumulative Adverse Impacts on Listed Fish Species (CCU) **Mitigation Measure FISH-MM-1:** Replacement of Habitat Lost during Construction of Project Facilities **Mitigation Measure FISH-MM-2:** Implement a Fishery Improvement Mitigation Fund **Mitigation Measure FISH-MM-3:** Establish a Shallow-Water Aquatic Habitat Conservation Easement The cumulative fish impacts have all been consolidated into this new impact. Please see the discussion of this consolidated cumulative impact below.
Vegetation and Wetlands	
Impact G-7: Increase in Wetland and Riparian Habitats in the Delta (B) **Mitigation:** No mitigation is required	**Impact CUM-12:** Increase in Wetland and Riparian Habitats in the Delta (B) **Mitigation:** No mitigation is required This cumulative impact has not changed. However, an updated impact discussion is provided below.
Wildlife	
Impact H-38: Cumulative Increase in Foraging Habitat for Wintering Waterfowl in the Delta (B) **Mitigation:** No mitigation is necessary.	**Impact CUM-13:** Cumulative Increase in Foraging Habitat for Wintering Waterfowl in the Delta (B) **Mitigation:** No mitigation is necessary. No change.
Impact H-39: Cumulative Loss of Herbaceous Habitats in the Delta (NCC) **Mitigation:** No mitigation is necessary.	**Impact CUM-14:** Cumulative Loss of Herbaceous Habitats in the Delta (NCC) **Mitigation:** No mitigation is necessary. This cumulative impact has not changed. However, an updated impact discussion is provided below.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact H-40: Cumulative Temporary Loss of Riparian Habitat in the Delta (NCC) **Mitigation:** No mitigation is necessary.	**Impact CUM-15:** Cumulative Temporary Loss of Riparian Habitat in the Delta (NCC) **Mitigation:** No mitigation is necessary. This cumulative impact has not changed. However, an updated impact discussion is provided below.
Land Use and Agriculture	
Impact I-8: Cumulative Conversion of Agricultural Land (CCU) **Mitigation:** No mitigation is available.	**Impact CUM-16:** Cumulative Conversion of Agricultural Land (CCU) **Mitigation:** No reasonable mitigation is available. This cumulative impact has not changed. However, an updated impact discussion is provided below.
Recreation and Visual Resources	
Impact J-23: Increase in Recreation Opportunities in the Delta (B) **Mitigation:** No mitigation is required.	**Impact CUM-17:** Increase in Recreation Opportunities in the Delta (B) **Mitigation:** No mitigation is required. This cumulative impact has not changed. However, an updated impact discussion is provided below.
Impact J-24: Enhancement of Waterfowl Populations and Increased Hunter Success in the Delta (B) **Mitigation:** No mitigation is required.	**Impact CUM-18:** Enhancement of Waterfowl Populations and Increased Hunter Success in the Delta (B) **Mitigation:** No mitigation is required. This cumulative impact has not changed. However, an updated impact discussion is provided below.
	Impact CUM-19: Reduction in the Quality of Views of the Reservoir Islands (CCU) **Mitigation Measure REC-MM-1:** Reduce the Size or Number of Recreation Facilities **Mitigation Measure REC-MM-2:** Partially Screen Proposed Recreation Facilities and Pump and Siphon Stations from Important Viewing Areas **Mitigation Measure REC-MM-3:** Design Levee Improvements, Siphon and Pump Stations, and Recreation Facilities and Boat Docks to Be Consistent with the Surrounding Landscape Please see the discussion of this new cumulative impact below.
Traffic and Navigation	
Impact L-21: Increase in Traffic on Delta Roadways during Operation of Future Projects, Including the DW Project (NCC-M) **Mitigation Measure L-4:** Implement Caltrans' Route Concepts for SR 4 and SR 12 **Mitigation Measure RJ-1:** Reduce the Number of Outward Boat Slips Located at the Proposed Recreation Facilities	This is no longer considered a cumulative impact. Future condition scenarios with the Proposed Project, as analyzed in Section 4.10, Traffic and Navigation, capture the effects of both cumulative projects and those of the Proposed Project. For this reason, this impact is not explored further in this chapter. Please refer to Section 4.10, Impact T-2: Increase in Traffic on Delta Roadways during Project Operation, for discussion of this impact.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact L-22: Reduction in Safety Conflicts on Delta Roadways during Operation of Future Projects, Including the DW Project (B) **Mitigation:** No mitigation is required.	This is no longer considered a cumulative impact. Future condition scenarios with the Proposed Project, as analyzed in Section 4.10, Traffic and Navigation, capture the effects of both cumulative projects and those of the Proposed Project. For this reason, this impact is not explored further in this chapter. Please refer to Section 4.10, Impact T-4: Potential for Traffic Safety Conflicts during Operation, for discussion of this impact.
Impact L-23: Cumulative Increase in Safety Problems on Delta Waterways (CCU) **Mitigation Measure L-5:** Develop and Enforce a Boater Safety Program for DW Private Boat Users **Mitigation Measure RJ-1:** Reduce the Number of Outward Boat Slips Located at the Proposed Recreation Facilities	This is no longer considered a cumulative impact. Future condition scenarios with the Proposed Project, as analyzed in Section 4.10, Traffic and Navigation, capture the effects of both cumulative projects and those of the Proposed Project. For this reason, this impact is not explored further in this chapter. Please refer to Section 4.10, Impact T-7: Increase in Boat Traffic and Congestion on Delta Waterways during Operation, for discussion of this impact.
Cultural Resources	
Impact M-13: Destruction of or Damage to Prehistoric Archaeological Sites in the Delta (NCC) **Mitigation:** No mitigation is required.	**Impact CUM-20:** Destruction of or Damage to Prehistoric Archaeological Sites in the Delta (NCC) **Mitigation:** No mitigation is required. No change.
Impact M-14: Destruction of or Damage to the NRHP-Eligible Historic Districts Representing Agricultural Labor Camp Systems in the Delta (CCU) **Mitigation Measure M-5:** Prepare an HPMP and a Data Recovery Plan for Archaeological Deposits on Bacon Island **Mitigation Measure M-6:** Prepare a Videotape of Public Broadcasting System Quality of the NRHP-Eligible Historic District on Bacon Island **Mitigation Measure M-7:** Prepare a Popular Publication on Bacon Island Resources for Use by Museums, Cultural Centers, and Schools **Mitigation Measure M-8:** Complete Historic American Building Survey/Historic American Engineering Record Forms, Including Photographic Documentation, That Preserve Information about the NRHP-Eligible District on Bacon Island	**Impact CUM-21:** Destruction of or Damage to Historic Districts Representing Agricultural Labor Camp Systems in the Delta (NCC-M) **Mitigation Measure CUL-MM-1:** Prepare and Implement a Historic Properties Treatment Plan This cumulative impact has changed and is no longer considered cumulatively considerable. An updated discussion is provided below.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact M-15: Destruction of or Damage to Prehistoric Archaeological Sites in the Delta (Alternative 3) (CCU) **Mitigation Measure M-4:** Prepare an HPMP to Provide for the Long-Term Monitoring and Treatment of Archaeologically Sensitive Areas on Holland Tract **Mitigation Measure M-11:** Cap Archaeological Sites on Holland Tract **Mitigation Measure M-12:** Construct Fencing or Other Barriers to Prevent Site Access on Holland Tract **Mitigation Measure M-13:** Construct Levees or Beach Slopes around Archaeological Sites to Decrease Wave Action and Erosion on Holland Tract **Mitigation Measure M-14:** Prepare an HPMP to Provide for the Long-Term Monitoring of Known Archaeological Sites on Holland Tract **Mitigation Measure M-15:** Survey Unsurveyed Portions of Holland Tract and Determine Eligibility for NRHP Listing and Appropriate Treatment	**Impact CUM-20:** Destruction of or Damage to Prehistoric Archaeological Sites in the Delta (NCC) **Mitigation:** No mitigation is required. This cumulative impact has changed and is no longer considered cumulatively considerable. An updated discussion is provided below.
Impact M-16: Destruction of or Damage to the NRHP-Eligible Historic Districts Representing Agricultural Labor Camp Systems in the Delta (Alternative 3) (CCU) **Mitigation Measure M-5:** Prepare an HPMP and a Data Recovery Plan for Archaeological Deposits on Bacon Island **Mitigation Measure M-6:** Prepare a Videotape of Public Broadcasting System Quality of the NRHP-Eligible Historic District on Bacon Island **Mitigation Measure M-7:** Prepare a Popular Publication on Bacon Island Resources for Use by Museums, Cultural Centers, and Schools **Mitigation Measure M-8:** Complete Historic American Building Survey/Historic American Engineering Record Forms, Including Photographic Documentation, That Preserve Information about the NRHP-Eligible District on Bacon Island	**Impact CUM-21:** Destruction of or Damage to Historic Districts Representing Agricultural Labor Camp Systems in the Delta (NCC-M) **Mitigation Measure CUL-MM-1:** Prepare and Implement a Historic Properties Treatment Plan This cumulative impact has changed and is no longer considered cumulatively considerable. An updated discussion is provided below.
Mosquitoes and Public Health	
Impact N-6: Increase in Abatement Levels during Partial-Storage, Shallow-Storage, or Shallow-Water Wetland Periods on the Reservoir Islands under Cumulative Conditions (NCC-M) **Mitigation Measure N-1:** Coordinate Project Activities with SJCMAD and CCMAD	**Impact CUM-22:** Increase in Abatement Levels during Partial-Storage, Shallow-Storage, or Shallow-Water Wetland Periods on the Reservoir Islands under Cumulative Conditions (NCC-M) **Mitigation Measure PH-MM-1:** Develop an Integrated Pest Management Program and Coordinate Project Activities with SJCMVCD and CCCMVCD This cumulative impact has not changed. The mitigation measure has been updated and is described in Section 4.12, Mosquitoes and Public Health.

