CHAPTER 4. DESCRIPTION OF COVERED ACTIVITIES AND ASSOCIATED FEDERAL ACTIONS

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*[**Note to reviewers:** This is the fourth draft of Chapter 4 for review by the Steering Committee. This draft includes revisions to the draft Chapter 4 provided to the Steering Committee on July 1, 2010. The purpose of this chapter is to describe the activities that will be addressed by the BDCP and will be proposed for regulatory coverage pursuant to the federal ESA and the State NCCPA.]*

CHAPTER 4. DESCRIPTION OF COVERED ACTIVITIES AND ASSOCIATED FEDERAL ACTIONS

4.1 INTRODUCTION

*[**Note to reviewers**: Issues relating to take authorization for the State and federal water contractors are still under discussion.]*

The BDCP is intended to provide the basis for the issuance of regulatory authorizations under the federal Endangered Species Act (ESA) and the California Natural Community Conservation Planning Act (NCCPA) for a broad range of ongoing and anticipated activities that are associated with the operations of the State Water Project (SWP) in the Sacramento-San Joaquin River Delta, as well as for actions related to the operation of certain power plants located in the Plan Area (Figure 4-1 identifies the Plan Area). Additionally, the BDCP is intended to provide the basis for a Section 7 consultation. This chapter identifies and describes the activities that are addressed by the BDCP. The chapter further categorizes these activities on the basis of the party chiefly responsible for their implementation, characterizing activities as either "covered activities" for those actions undertaken by non-federal parties or as "associated federal actions" for those actions that are authorized, funded, or carried out by the Bureau of Reclamation (Reclamation). The potential effects of all of these activities on covered species, their habitats, and natural communities have been evaluated as part of an overall assessment of the effects of the BDCP, as described in Chapter 5, *Effects Analysis*. All construction and maintenance activities included as covered activities and actions would comply with the avoidance and minimization measures described in Chapter 3, *Conservation Strategy*, to avoid or reduce adverse effects on covered species and natural communities.

As a joint HCP/NCCP, the BDCP has been designed to meet the requirements of both State and federal endangered species laws and provide the basis for non-federal entities to obtain take authorizations from the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) pursuant to section 10 of the ESA and from the California Department of Fish and Game (DFG) under section 2835 of the NCCPA, and potentially under section 2081 of the California Endangered Species Act (CESA).[1]

[1] The BDCP has also been developed to meet the permit issuance standards of CESA for the activities described in this chapter.

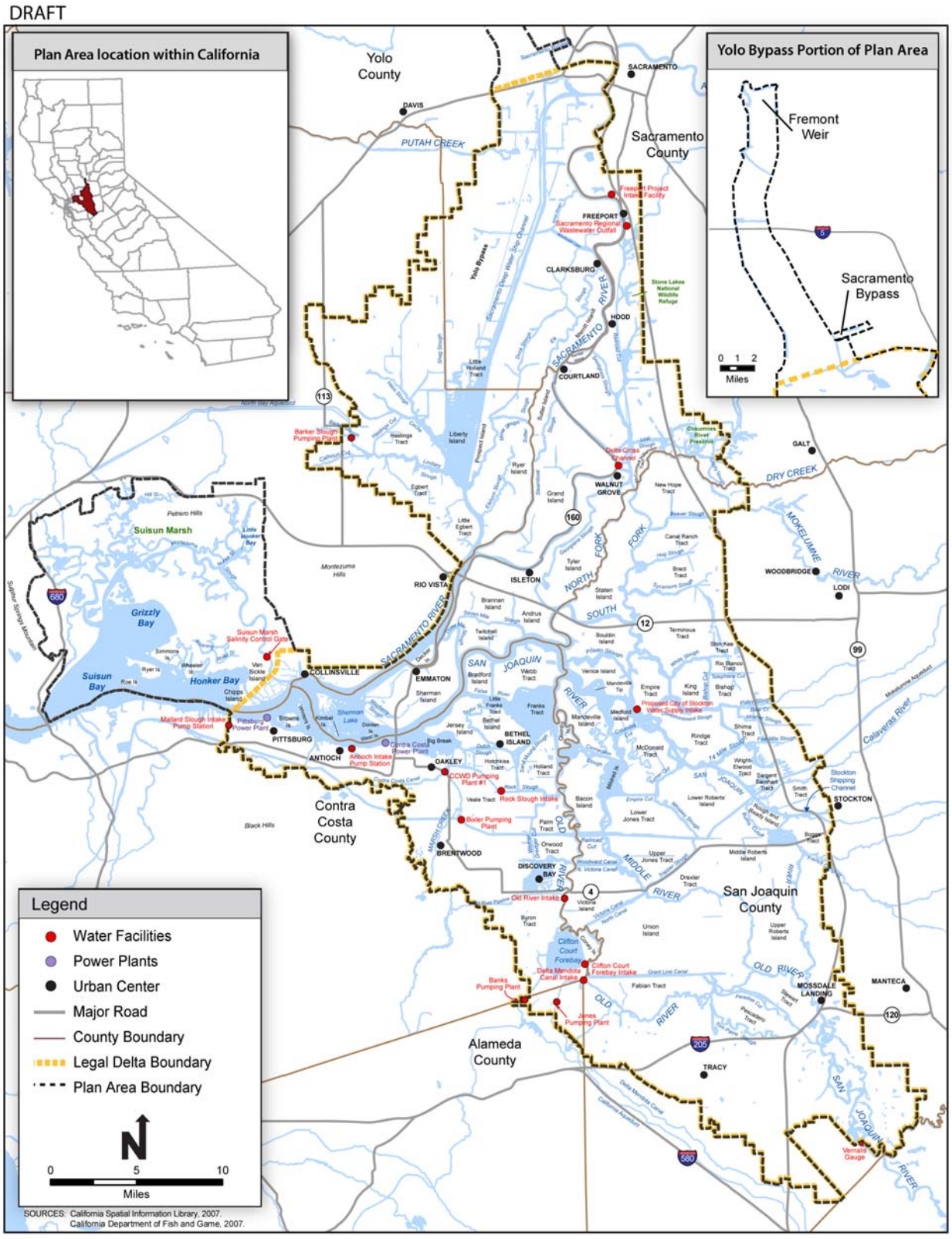

Figure 4-1. BDCP Plan Area Location

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Specifically, the Department of Water Resources (DWR), certain SWP contractors, and Mirant Delta LLC (Mirant) are seeking regulatory coverage under the ESA and the NCCPA to ensure that their activities within the geographic scope of the Plan, including conveyance, diversions, exports, or use of water from the Delta associated with energy generation, comply with these laws. The BDCP further provides the basis for the biological assessment (BA) to facilitate consultation under Section 7 of the ESA.

*[**Note to Reviewers:** The regulatory mechanism of the ESA that will be used to provide regulatory coverage to the CVP contractors has yet to be determined. Also, it has not yet been determined if coverage will be provided or what mechanism may be used to provide coverage for other diversions in specific areas of the Delta.]*

To meet these regulatory objectives, the BDCP sets out a comprehensive conservation strategy that addresses the effects of SWP, CVP, and Mirant existing and future actions that may occur within the Plan Area on aquatic and terrestrial species, including those listed under the ESA or CESA as threatened, endangered, or candidates for listing, as well as on critical habitat, if any, that has been designated for these species (see Chapter 3, *Conservation Strategy*). The BA for federal actions in the Delta will incorporate the BDCP Conservation Strategy as it relates to those actions and will serve as a companion document to the BDCP. The BDCP does not attempt to distinguish precisely between the effects on covered species and their habitat attributable to the CVP-related federal actions and to covered activities associated with the SWP. Rather, the BDCP includes a comprehensive analysis of the effects related to both the SWP and the CVP within the Plan Area and sets out a conservation strategy that adequately addresses the totality of those effects. On the basis of the BDCP and the companion BA, it is expected that the FWS and NMFS will issue section 10 permits and a new joint biological opinion that supersede biological opinions existing at that time as they relate to SWP and CVP actions addressed by the BDCP, as well as CVP and SWP operations affected by BDCP that occur upstream of the Delta.