2001 Final EIR Impacts and Mitigation Measures	Differences between 2010 Place of Use EIR Impacts and 2001 FEIR Impacts
Impact N-7: Cumulative Increase in Mosquito Abatement Needs Resulting from Implementation of Future Projects, Including the DW Project (CCU) **Mitigation:** No mitigation is available.	**Impact CUM-23:** Cumulative Increase in Mosquito Abatement Needs Resulting from Implementation of Future Projects, Including the Project (CCU) **Mitigation Measure PH-MM-1:** Develop an Integrated Pest Management Program and Coordinate Project Activities with SJCMVCD and CCCMVCD This cumulative impact has not changed. However, an updated impact discussion is provided below.
Air Quality	
Impact O-17: Increase in Cumulative Production of Ozone Precursors and CO in the Delta (CCU) **Mitigation Measure RJ-1:** Reduce the Number of Outward Boat Slips Located at the Proposed Recreation Facilities **Mitigation Measure O-4:** Coordinate with Local Air Districts to Reduce or Offset Emissions	**Impact CUM-24:** Increase in Cumulative Production of Ozone Precursors and CO in the Delta (CCU) **Mitigation Measure REC-MM-1:** Reduce the Size or Number Recreation Facilities **Mitigation Measure Air-MM-4:** Coordinate with the SJVAPCD and BAAQMD to Reduce or Offset Emissions This cumulative impact has not changed. However, an updated impact discussion is provided below.
Climate Change	
The effects of and to global Climate Change were not discussed in the 2001 FEIR or 2001 FEIS.	The Project is not anticipated to contribute to any cumulative impacts related to climate change because implementation of the Project would result in a net reduction in annual greenhouse gas emissions.
Noise	
The effects of noise attributable to the Project were not discussed in the 2001 FEIR or 2001 FEIS.	The Project is not anticipated to contribute to any cumulative impacts related to noise because of the lack of sensitive receptors in and near the Project area.

Note: CCU = Cumulatively Considerable and Unavoidable; NCC = Not Cumulatively Considerable; NCC-M = Not Cumulatively Considerable with Mitigation; B = Beneficial.

Cumulative Impacts by Resource

Based on the updated list of projects described above, conditions included as part of the baseline, and the Project, the description of the potential cumulative impacts and the Project's contribution to these impacts is revised for each resource evaluated in this Place of Use EIR if the analysis needed to be updated or changed. For cumulative impacts that did not change from those described in the 2001 FEIR and 2001 FEIS, the cumulative impacts are summarized here. The resources are presented in the same order as in Chapter 4.

Water Supply

The physical environmental impacts from changes in water supply conditions are similar to potential changes in runoff and river flow. The change in flow is not

itself considered an impact unless this change exceeds the normal range of flows for the river or stream channel. An increased water supply diversion would change the downstream flow, and an increased flow could allow increased diversions, but these changes are not considered impacts unless the normal range of the water supply diversions was exceeded. Nevertheless, two cumulative water supply impacts are identified.

Impact CUM-1: Reduction in Delta Consumptive Use under Cumulative Conditions

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Under cumulative conditions, implementation of Alternative 2 would decrease Delta consumptive use from consumptive use estimated for the No-Project Alternative.

This cumulative impact is considered beneficial.

Mitigation

No mitigation is required.

Impact CUM-2: Increased Water Supplies Available for Export

Combining the Project facilities and operations with existing Delta operations and cumulative future storage and conveyance projects, including Shasta Reservoir Enlargement, North-of-Delta Off-Stream Storage, Los Vaqueros Reservoir Expansion, Upper San Joaquin River Basin Storage, an isolated conveyance facility (under BDCP), and possible increases in Banks Pumping Plant permitted capacity (to 10,300 cfs) could result in increased water supplies available for export. It is assumed that these cumulative water supply projects could have positive effects on Delta water supply conditions by improving the amount and timing of flow to the Delta, providing flexibility in timing of storage and release of water for exports, and increasing the amount and timing of water used to protect sensitive aquatic species in upstream tributaries, in the rivers and Delta channels, or with Delta outflow.

Implementation of the Project would not contribute to any cumulative impacts on water supply conditions, but is instead intended to improve reliability by increasing operational flexibility and storage in the system. Combined with the other projects listed above, it is expected that the overall water supply reliability would improve. The Project would result in a small increase in overall water deliveries from the Delta, resulting in potential new areas of use south of the Delta. (See Chapter 6, “Growth-Inducing Impacts.”)

In addition to the various projects listed above, the USFWS and NMFS BOs for OCAP include several additional CVP and SWP pumping restrictions (implemented as OMR reverse flow limits) to protect delta smelt and other fish from entrainment. These new restrictions in the months of January–June are likely to reduce the allowable total pumping by CVP and SWP and increase the need for full capacity pumping in the months of July–December. This will make the Project more valuable for maintaining the maximum possible south-of-Delta water supply reliability with the existing south Delta intakes. The cumulative effects of these restrictions may be significant for water supply, but the Project’s

contribution could at least partially offset this cumulative loss of water supply. The Project's contribution to cumulative water supply impacts therefore is considered both considerable and beneficial.

This cumulative impact is considered beneficial.

Mitigation
No mitigation is required.

Delta Hydrodynamics

The effects of Project operations on the Delta channel hydrodynamics was not further evaluated in this Place of Use EIR, as the Project siphons and discharge pumps on Webb Tract and Bacon Island (reservoir Islands) are generally the same as previously described and evaluated for the 2001 FEIR and 2001 FEIS. This Place of Use EIR describes the Project operations, including the possible impacts of the Project diversion and discharge on Delta channel flows, in Chapter 3, "Project Operations."