4.1.1 History and Overview of the SWP and CVP

4.1.1.1 SWP

The SWP is currently operated to provide water for agricultural, municipal, industrial, recreational, and environmental purposes, and to control flooding. As conditions of the water right permits and licenses, the State Water Board requires that the SWP meet specific water quality, quantity, and operational criteria within the Delta. The development of the SWP was necessitated by the tremendous population growth that occurred in California after the Second World War. The State recognized at the time that local water supplies alone would not be sufficient to meet future regional demands, prompting the legislature in 1945 to commission an investigation of statewide water needs. That investigation resulted in recommendations for substantial new water infrastructure, including the development of various aqueducts and channels, a multipurpose dam and reservoir near Oroville on the Feather River, and an aqueduct

to carry water from the Delta to the San Joaquin Valley and Southern California (http://www.water.ca.gov/swp/history.cfm).

In 1960, California voters authorized the first phase of the SWP, which enabled water deliveries from watersheds of Northern California to the cities of Southern California and to farmers in the Tulare Basin that were beyond the reach of the CVP. After the SWP was passed by voters in 1960, the California Aqueduct, the main conveyance for the SWP, Clifton Court Forebay (CCF), and Harvey O. Banks Pumping Plant west of Tracy were constructed (Figure 4-1 and 4-2 which depict both CVP and SWP facilities).

Today, the SWP consists of 34 storage facilities (reservoirs and lakes), 20 pumping plants, four pumping-generating plants, five hydroelectric power plants, and about 701 miles of open canals and pipelines. It provides water which supplements local sources for approximately 20 million Californians and about 660,000 acres of irrigated farmland (http://www.water.ca.gov/swp/).

The SWP distributes water to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. These suppliers, known as the State Water Project contractors, receive specified annual amounts of water as provided by contracts with DWR.[2] These contracts are subject to renewal during the period 2035 through 2042. Of the total water supply under contract, 70 percent is allocated to urban users and 30 percent to agricultural users. (http://www.water.ca.gov/swp/).

[2] Under existing contract conditions, DWR is currently (2010) obligated to make 4.167 MAF/year of water available to its contractors, except under certain conditions specified in the contract, including shortage of supply availability, under which a lesser amount may be made available.