The cumulative impacts and mitigation measures for this resource (Delta hydrodynamics) have not changed since publication of the 2001 FEIR and 2001 FEIS. The channel hydrodynamics are generally controlled by the combination of channel geometry, tidal flows, river inflows and export pumping. Therefore, the cumulative impacts of all other projects and regulatory programs that may change or modify channel geometry, river inflows, tidal restoration, unplanned flooded islands, or export pumping could have a cumulative impact on Delta tidal hydrodynamics. However, the contribution of the Project operations on these cumulative impacts would be not cumulative considerable with mitigation.

Impact CUM-3: Cumulative Hydrodynamic Effects on Local Channel Velocities and Stages during Maximum Project Diversions

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Because the basic tidal hydraulics that control local channel velocities and stages are not expected to change substantially under cumulative future conditions, possible hydrodynamic impacts of Alternative 2 during maximum Project diversions under cumulative future conditions are expected to be similar to those described in the 2001 FEIR and 2001 FEIS Hydrodynamics analysis.

This cumulative impact is not cumulatively considerable.

Mitigation
No mitigation is required.

Impact CUM-4: Cumulative Hydrodynamic Effects on Local Channel Velocities and Stages during Maximum Project Discharges

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Because the basic tidal hydraulics that control local channel velocities and stages are not expected to change substantially under cumulative future conditions,

possible hydrodynamic impacts of Alternative 2 during maximum Project discharges under cumulative future conditions are expected to be similar to those described in the 2001 FEIR and 2001 FEIS Hydrodynamics analysis.

This cumulative impact is not cumulatively considerable.

Mitigation
No mitigation is required.

Impact CUM-5: Cumulative Hydrodynamic Effects on Net Channel Flows

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Under future conditions, the full physical capacity (10,300 cfs) at Banks Pumping Plant was assumed in the DeltaSOS simulations. Use of full capacity at the Banks Pumping Plant may require implementation of DWR's South Delta Improvements Project to provide sufficient channel conveyance and Clifton Court diversion capacity, to protect agricultural diversion siphons and pumps at low tidal stages, and to maintain water quality that is sufficient for south Delta irrigation uses. This may allow flows in the Old River and Middle River channels during periods of maximum Delta exports that are higher than historical flows. Project discharges would contribute to these channel flows during periods with available water for diversion and during periods with available export pumping capacity for Project discharges.

Pumping at full Banks Pumping Plant capacity would increase, by about 3,620 cfs (6,680 cfs to 10,300 cfs), the total export capacity of the Banks Pumping Plant pumps. Because the Old River and Middle River channels each carry about half of the export flow (not supplied by diversion from the San Joaquin River at the head of Old River), the increased assumed pumping rate under cumulative conditions would be expected to increase the maximum net flow in the Old and Middle River channels by about 1,800 cfs each. However, because tidal flows in these channels are substantial under No-Project Alternative conditions, these channels (with modifications included in the DWR South Delta Improvements Project) are expected to provide sufficient flow conveyance for maximum export pumping without any hydrodynamic impacts from channel scouring or other hydraulic effects (i.e., navigation or recreation effects).

Nevertheless, because the possible hydrodynamic effects of Project operations on south Delta channels under cumulative future conditions is uncertain at this time, this cumulative hydrodynamic impact is cumulatively considerable. Implementation of Mitigation Measure CUM-MM-1 will reduce this impact to a not-cumulatively-considerable level.

Mitigation Measure CUM-MM-1: Operate the Project to Prevent Unacceptable Hydrodynamic Effects in the Middle River and Old River Channels during Flows That Are Higher Than Historical Flows
This mitigation measure has not changed since the 2001 FEIR and 2001 FEIS. USGS and DWR tidal flow measurements (i.e., velocities and stages) in south Delta channels, as well as tidal hydrodynamic model simulations, should be used to determine the effects of Project operations, and Project operations should be

controlled to prevent unacceptable hydrodynamic conditions in south Delta channels. Measures that may be used to prevent unacceptable hydrodynamic effects include establishing minimum tidal stages and maximum channel velocities. Project operations would be reduced or eliminated during these extreme tidal conditions.

Water Quality

The 2001 FEIR identified several cumulative water quality impacts that were the same as the Project-level impacts. Cumulative water quality impacts are bound by the requirements and existing controls mandated by various regulatory measures, such as the D-1641objectives and the RWQCB basin plans, TMDL implementation programs, and NPDES discharge permits.

Future activities affecting water quality in the Delta will include continued agricultural and municipal diversions, discharges from treated municipal wastewater and agricultural drainage, and maintenance of existing channels and levees. New facilities (e.g., channel gates and barriers) may be constructed, and existing channels may be modified for navigation or for increased water conveyance (e.g., BDCP and DWR/Reclamation SDIP). Some existing agricultural lands may be converted to urban development or to wetlands and other wildlife habitat uses, changing the water diversion and discharge patterns for these lands. Increasing populations in the watershed may result in higher concentrations of water quality variables associated with wastewater and increased surface runoff.

The nature of the water quality impacts described in Section 4.1, Water Quality, would not be expected to change as a result of cumulative effects. The magnitude of the impacts also are not expected to change substantially. These less-than-significant water quality impacts are not likely to become significant impacts because the same basic water quality control programs will govern any future changes in the Delta.

One exception, however, is Impact CUM-6: Increase in Pollutant Loading in Delta Channels Associated with Recreational Boating. This impact is considered to be less than significant as Impact WQ-11, but is considered significant under cumulative conditions. It is presented in this cumulative chapter as Impact CUM-6, which has not changed from the 2001 FEIR and 2001 FEIS, where it was presented as Impact C-24.One new cumulative impact, Impact CUM-7, has been added and is described below. This is a benefit associated with a potential isolated conveyance facility or through-Delta conveyance improvements.

Many future actions and projects could affect the Delta, but it is difficult to envision a single future for the Delta with any certainty for use in a cumulative assessment. Instead, cumulative impacts are discussed for several potential future conditions.

Impact CUM-6: Increase in Pollutant Loading in Delta Channels Associated with Recreational Boating

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Pollutant loading associated with recreational boat use in the Delta, including pollutant loading effects caused by the Project, could result in periodic pollution problems in Delta waters.

This cumulative impact is cumulatively considerable and unavoidable.

Mitigation Measure CUM-MM-2: Clearly Post Waste Discharge Requirements, Provide Waste Collection Facilities, and Educate Recreationists regarding Illegal Discharges of Waste

This mitigation measure has not changed since the 2001 FEIR and 2001 FEIS. Prior to operation of the Project recreation facilities, the Project applicant shall:

- Post notices at all Project recreation facilities describing proper methods of disposing of waste. Waste discharge requirements shall be posted and enforced in accordance with local and state laws and ordinances.
- Provide waste collection receptacles on and around the boat docks for the boaters using the Project recreation facilities.
- Provide educational materials to inform recreationists about the deleterious effects of illegal waste discharges and the location of waste disposal facilities throughout the Delta.

Mitigation Measure REC-MM-1: Reduce the Size or Number of Recreation Facilities

This mitigation measure is described in Section 4.9, Recreation and Visual resources.

Increased Delta Exports

Increased Delta exports could result from increased pumping capacity at SWP Banks (as with the SDIP) or relaxation of export restrictions. Increases in Delta exports could result in a decreased availability of water for Project diversions, which generally would tend to reduce any water quality impacts associated with the Project operations. However, an increase in Delta pumping capacity could increase the ability to export water from Delta wetlands, but the WQMP would ensure that there would be no significant water quality effects at the urban intakes.

Decreased Delta Exports

Decreases in Delta exports could occur if new export restrictions are established. Decreases in Delta exports could result in increased availability of water for Project diversions (because they would be screened), which might increase the water quality impacts associated with Project operations. However, the WQMP

would ensure that there would be no significant water quality effects at the urban intakes.

Changes in Future Delta Water Quality

Delta water quality could be affected by new actions such as habitat restoration (potential for increased DOC), improved wastewater treatment, increased generation of wastewater associated with growing population size, and changes in volume and quality of agricultural return flows. Degraded baseline water quality could restrict Project operations in order to avoid not meeting water quality objectives, whereas improved baseline Delta water quality could result in fewer restrictions on Project operations. These variations in future baseline conditions and Project operations are not expected to cause any significant cumulative impacts.

Improvements in Water Treatment Procedures

Many EPA MCL objectives, as well as water treatment regulations, are likely to be revised in the future. Many water treatment plants have responded to recent regulatory changes by using coagulation to remove DOC and using chloramines or ozone instead of chlorination for disinfection. Health concerns about the effects of DOC and bromide on DBP concentrations should diminish over time, as drinking water treatment techniques improve. As concerns about DOC decrease, potential WQMP restrictions on Project operations may relax.

Future Delta Conveyance Facilities

Impact CUM-7: Improved Central Valley Project and State Water Project Water Quality Resulting from Increased Use of Sacramento River Water

If an isolated conveyance facility or improved through-Delta conveyance facilities are constructed, possible effects on the Project operations would depend on the Delta operating procedures. With an isolated conveyance facility and increased pumping capacity, there could be less water available for Project diversions, but there likely would be more unused capacity to export the Project water. With an isolated conveyance facility in place, Project water could be used to meet requirements such as Delta outflow and thereby allow increased exports of clean Sacramento River water in the isolated conveyance facility. Urban intakes that remain in the Delta could receive a higher percentage of water from Project discharges, but potential water quality impacts at these urban intakes still would be controlled by the WQMP. No significant water quality impacts are likely, and this future impact is considered beneficial.

This cumulative impact is considered beneficial.

Mitigation
No mitigation is required.

Flood Control and Levee Stability

Impact CUM-8: Decrease in Cumulative Flood Hazard in the Delta

Implementation of the Project and other proposed projects will cause a decrease in cumulative flood hazard within the Delta. Other projects that have the potential to alter flood hydrology or alter levee stability are proposing to do so with the intent of reducing flood hazards. The proposed levee geometry on the four Project island levees would improve their general stability and improve their potential to provide necessary flood control. Implementation of any of these alternatives would increase the levee mass, decrease the internal levee seepage potential, provide improved erosion protection, and maintain levee top widths and heights in accordance with PL84-99, which exceeds the existing condition.

Through increased stability of the Project islands, the Delta levee system would benefit from an overall improvement and reduced risk of potential levee failure on Project islands affecting adjacent island levee stability (e.g., levee failure of a Project island directing flow at an adjacent island levee). Under certain operational schemes, the Project islands could provide flood pressure relief on the Delta levee system by storing floodwaters and contribute to flood stage reduction if storage exists during times of Delta flooding.

This cumulative impact is considered beneficial.

Mitigation
No mitigation is required.

Impact CUM-9: Decrease in the Need for Public Financing of Levee Maintenance and Repair on the Project islands

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Implementation of Alternative 2 would likely reduce the need for public financing of levee maintenance and repair on the Project islands. Savings at the state and federal level would result from Project implementation because the risk of levee failure would be reduced, so the cost of reclamation would be much lower than in the case of existing levees.

This cumulative impact is considered beneficial.

Mitigation
No mitigation is necessary.

Utilities and Highways

Cumulative impacts related to utilities and highways have not changed, and Impact CUM-10 (presented as Impact E-27 in the 2001 FEIR and 2001 FEIS) still applies.

Impact CUM-10: Cumulative Decrease in the Risk of Structural Failure of Roadways and Utilities

Implementation of planned levee improvements throughout the Delta, combined with levee improvements on the Project islands, would decrease the cumulative risk of levee failure on Delta islands. Furthermore, increased levee stability in the vicinity of the Project islands would reduce the cumulative risk of structural failure of roadways and utilities in the area.

This cumulative impact is considered beneficial.

Mitigation

No mitigation is required.

The levee improvements and management of the four islands associated with the Project have the potential to disrupt existing utilities, but measures included in the Project and as mitigation would ensure that there are no disruptions to service. Other projects, such as levee and road improvements and restoration, also could disrupt these services. However, pipelines, electrical lines, and other utilities generally have right-of-way or senior rights, and Project proponents will coordinate with the owners/operators of these utilities to ensure there is minimal disruption of service. Additionally, the levee improvements proposed as part of the Project would increase road and utility stability and result in a beneficial effect.

Fishery Resources

Cumulative Project effects on fish are tied to past and present environmental conditions, such as operations of the DCC and export pumping by the SWP and CVP facilities in the south Delta. The impact analyses detailed in Section 4.5, Fishery Resources, included some relevant impacts of other activities such as south Delta diversions by the SWP and CVP export facilities. Impact analyses and significance declarations described in Impacts FISH-1through FISH-11 also apply under cumulative conditions, as do the proposed mitigation measures.

Overview of Cumulative Conditions

A number of activities in the Delta that cumulatively may affect fishery resources are summarized below relating to water diversions, contaminants, urbanization, climate change, nonnative species, and beneficial actions.

Water Diversions

Herren and Kawasaki (2001) enumerated 2,209 water diversions within the Delta, of which 17 were screened. As of May 2009, the total number of diversions listed in the California Fish Passage Assessment Database is 2,265, of which 20 are screened (CalFish 2009). For 1,881 of these, the maximum diversion capacity is not known. Not all diversions are functional. The 384 diversions for which capacity is known total almost 27,000 cfs: about 16,000 cfs of this are screened (with the SWP and CVP export facilities making up 15,200 cfs, albeit with screening consisting of relatively low-efficiency louvers). This included 365 unscreened intakes and 19 screened intakes. Of the unscreened intakes 82% were less than 50-cfs maximum capacity, and of the screened intakes 74% were less than 50-cfs maximum capacity. Aside from large diversions such as the SWP and CVP export facilities (see above), little study has been done of the numerous diversions in the Delta. Moyle and Israel (2005) conducted an extensive literature review and found only six studies related to the Delta and Suisun Marsh from which any quantitative information could be obtained. From the available information, it was not possible to ascertain whether the smaller diversions would have measurable effects at the population level, beyond the loss of individuals. Installation of fish screens in many cases may be indicative of a "precautionary approach that a diversion should be assumed to harm fish populations unless it can be proven otherwise" (Moyle and Israel 2005, 26).

Contaminants

Fish inhabiting the Delta potentially are affected by a variety of contaminants. California's 2006 list of water quality–impaired water bodies, submitted to the USEPA as required under Section 303(d) of the CWA, names 13 pollutants for which TMDLs have been required (Table 5-2). Recent investigations related to the POD have shown that moderate to high levels of ammonia (in Sacramento River water samples) may result in high mortality of larval delta smelt during bioassays (Baxter et al. 2008). However, studies using biomarkers (e.g., histological abnormalities) to indicate the effects of contaminants have provided little evidence for negative effects on delta smelt, longfin smelt, and threadfin shad but more evidence for striped bass, yellowfin goby, and inland silverside (Baxter et al. 2008, 15–16).

Table 5-2. Contaminants in the Delta That Have Been Identified as Requiring TMDLs (California Environmental Protection Agency, State Water Resources Control Board 2007)

Chlorpyrifos	Group A pesticides
DDT	Mercury
Diazinon	Organic enrichment/low dissolved oxygen
Dioxin	Pathogens
Electrical conductivity	PCBs (polychlorinated biphenyls)
Exotic species	Unknown toxicity
Furan compounds	

Urbanization

The human population living in the counties bordering the Delta is projected to double in number from 2000 to 2050, with some counties possibly tripling in size (State of California, Department of Finance 2007; Table 5-3). Accompanying these increases will be increased demand for water, among other resources. Increased urbanization tends to be accompanied by a number of cumulative impacts on aquatic resources, including increased impervious surface levels (leading to greater runoff and stream flashiness) and contaminants. Bilby and Mollot (2008) demonstrated a significant decline (75%) in incidences of coho salmon spawning associated with increasing urbanization (50% more urban or industrial use) from 1986 to 2001 in several tributary streams of Puget Sound, Washington. Similar effects could occur in California for Chinook salmon or steelhead. Larger human populations may place a greater pressure on waters for recreation, with associated effects such as disturbance of streambeds and erosion of banks by recreational vessel wakes.