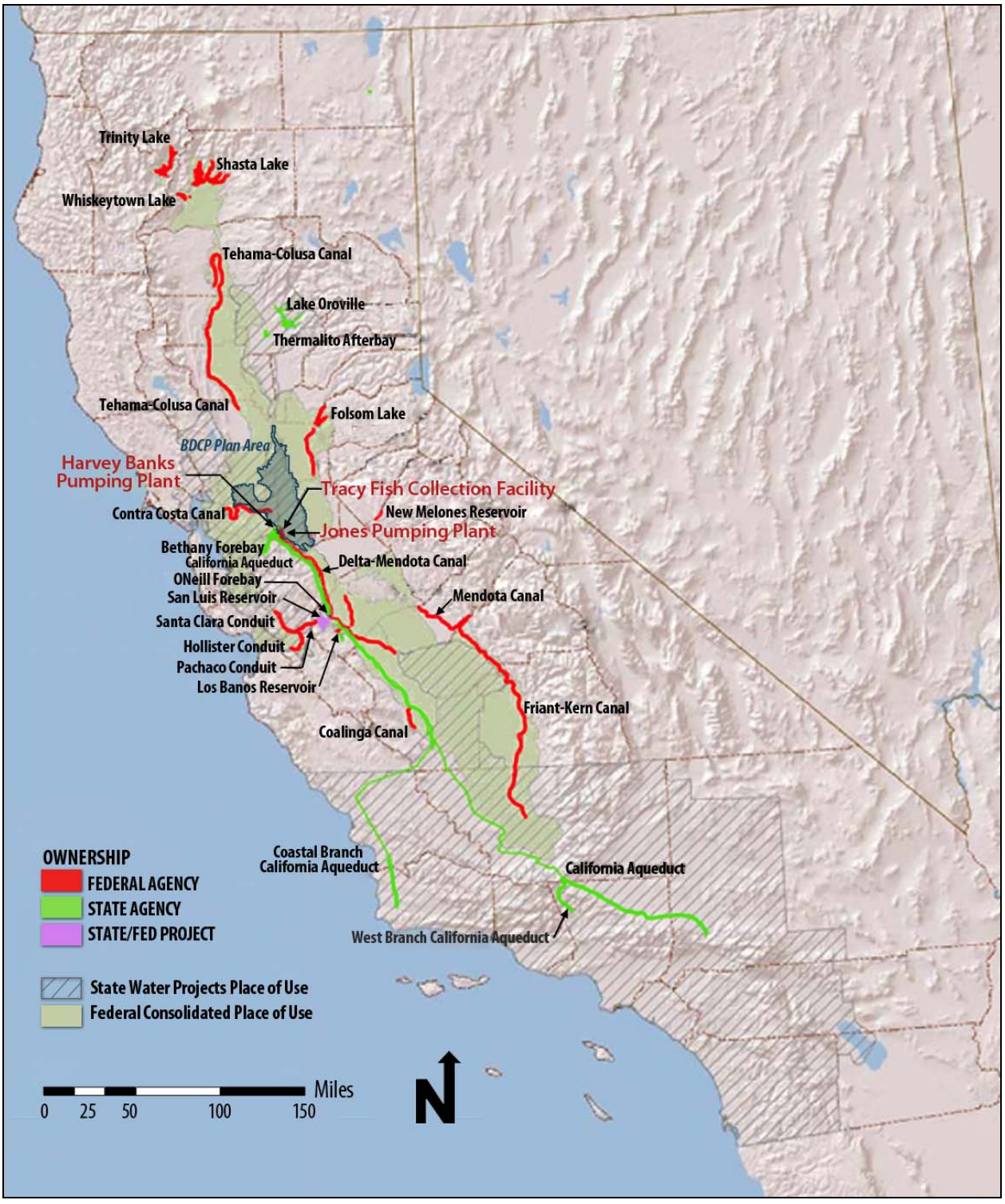

Figure 4-2. CVP and SWP Facilities

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4.1.1.2 CVP

Beginning in the late 1800s, the State of California recognized the potential to deliver surplus water from the Sacramento River to the dry, but potentially productive, San Joaquin Valley (Alexander et al. 1874). The State further recognized, as reflected in the 1930 State Water Plan (Department of Public Works 1930), that the development of upstream storage capacity along the Sacramento River could simultaneously resolve two major water problems facing the State: water shortages in the San Joaquin Valley, where pumping in excess of natural groundwater recharge was occurring; and salinity intrusion into the Delta, which could be addressed with a hydraulic salinity barrier created through controlled releases of water from upstream storage (Lund et al. 2007). This water plan served as a blueprint for the eventual CVP.

In 1933, the State legislature and the voters of California approved the CVP. Shortly thereafter, California ceded control of the project to the federal government to maximize federal financial contributions during the Great Depression. Construction of Shasta Dam, one of the primary components of the CVP, began in 1938. In the 1940s, federal agencies agreed on an approach to divert water from the Sacramento River, which relied on a small cross-channel to move water through the Delta. This channel, which was constructed by Reclamation in 1944, is known as the Delta Cross Channel.

Following the construction of the Friant Dam (1942) and the Friant-Kern Canal (1948), the CVP began diverting San Joaquin River water to supply irrigators on the east side of the San Joaquin Valley. Subsequent projects on the west side of the Sacramento Valley, notably the Tehama-Colusa Canal (1980), increased capacity for upstream diversions from the Sacramento River. The CVP's major water storage facilities are located at the Shasta, Trinity, Folsom, and New Melones dams (USBR 2008) (Figure 4-2). The primary water pumping facility for the CVP is the Jones Pumping Plant, which is located west of the City of Tracy.