Table 5-3. Projections of Population Growth in the Six Counties Bordering the Sacramento–San Joaquin River Delta (State of California, Department of Finance 2007)

							2000–2050	
County	2000	2010	2020	2030	2040	2050	% Increase	Factor Increase
Alameda	1,453,078	1,550,133	1,663,481	1,791,721	1,923,505	2,047,658	41%	1.4
Contra Costa	956,497	1,075,931	1,237,544	1,422,840	1,609,257	1,812,242	89%	1.9
Sacramento	1,233,575	1,451,866	1,622,306	1,803,872	1,989,221	2,176,508	76%	1.8
San Joaquin	569,083	741,417	965,094	1,205,198	1,477,473	1,783,973	213%	3.1
Solano	396,995	441,061	503,248	590,166	697,206	815,524	105%	2.1
Yolo	170,190	206,100	245,052	275,360	301,934	327,982	93%	1.9
Total	4,779,418	5,466,508	6,236,725	7,089,157	7,998,596	8,963,887	88%	1.9

Climate Change

Climate change is predicted to bring profound changes to California's natural environment. Hayhoe et al. (2004) describe the results of four climate change models: compared to 1960–1991, by 2070–2099 statewide average annual temperatures will be 2.3–5.8ºC higher, average annual precipitation will be reduced by >100 mm, sea level will have risen 19.2–40.9 cm, snowpack will have declined by 29–89%, and change in annual inflow to reservoirs will decline by >20%. (One model predicted slight increases in precipitation, snowpack, and reservoir inflow). Changes in vegetation also are predicted, e.g., substantial decreases in the extent of alpine/subalpine forest, evergreen conifer forest, mixed evergreen woodland, and shrubland and increases in mixed evergeen forest and grassland (Hayhoe et al. 2004). Climate change is likely to cumulatively affect native fishes by increasing water temperatures (hence reducing DO), reducing streamflows, and increasing the likelihood of drought-related fires. A rise in sea level will lead to increasing rates of erosion, sedimentation, flooding, and inundation of low-lying coastal ecosystems. With reductions in snowmelt runoff,

peak flows may come earlier as rainfall contributes more, which could affect species such as Central Valley spring-run Chinook salmon that have evolved their life history based on predictable runoff patterns (Williams 2006). Increasing temperatures may increase metabolic needs of fish predators and increase predation (Lindley et al. 2007). Moyle et al. (2008) qualitatively assessed the potential for climate-related impacts on California's native salmonids (Table 5-4). Their analysis indicated that the majority of species (18 of 29, 62%) were vulnerable in all or most of the watersheds inhabited; no species was invulnerable to climate change. Of the species that migrate through the Delta and may be cumulatively affected by the Project Alternative, late fall–run, winter-run, and spring-run Chinook salmon were assessed to be "vulnerable in all watersheds inhabited," steelhead were "vulnerable in most watersheds inhabited," and fall-run Chinook salmon were "vulnerable in portions of watersheds inhabited" (Table 4.5-23).

Table 5-4. Qualitative Assessment of California Salmonids' Vulnerability to Climate Change Based on Analysis by Moyle et al. (2008)

Vulnerability	Taxon
Vulnerable in all watersheds inhabited	Klamath Mountains Province Summer Steelhead[SSC]; Northern California Coastal Summer Steelhead[T,SSC]; Central California Coast Steelhead[T]; South–Central California Coast Steelhead[T,SSC]; Southern Steelhead[E,SSC]; Upper Klamath–Trinity Rivers Spring-Run Chinook Salmon[SSC]; **Central Valley Late Fall–Run Chinook Salmon[SC,SSC]; Sacramento Winter-Run Chinook Salmon[E,E]; Central Valley Spring-Run Chinook Salmon[T,T]**; Southern Oregon–Northern California Coastal Coho Salmon[T,T]; Central California Coast Coho Salmon[E,E]; McCloud River Redband Trout[SSC]; Eagle Lake Rainbow Trout[SSC]; Lahontan Cutthroat Trout[T]
Vulnerable in most watersheds inhabited (possible refuges present)	**Central Valley Steelhead[T];** Upper Klamath–Trinity Rivers Fall-Run Chinook Salmon; California Coast Chinook Salmon[T]; Goose Lake Redband Trout[SC]; Coastal Cutthroat Trout[SSC]
Vulnerable in portions of watershed inhabited (e.g., headwaters, lowermost reaches of coastal streams)	Northern California Coastal Winter Steelhead[T]; **Central Valley Fall-Run Chinook Salmon[SC];** California Golden Trout[SC,SSC]; Little Kern Golden Trout[T]; Kern River Rainbow Trout[SC,SSC]; Paiute Cutthroat Trout[T]; Mountain Whitefish
Low vulnerability because of location, cold water sources, and/or active management	Klamath Mountains Province Winter Steelhead; Resident Coastal Rainbow Trout; Southern Oregon–Northern California Coastal Chinook Salmon
Not vulnerable to significant population loss because of climate change	None

Note: Species in **bold** migrate through the Delta and could be affected by Project operations.

[E] Endangered (Federal), [T]Threatened (Federal), [E]Endangered (State), [T]Threatened (State), [SC]Species of Concern (Federal), [SSC]Species of Special Concern (State).

Nonnative Species

Nonnative species have been introduced intentionally and incidentally into the Delta and neighboring areas for more than 100 years. Striped bass stocking and

rearing activities are of particular importance. Striped bass originally were stocked into this area in 1879, with artificial propagation attempted from 1907 to 1910 (Dill and Cordone 1997). DFG, in association with private aquaculturists, released 11 million fingerlings and yearlings from 1981 to 1991 in an attempt to offset declining abundance (Figure 5-1). Following termination of the hatchery-rearing program because of concerns regarding predation by striped bass on listed species, striped bass juveniles were salvaged from the SWP diversion in the south Delta, reared for 1 or 2 years in net pens, and then released into the San Francisco Bay estuary (Moyle 2002). From 1993 to 2001, an average of more than 230,000 striped bass salvaged and reared by this program were released annually into the San Francisco Bay/Delta system (Figure 4.5-8). It was hoped that the decline in striped bass adult abundance from 2.2 million adults in the 1960s–1970s to less than 1 million adults in the 1990s could be offset by this program, with the goal of stabilizing the population at about 3 million adults (Lindley and Mohr 2003). Lindley and Mohr (2003) estimated that the predatory effects of a population of 3 million adult striped bass would increase the probability of quasi-extinction (i.e., three consecutive spawning runs of fewer than 200 adults) of winter-run Chinook salmon to 55%, compared to probabilities of 28% with 512,000 striped bass adults or 30% with 700,000 adults.

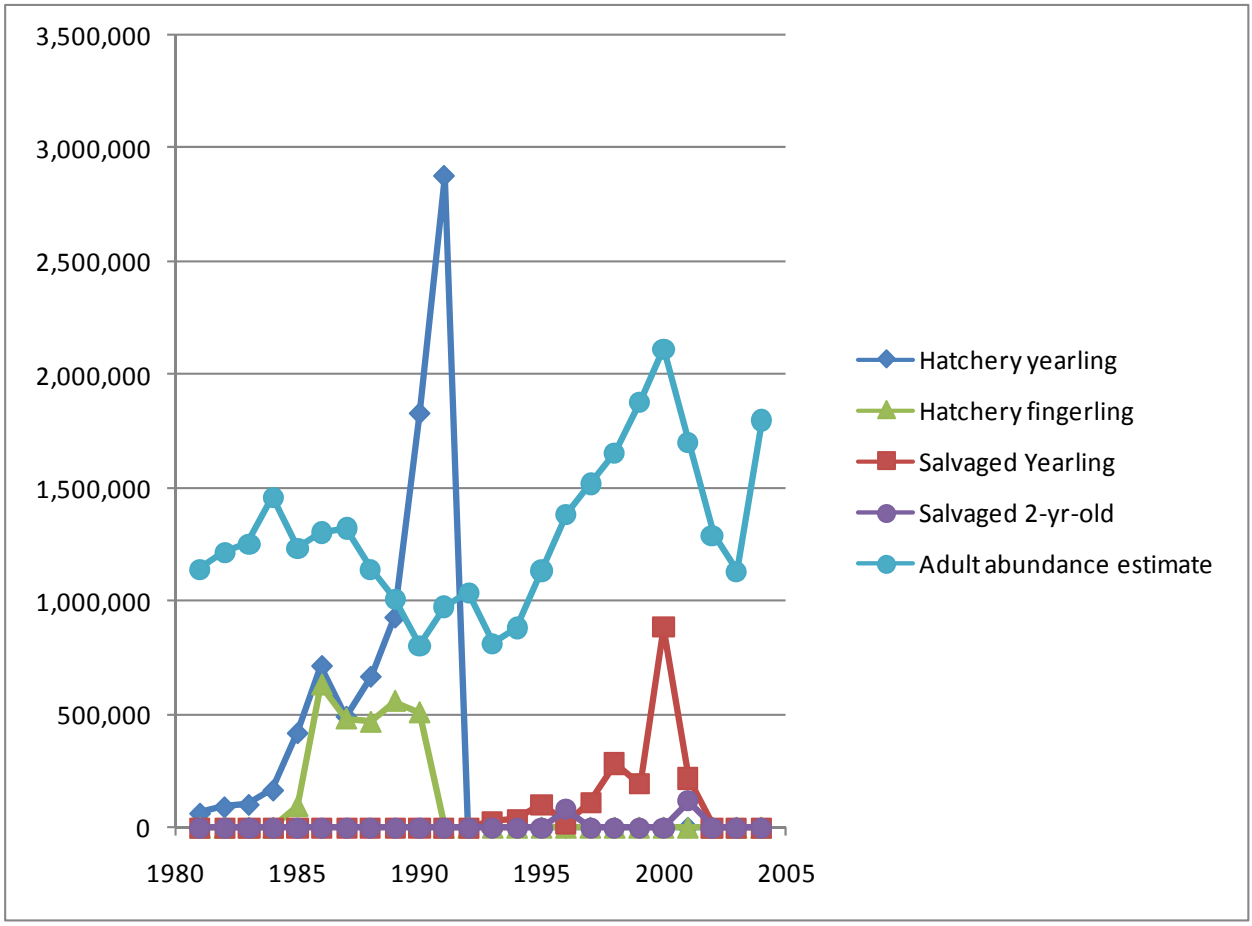

Figure 5-1. Releases of Hatchery-Reared and Salvaged Striped Bass into the Greater San Francisco Bay Watershed, with Estimates of Adult Abundance, 1981–2004 (Gingras 2008)

Note: Adult abundance estimates for 1995, 1997, 1999, and 2001 were interpolated from adjacent years.

Discharge of ballast water from foreign ships entering San Francisco Bay and the Delta probably has introduced several species. The introduced clam *Corbula amurensis* appears to have greatly depleted stocks of plankton upon which fish and other species depend (Kimmerer 2002a). Yellowfin goby (*Acanthogobius flavimanus*) and shimofuri goby (*Tridentiger bifasciatus*) are well established in several coastal regions and may compete with native fauna, prey upon them, or be preyed upon by them (Moyle 2002; Workman and Merz 2007). A number of fish species have been introduced to enhance recreational fishing, either as targets for harvest (e.g., striped bass, brown trout, largemouth bass [*Micropterus salmoides*]) or else as bait (e.g., inland silverside, *Menidia beryllina*) (Moyle 2002). Inland silversides may prey upon eggs and larvae of delta smelt and compete with juveniles (Bennett 2005). Illegal introductions of fish and other animals, e.g., from the aquarium trade or for recreational fishing, is another pathway that may cumulatively affect native species.

Beneficial Actions

Measures outlined in the RPA of the USFWS (2008a) and NMFS (2009) OCAP BO are expected to improve conditions for fishery resources in the Delta (see Environmental Setting, above, and Appendix C). Many actions outside the Delta will benefit species such as salmonids that inhabit the Delta for portions of their life cycles. Examples of these actions include changes in operation of the Feather River Hatchery and Oroville Dam in relation to FERC relicensing, restoration of the San Joaquin River above its confluence with the Merced River for eventual reintroduction of Chinook salmon, and habitat restoration and removal of barriers to fish passage in Battle Creek.

If implemented as currently proposed, the BDCP is expected to provide the most benefit to fishery resources in the Delta because of its numerous actions intended to balance the needs of aquatic organisms and humans.

The Overview of the BDCP Draft Conservation Strategy (http://baydeltaconservationplan.com/NewsLtrBackgroundDoc/Overview_of_Conservation_Strategy_1-12-2009.pdf, p. 6) mentions that "the main challenge facing the BDCP is the restoration of key ecosystem functions in the highly altered environment of the Delta." The Conservation Strategy will include

> a comprehensive integrated package of conservation measures that incorporate physical improvements (e.g., habitat restoration, fish passage improvements), improved ecosystem processes (e.g., improvements in flow patterns, improved food web, enhanced habitat quality and availability), and direct enhancement of production and survival of covered species (mark-select fisheries, conservation hatcheries, and reductions of toxicants and non-native predators) (BDCP Conservation Strategy Overview, p.7).

The primary components of the Conservation Strategy include:

> (1) the construction of new north Delta diversion facilities and an isolated conveyance facility in conjunction with operation of existing facilities; (2) detailed criteria that will govern the operations of the conveyance system across a range of hydrological conditions; (3) restoration of tidal marsh,

floodplain, and riparian, and upland transition habitat; and (4) actions to address and control contaminants, non-native invasive species, and predation; and to address other potentially important non-conveyance and non-habitat-related stressors on covered species (collectively called "other stressors") (BDCP Conservation Strategy Overview, p.7).

Impacts

Impact CUM-11: Cumulative Impacts on Listed Fish Species

The Project's effects in conjunction with ongoing cumulative conditions related to water diversions, contaminants, urbanization, climate change, and nonnative species are likely to reduce significantly the abundance of sensitive Delta fish species, namely salmonids, delta and longfin smelt, and green sturgeon. While the Project's incremental contribution is very small, environmental conditions are substantially degraded and the additional increment could contribute further to these species' decline. Therefore, this impact is considered significant. However, there are also beneficial elements of the Project that could offset some of these impacts, including screening intakes and providing periodic water supply releases for environmental benefits. Furthermore, recent BO conditions require measures to improve Delta habitat conditions for sensitive Delta fish species, and BDCP efforts also are focused on measures to benefit these species. As noted above, impact analyses and significance declarations described in Impacts FISH-1 through FISH-11 in Section 4.5, Fishery Resources, also are applicable under cumulative conditions, as are the proposed mitigation measures.

Implementation of Mitigation Measures FISH-MM-1 through FISH-MM-3 and the environmental commitments described in Chapter 2 will help reduce Impact CUM-11, but not necessarily to a less-than-significant level.

This cumulative impact is considered cumulatively considerable and unavoidable.

Mitigation Measure FISH-MM-1: Replacement of Habitat Lost during Construction of Project Facilities
This mitigation measure is described in Section 4.5.

Mitigation Measure FISH-MM-2: Implement a Fishery Improvement Mitigation Fund
This mitigation measure is described in Section 4.5.

Mitigation Measure FISH-MM-3: Establish a Shallow-Water Aquatic Habitat Conservation Easement
This mitigation measure is described in Section 4.5.