The CVP presently consists of 20 dams and reservoirs, 11 powerplants, and 500 miles of major canals, as well as conduits, tunnels, and related facilities. These facilities provide sufficient quantities of water to irrigate approximately one-third of the agricultural land of California and to provide for municipal and industrial use to support close to 1 million households for one year (http://www.usbr.gov/projects/Project.jsp?proj_Name=Central%20Valley%20Project). Over 250 contractors in 29 out of 58 counties in California have entered into long-term contracts for CVP water (http://www.water.ca.gov/swp/cvp.cfm).

The Central Valley Project Improvement Act (CVPIA) of 1992 mandated that the CVP be partly managed for the protection, restoration, and enhancement of fish and wildlife. The CVPIA provided for annual allocations of water to support fish and wildlife resources, a habitat restoration fund financed by water and power users, and a moratorium on new water contracts until such time as fish and wildlife goals are achieved (http://www.usbr.gov/mp/cvpia/index.html).

4.1.2 Overview of Covered Activities and Associated Federal Actions

4.1.2.1 SWP and CVP

The SWP and CVP function as two inter-basin water storage and delivery systems that divert and re-divert water from the southern portion of the Delta. The SWP and CVP utilize major reservoirs upstream of the Delta to store water, and use natural watercourses and canal systems to transport water to areas south and west of the Delta. The CVP also includes facilities and operations on the Stanislaus and San Joaquin rivers, such as the New Melones and Friant dams.

The Projects are permitted by the State Water Board to store water during wet periods, divert water that is surplus to the Delta, and re-divert Project water that has been stored in upstream reservoirs. Both Projects operate pursuant to water right permits and licenses issued by the State Water Board that allow for the appropriation of water by diverting to storage or by directly diverting to use and re-diverting releases from storage later in the year. As conditions of their water right permits and licenses, the State Water Board requires that the CVP and SWP meet specific water quality, quantity, and operational criteria within the Delta.[4] Reclamation and DWR closely coordinate their management of the operations of the CVP and SWP to meet these conditions.

The BDCP covered activities consist of activities in the Plan Area associated with the conveyance and export of water supplies from the SWP's Delta facilities and with the implementation of the BDCP Conservation Strategy. Each of these activities falls into one of four categories: 1) operation of existing and new Delta facilities used to transport and deliver water for Project purposes; 2) construction of new facilities; 3) facility maintenance, monitoring and other associated ongoing activities; and 4) implementation of certain BDCP conservation measures and the biological monitoring and adaptive management programs.

The BDCP associated federal actions comprise those activities that are authorized, funded, or carried out by Reclamation within the Plan Area and relate to the operation of the CVP's Delta facilities to meet CVP purposes. These actions include: 1) operation of existing CVP Delta facilities to convey and export water for project purposes; and 2) associated maintenance and monitoring activities. The CVP is operated in coordination with the SWP under the Coordinated Operations Agreement (COA). While the CVP and SWP are separate systems, they function in an integrated and coordinated manner. Reclamation, and/or the CVP contractors may seek to wheel CVP water through a new conveyance facility.

Under the BDCP, the type of water conveyance infrastructure in use serves to demarcate the near-term and long-term components of the Plan. Specifically, the near-term component of the BDCP encompasses those actions related to the operations of the projects under existing water conveyance infrastructure, including conservation measures associated with this operational

[4] DWR has a separate contract to provide water to NDWA and that contract has separate water quality standards.

framework. The long-term component of the BDCP comprises those actions related to project operations under new isolated conveyance infrastructure, including the construction of and operation of the infrastructure and the implementation of an array of conservation measures.[5] The actions that will be implemented during the near-term and long-term periods will involve both covered activities and associated federal actions.

Other actions associated with the CVP and SWP are not within the scope of the BDCP. These actions occur upstream of the Delta, outside of the Plan Area, and include the operations of certain reservoirs and the diversion and delivery of certain water supplies. Although these other activities are not addressed by the BDCP, the effect of the BDCP on those activities and the effects of those activities on listed species will be analyzed and addressed in the joint biological opinion to be issued pursuant to the BDCP or in subsequent biological opinions that cover project-related activities that are outside of the Plan Area.