Vegetation and Wetlands

The Project would result in changes in vegetation and wetland types at the reservoir and Habitat Islands, but would mitigate impacts to ensure no net losses

of any vegetation or wetland type. Many other projects throughout the Delta have resulted or could result in loss of wetlands (In-Delta Storage Project, Banks Pumping Plant Expansion to 10,300 cfs, Mountain House Development Project, River Islands Development Project, and a power facility development project), and many proposed and future projects (Suisun Management Plan, BDCP) include substantial protection and restoration of tidal and other wetlands. Additionally, loss of wetlands typically is mitigated through regulatory programs (e.g., USACE 404 permit) to ensure there is no net loss of wetland types.

It is expected that over the long term there will be a net increase in wetlands as a result of various restoration efforts.

Impact CUM-12: Increase in Wetland and Riparian Habitats in the Delta

Implementation of the Project in conjunction with implementation of the other Delta projects with restoration, mitigation, or creation components described above is expected to result in an increase in the acreage of permanent and seasonal wetlands and riparian habitat in the Delta.

This cumulative impact is considered beneficial.

Mitigation

No mitigation is required.

Wildlife

The Delta region, Suisun Marsh, and San Francisco Bay continue to be productive and important habitats for hundreds of bird and mammal species. Many restoration efforts that are designed to expand and enhance marsh habitat are being advanced by USFWS, DFG, and other agencies. Conversely, there continue to be wetland and upland habitat losses attributable to water and development projects throughout the region.

Many of the water storage projects listed above would result in impacts on vegetation and wildlife resources. For example, Sites Reservoir would inundate hundreds of acres of habitats, including annual grasslands, some of which support vernal pools, riparian woodlands, chaparral, and oak woodland. Similarly, expansion of Los Vaqueros Reservoir would inundate annual grassland, riparian woodlands, chaparral, and oak woodland. However, most of the projects listed above are not located near the Project and habitats are not contiguous. Therefore the Project would not contribute to cumulative impacts on habitats and related resources except with those projects that are within 60 miles.

Iimplementation of the Proposed Project in combination with other local and regional projects would contribute to the cumulative loss of identified sensitive resources, including foraging habitat for wintering waterfowl and herbaceous and riparian habitats for sensitive wildlife species from construction and operation activities. Although these combined impacts could be cumulatively considerable,

implementing the final HMP would reduce the Proposed Project's contribution to these cumulative impacts to a level below the cumulatively considerable threshold.

Impact CUM-13: Cumulative Increase in Foraging Habitat for Wintering Waterfowl in the Delta

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Foraging habitat for wintering waterfowl would increase in the Delta as mitigation projects that convert existing land uses to habitat uses (including the Project) are implemented.

This cumulative impact is considered beneficial.

Mitigation

No mitigation is necessary.

Impact CUM-14: Cumulative Loss of Herbaceous Habitats in the Delta

Delta levee rehabilitation, water management, and flood control projects could reduce amounts of herbaceous habitat in the Delta region. This cumulative effect may be offset by habitat restoration and subsidence control projects that are implemented separately from or jointly with those projects. The Proposed Project would contribute to the loss of herbaceous habitats by flooding the Reservoir Islands but would compensate for this loss by creating habitats on the Habitat Islands and by implementing the final HMP. Habitat creation and implementation of the HMP would reduce the Proposed Project's contribution to the cumulative loss of herbaceous habitats in the Delta region to a level below the cumulatively considerable threshold.

This cumulative impact is not cumulatively considerable.

Mitigation

No mitigation is required.

Impact CUM-15: Cumulative Temporary Loss of Riparian Habitat in the Delta

Delta levee rehabilitation, water management, and flood control projects could reduce amounts of riparian habitat in the Delta region. Losses of riparian vegetation associated with these levee improvement projects are commonly temporary, and any long-term losses usually are offset by habitat restoration and subsidence control projects. Although the Proposed Project would remove riparian habitat, there would be a net increase in the amount of riparian habitat when the final HMP is implemented and habitats on the Habitat Islands are created. Habitat restoration and implementation of the HMP would reduce the Proposed Project's contribution to the cumulative temporary loss of riparian habitats in the Delta region to a level below the cumulatively considerable threshold.

This cumulative impact is not cumulatively considerable.

Mitigation
No mitigation is required.

Land Use and Agriculture

Implementation of the Project would not contribute to cumulative impacts on land use, including changes in Williamson Act contracts, a substantial reduction in regional housing supply, and incompatibilities with adjacent land uses. Implementation of the Project would, however, contribute to the regional conversion of agricultural land as described below. The Project, in conjunction with other projects that convert agricultural land to other uses, would not be consistent with general plan or DPC's principles that promote the retention and production of agricultural land as described in Section 4.8, Land Use and Agriculture.

The above list of related projects evaluated for cumulative impacts includes a number of projects that would convert agricultural lands to nonagricultural uses. Agricultural land conversions could occur through the urban development of Delta islands, levee improvement and flood control projects, or subsidence-reduction programs. The actual amount of agricultural land that may be converted by other projects is not known. Because these totals are not known, this assessment used countywide historical data on agricultural land conversion as a method to put the estimated Project conversion in context with conversion trends in Contra Costa and San Joaquin Counties.

The Project would result in the conversion of an estimated 14,949 acres of farmland (8,290 acres in San Joaquin County and 6,659 acres in Contra Costa County). In 2006, Contra Costa and San Joaquin Counties had a combined total of approximately 437,547 acres of prime farmland; 97,365 acres of farmland of statewide importance; and 66,820 acres of unique farmland (Table 4.8-6). The acreage of prime farmland affected by the Project (13,148 acres) represents approximately 3% of the total prime farmland in both counties. Between 1996 and 2006, the combined average annual loss of prime farmland for both counties was approximately 3,666 acres per year (California Department of Conservation 2006a and 2006b).

Impact CUM-16: Cumulative Conversion of Agricultural Land

The cumulative conversion of prime and other agricultural lands by the Project and related projects is considered a significant and unavoidable impact. This impact would be partially offset because the Proposed Project and other projects have the potential to increase water supply and reliability for agricultural uses, which could help maintain lands in agricultural production. Additionally, as part of the environmental commitments described in Chapter 2, agricultural conservation easements would be placed on the Habitat Islands; the inclusion of this environmental commitment would help protect agricultural resources in the region.

However, the cumulative conversion of agricultural land would be cumulatively considerable and unavoidable.

Mitigation
No reasonable mitigation is available to reduce this impact to a less-than-significant level. It is extremely unlikely that a similar amount of land in the region with similar qualities and productivity could be brought into production to mitigate the effects resulting from the cumulative loss of agricultural land. Counties in the Project region generally are losing farmland faster than new land is being brought into production. For example, between 2004 and 2006, approximately 6,618 acres of important farmland in San Joaquin County were converted to urban and other uses, while only 2,668 acres of grazing lands and other nonagricultural lands were converted to agricultural land (California Department of Conservation 2006a and 2006b).

Recreation and Visual Resources

The proposed levee improvements would result in a significant and unavoidable degradation of local views. This is addressed under Impact CUM-19 below.

Impact CUM-17: Increase in Recreation Opportunities in the Delta

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Implementation of Alternative 2 concurrent with other agricultural conversion projects and the DWR water management programs may result in an increase in recreation opportunities throughout the Delta. Although the North Delta Flood Control and Ecosystem Restoration Project is not currently funded for implementation, the 2008 EIR includes objectives to enhance Delta recreation, and calls for channel and levee improvements that may improve access for boaters and anglers. The South Bay Salt Ponds Project also aims to enhance recreation access and opportunities near the Delta region. In addition, the North Delta project, the CALFED Ecosystem Restoration Program, and the Franks Tract Project all have ecosystem restoration components that could improve fishery conditions and support increased fishing in the Delta.

Implementation of agricultural conversion projects by state and federal agencies would be expected to include provisions for public access and new opportunities for recreation in the Delta. Implementation of Alternative 2 would provide waterfowl habitat of varying quality and new recreation facilities for use by hunters, anglers, boaters, and other recreationists.

This cumulative impact is considered beneficial.

Mitigation
No mitigation is required.

Impact CUM-18: Enhancement of Waterfowl Populations and Increased Hunter Success in the Delta

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Implementation of Alternative 2 concurrent with other proposed agricultural conversion projects throughout the Delta would be expected to reduce available waste grain for waterfowl foraging habitat. However, projects that result in the

conversion of agricultural land used by waterfowl for foraging would be required to compensate for the loss of wintering waterfowl foraging habitat. The overall effect of proposed projects in the Delta, including the Project, would be beneficial for waterfowl foraging habitat. This analysis assumes that adverse impacts of agricultural conversion projects would be mitigated or otherwise offset through implementation of other beneficial projects. Because Delta projects are expected to enhance or maintain habitat values overall, waterfowl would be expected to continue to use the Delta. Hunter success, therefore, may increase throughout the Delta.

This cumulative impact is considered beneficial.

Mitigation
No mitigation is required.

Impact CUM-19: Reduction in the Quality of Views of the Reservoir Islands

Visual impacts would be significant and unavoidable for views in and outside the Reservoir Islands because of levee and infrastructure improvements. Other development in the Delta could similarly degrade the overall visual quality of the Delta for viewer groups. Implementation of Mitigation Measures REC-MM-1, REC-MM-2, and REC-MM-3 would reduce the severity of Impact REC-8, but not to a less-than-significant level. The cumulative impact on visual resources resulting from the Proposed Project and other development projects in the Delta is therefore considered significant and unavoidable.

This cumulative impact is cumulatively considerable and unavoidable.

Mitigation Measure REC-MM-1: Reduce the Size or Number of Recreation Facilities
This mitigation measure is described in Section 4.9.

Mitigation Measure REC-MM-2: Partially Screen Proposed Recreation Facilities and Pump and Siphon Stations from Important Viewing Areas
This mitigation measure is described in Section 4.9.

Mitigation Measure REC-MM-3: Design Levee Improvements, Siphon and Pump Stations, and Recreation Facilities and Boat Docks to Be Consistent with the Surrounding Landscape
This mitigation measure is described in Section 4.9.

Traffic and Navigation

The analysis presented in Section 4.10, Traffic and Navigation, accounted for other projects that would occur independently of the Project. For instance, the traffic growth projections and roadway operation analysis account for regional and local population and employment growth, anticipated future development projects, and planned roadway improvement projects.

Because of this, future condition scenarios (2030) without the Proposed Project capture the effect of cumulative projects. Future condition scenarios (2030) with the Proposed Project capture the effects of both cumulative projects and those of the Proposed Project.

Cultural Resources

Impact CUM-20: Destruction of or Damage to Prehistoric Archaeological Sites in the Delta

This cumulative impact has not changed since the 2001 FEIR and 2001 FEIS. Fourteen prehistoric sites have been found near the Project site. Many of these have been adversely affected by agricultural activities, leveling, and sand extraction occurring in the Delta. The effects of the Project would not contribute to the overall loss of prehistoric resources in the Delta because the single prehistoric archaeological site within the APE for the Project is not eligible for listing in the NRHP.

This cumulative impact is not cumulatively considerable.

Mitigation

No mitigation is required.

Impact CUM-21: Destruction of or Damage to Historic Districts Representing Agricultural Labor Camp Systems in the Delta

During the last 25 years, the majority of agricultural labor camps in the Delta has been demolished or modified or have deteriorated without being documented or otherwise preserved. The resources on Bacon Island represent one of the last intact agricultural labor camp systems in the Delta. The destruction of the Bacon Island Rural Historic District would add to the loss of this historic resource type in the Delta. However, available environmental impact documents and cultural resource studies for the cumulative projects do not indicate that these projects, when combined with the Project effect, result in a cumulatively significant impact.

This cumulative impact is cumulatively considerable. Implementing Mitigation Measure CUL-MM-1 reduces this impact to a not-cumulatively-considerable level.

Mitigation Measure CUL-MM-1: Prepare and Implement a Historic Properties Treatment Plan

No mitigation is required beyond Mitigation Measure CUL-MM-1, described in Section 4.11, for the Project impact.

Mosquitoes and Public Health

Impact CUM-22: Increase in Abatement Levels during Partial-Storage, Shallow-Storage, or Shallow-Water Wetland Periods on the Reservoir Islands under Cumulative Conditions

This cumulative impact has not changed. The mitigation measure has been updated and is described in Section 4.12, Mosquitoes and Public Health.

This cumulative impact is cumulatively considerable. Mitigation Measure PH-MM-1 reduces this impact to a not-cumulatively-considerable level.

Mitigation Measure PH-MM-1: Develop an Integrated Pest Management Program and Coordinate Project Activities with SJCMVCD and CCCMVCD

This mitigation measure is described in Section 4.12, Mosquitoes and Public Health.

Impact CUM-23: Cumulative Increase in Mosquito Abatement Needs Resulting from Implementation of Future Projects, Including the Project

The Project would affect mosquito breeding habitat by reducing it from May through August and increasing it during September and October. Other projects, including the North Delta Flood Control and Ecosystem Restoration Project, Liberty Island Restoration, the CVP-SWP OCAP, and the CALFED ERP, also have the potential to create increased mosquito breeding habitat. Development around the periphery of the Delta increases the risk to people of mosquito-borne diseases. These combined increases require mosquito abatement districts such as SJCMVCD and CCMVCD to increase control efforts, increasing costs for abatement. Mitigation should be implemented for each project during the project evaluation and approval process to minimize the cumulative effects on mosquito abatement. Implementation of Mitigation Measure PH-MM-1 would reduce the Project's contribution to cumulative increases in mosquito abatement needs. However, because there is no guarantee that mitigation measures would be implemented for other future projects, this impact is considered significant and unavoidable.

This cumulative impact is considered cumulatively considerable and unavoidable.

Mitigation Measure PH-MM-1: Develop an Integrated Pest Management Program and Coordinate Project Activities with SJCMVCD and CCCMVCD

This mitigation measure is described in Section 4.12, Mosquitoes and Public Health.

Air Quality

Impact CUM-24: Increase in Cumulative Production of Ozone Precursors and Carbon Monoxide in the Delta

This cumulative air quality impact identified in the 2001 FEIR and 2001 FEIS has not changed. Project construction would contribute to minor increases in PM2.5, PM10, and CO. PM10, NO_X, and CO would be mitigated as part of the project. Construction- and operation-related increases in ROG would be significant and unavoidable. NO_X emissions could be reduced substantially by using electrically powered pumps. Other construction activities, along with ongoing agricultural activities, have the potential to contribute to cumulative air quality impacts. Implementing Mitigation Measures RJ-1 and O-4 would reduce this impact, but not to a less-than-significant level. The cumulative impact of ROG emissions therefore would be significant and unavoidable.

This cumulative impact is considered cumulatively considerable and unavoidable.

Mitigation Measure REC-MM-1: Reduce the Size or Number of Recreation Facilities

This mitigation measure is described in Section 4.9, Recreation and Visual Resources.

Mitigation Measure AIR-MM-4: Coordinate with the SJVAPCD and BAAQMD to Reduce or Offset Emissions

This mitigation measure is described in Section 4.13, Air Quality.

Climate Change

Implementation of the Project would increase GHG emissions associated with sources such as recreation and water pumping. However, the increase in emissions from these sources would be outweighed by reductions in peat oxidation–related GHG emissions resulting from inundation of Bacon Island and Webb Tract. Consequently, because the Project would reduce GHG emissions, it would not contribute to cumulative impacts related to climate change and would result in a long-term beneficial effect.

Noise

Construction noise associated with the Proposed Project would be temporary and highly localized, and noise attributable to the operation of the proposed pump stations is not anticipated to be audible at the nearest noise-sensitive land uses. Because of the lack of sensitive receptors described in Section 4.15, Noise, it is not anticipated that the Project would make a cumulatively considerable contribution to any significant cumulative noise impacts in the Project area.