4.1.2.2 Mirant Delta, LLC Power Plants

The operation of Mirant's power plants, which are located in the cities of Pittsburg and Antioch (referred to as the "Pittsburg Power Plant" and the "Contra Costa Power Plant" and collectively as the "Delta Plants"), requires the diversion of water from the Delta. Mirant's generating units burn natural gas and are cooled with Delta water. As described below, Mirant's current operational parameters are set by (1) its Clean Water Act (CWA) National Pollution Discharge Elimination System (NPDES) permits, which include requirements pursuant to section 316(b); (2) incidental take permits issued by the National Marine Fisheries Service and U.S. Fish and Wildlife Service pursuant to the Endangered Species Act; and (3) a Memorandum of Understanding with the California Department of Fish and Game authorizing incidental take of species listed under the California Endangered Species Act.

The BDCP covers those Mirant activities associated with the generation of power at its Pittsburg and Contra Costa power plants. These activities involve either (1) current power generation activities and water intake and discharge flows associated with those activities; or (2) recurrent maintenance activities required to ensure continued proper operation of those existing facilities.

4.2 COVERED ACTIVITIES

The activities described in this section are considered to be "covered activities" under the BDCP. Covered activities are those actions that are carried out by non-federal entities, such as DWR and Mirant, and are expected to be covered by regulatory authorizations under section 10 of the ESA and section 2835 of the NCCPA. Covered activities are distinguished from "associated federal actions," which are those BDCP-related actions that are carried out, funded, or authorized by Reclamation and will be authorized under Section 7 of the ESA.

[5] The activities related to the development of a tunnel/pipeline facility are included in the long-term component of the BDCP. As such, the period associated with the long-term component of the BDCP will likely overlap with the near-term period as development of a tunnel/pipeline facility will occur during the implementation of the near-term operational regime.

4.2.1 Operations and Maintenance of Existing SWP Facilities

This section describes covered activities carried out by DWR to operate and maintain the existing SWP facilities in the Delta. These activities involve the daily operation of water diversion, conveyance, and delivery systems, and appurtenant facilities within the Plan Area. The near-term and long-term criteria and adaptive ranges set out in Chapter 3, *Conservation Strategy*, establish parameters under which certain operations-related actions identified in this chapter will be carried out.

The SWP's facilities within the Plan Area consist of the Clifton Court Forebay; Banks Pumping Plant; Skinner Delta Fish Protective Facility; the installation, operation and removal of the temporary barriers in the south Delta; the northern portion of the California Aqueduct; Barker Slough Pumping Plant; and the eastern portions of the North Bay Aqueduct (Figures 4-1 and 4-2). These SWP facilities are used to export water from the south Delta (Banks Pumping Plant) and from the north Delta (Barker Slough Pumping Plant) into canals and pipelines that carry it to municipal and industrial (M&I) and agricultural water contractors in the San Francisco Bay Area and Southern California. These facilities are integral components of the SWP and contribute to the functional capacity of the overall system. This section describes these facilities, their operational requirements, and the actions necessary to maintain their viability. The manner in which these facilities are operated and maintained is not only integral to the proper functioning of the water supply system, but intertwined with the actions in the BDCP Conservation Strategy to provide for the conservation of the aquatic ecosystem and covered fish species.

The existing SWP facilities described in this section will continue to operate under both the near-term and long-term components of the BDCP, but will be subject to different operating criteria following completion of new water conveyance facilities. The BDCP near-term and long-term operational criteria and adaptive operational ranges are described in Chapter 3, *Conservation Strategy*, and include descriptions of operations of SWP facilities in the Plan Area.

The following descriptions of SWP-related covered activities are intended to be sufficiently broad to cover all aspects of the development, operation, and maintenance of identified SWP facilities that may potentially affect resources covered by this Plan, including covered species and their habitats. The measures to address the effects of these covered activities on covered resources are set out in the BDCP Conservation Strategy (see Chapter 3, *Conservation Strategy*).

4.2.1.1 Clifton Court Forebay

4.2.1.1.1 *Background*

Water for the SWP is diverted into Clifton Court Forebay (CCF) and pumped at Banks Pumping Plant (Banks). Clifton Court Forebay is a 31,000-acre-foot regulatory reservoir located in the southwestern edge of the Delta, about 10 miles northwest of the City of Tracy. Inflows to the Forebay from surrounding channels are controlled by radial gates, which are generally operated based on the tidal cycle to reduce approach velocities, prevent scour in adjacent channels, and

minimize water level fluctuation in the south Delta by taking water in through the gates at times other than low tide. When a large head differential (difference in water surface elevation) exists between the outside and the inside of the gates, theoretical inflow can be as high as 15,000 cfs for a short time.

4.2.1.1.2 *Activity*

See Chapter 3, *Conservation Strategy*, for description of BDCP near- and long-term operations criteria and adaptive range for south Delta operations of the SWP and CVP to provide for protection of covered fish species in conjunction with water conveyance and diversion. DWR is seeking ESA section 10 and NCCPA section 2835 permits for all existing and future operations and maintenance of Clifton Court Forebay.

4.2.1.2 Harvey O. Banks Pumping Plant

4.2.1.2.1 *Background*

The Banks Pumping Plant is in the south Delta, about 8 miles northwest of Tracy and marks the beginning of the California Aqueduct. By means of 11 pumps, including two rated at 375-cfs capacity, five at 1,130-cfs capacity, and four at 1,067-cfs capacity, the Banks Pumping Plant provides the initial lift of water 244 feet into the aqueduct. The nominal capacity of the Banks Pumping Plant is 10,300 cfs. The pumps can be operated at full capacity to enable diversions to utilize power in off-peak periods.

4.2.1.2.2 *Activity*

Chapter 3, *Conservation Strategy*, includes a description of the near-term and long-term operations criteria and adaptive ranges for south Delta operations of the SWP and CVP. These measures have been designed to address the effect on covered fish species of water conveyance and diversion actions associated with the Banks Pumping Plant. As such, the BDCP provides the basis for federal and State regulatory authorizations under the ESA and NCCPA for coverage of all existing and future operations and maintenance activities of the Banks Pumping Plant. Refer to the background discussion above with respect to existing operations, to Chapter 3, *Conservation Strategy* for the near-term and long-term operations criteria and adaptive ranges for south Delta operations of the SWP and CVP, and refer to Section 4.2.1.7 below for a description of the types of maintenance activities that may occur.

4.2.1.3 John E. Skinner Delta Fish Protective Facility

4.2.1.3.1 *Background*

The John E. Skinner Delta Fish Protective Facility is located at the head of the Intake Channel that connects Clifton Court Forebay to the Banks Delta Pumping Plant. The Skinner Fish Facility screens fish away from the pumps. Debris is directed away from the pumps by a 388-foot-long trash boom. Fish are diverted from the intake channel into bypasses by a series of metal louvers, while the main flow of water continues through the louvers and toward the pumps. These fish pass through a secondary system of screens and pipes into seven holding tanks, where

they are later counted and recorded. The salvaged fish are then returned to the Delta in oxygenated tank trucks.

4.2.1.3.2 *Activity*

Chapter 5, *Effects Analysis*, describes the level of take associated with the operations of the Skinner Fish Facility. DWR is seeking ESA section 10 and NCCPA section 2835 permits for all existing and future operations and maintenance of the Skinner Fish Facility not otherwise restricted by the BDCP Conservation Strategy. Refer to the background description above with respect to operations of this facility, and to Section 4.2.1.7 below for a description of the types of maintenance activities that may occur.

4.2.1.4 Barker Slough Pumping Plant and North Bay Aqueduct

4.2.1.4.1 *Background*

The Barker Slough Pumping Plant diverts water from Barker Slough into the North Bay Aqueduct (NBA) for delivery in Napa and Solano counties. The NBA intake is located approximately 10 miles from the mainstem Sacramento River at the end of Barker Slough. The maximum pumping capacity is 175 cfs (pipeline capacity). During the last few years, daily pumping rates have ranged between 0 and 140 cfs. Each of the 10 NBA pump bays is individually fitted with a positive barrier fish screen consisting of a series of flat, stainless steel, wedge-wire panels with a slot width of 3/32 inch. This configuration is designed to exclude fish 25 millimeters (mm) or larger from being entrained. The bays tied to the two smaller units have an approach velocity of about 0.2 ft/sec. The larger units were designed for a 0.5-ft/sec approach velocity, but actual approach velocity is about 0.44 ft/sec. The screens are routinely cleaned to prevent excessive head loss, thereby minimizing increased localized approach velocities.

4.2.1.4.2 *Activity*

DWR is seeking ESA section 10 and NCCPA section 2835 permits for all existing and future operations and maintenance of the Barker Slough Pumping Plant not otherwise restricted by the BDCP operating criteria. Combined operations of a new intake on the Sacramento River (described below in Section 4.2.2.3) and the existing intake at Barker Slough would be included under BDCP covered activities for future peak demand of up to 240 cfs.

4.2.1.5 State Water Project Diversions

4.2.1.5.1 *Background*

The amount of water delivered by the SWP in any year has been and will continue to be variable, but in any year, will be equal to the amount of water that is hydrologically available and that can be diverted under current contractual rights consistent with the terms and conditions of the BDCP and existing permits and regulations. SWP "project water" is water made available for delivery to the contractors by the project conservation and transportation facilities included in the system. Under existing contract conditions, DWR is currently (2010) obligated to make 4.167 MAF/year of water available to its contractors, except under certain conditions specified in the

contract, including shortage of supply availability, under which a lesser amount may be made available. The obligation incrementally increases to a maximum amount of 4.173 MAF/year in 2021. This quantity may be exceeded if DWR determines surplus water is available above and beyond that needed to satisfy all regulations, permits, and operational requirements.

The California Water Code requires the State to allow the use of SWP facilities to convey non-Project water as long as the conveyance will not interfere with SWP operations. During drier years, conveyance capacity is available in SWP facilities for the transfer of water by other entities. Non-Project water for Drought Water Banks, Dry Water Purchase Programs, and individual transfers has been conveyed through SWP facilities in the past and is expected to continue into the future. SWP facilities are also used to support groundwater banking programs, such as the Semitropic Water Banking and Exchange Program.

4.2.1.5.2 *Activity*

Chapter 3, *Conservation Strategy*, includes a description of the near-term and long-term operations criteria and adaptive ranges for the SWP and CVP under the BDCP. These measures have been designed to address the effect on covered fish species of water conveyance and diversion actions associated with the SWP and CVP. As such, the BDCP provides the basis for federal and State regulatory authorizations under the ESA and NCCPA for coverage of all existing and future diversion activities of the SWP in the Plan Area.

4.2.1.6 Temporary Barriers in the South Delta

4.2.1.6.1 *Background*

The South Delta Temporary Barriers Project consists of four barriers across south Delta channels for the purpose of benefitting southern Delta agricultural diverters by increasing water levels, improving circulation, and improving water quality, and for the purpose of benefiting San Joaquin River fall-run Chinook salmon by keeping them away from the export facilities. The existing South Delta Temporary Barriers Project consists of the annual installation and removal of temporary barriers at the following locations:

- Middle River near Victoria Canal, about 0.5 mile south of the confluence of Middle River, Trapper Slough, and North Canal;
- Old River near Tracy, about 0.5 mile east of the Delta-Mendota Canal intake;
- Grant Line Canal near Tracy Boulevard Bridge, about 400 feet east of the Tracy Boulevard Bridge; and
- At the Head of Old River (in Old River near its divergence from the San Joaquin River).

The barriers on Middle River, Old River near Tracy, and Grant Line Canal are tidal control facilities composed of rock and gated culverts designed to improve water levels and circulation for agricultural diversions and are in place during the growing season.

A rock barrier may be installed during the fall at the Head of Old River to improve flow quality for salmon migration in the San Joaquin River. In the past, the barrier has been installed at the direction of the Department of Fish and Game.[6] The objective of the barrier is to improve dissolved oxygen levels by reducing the amount of flow diverted into Old River and, therefore, keeping more flow moving downstream in the San Joaquin River. A non-physical or physical (rock) barrier may also be installed at the Head of Old River in the spring. This barrier would be designed to discourage salmonids migrating downstream in the San Joaquin River from entering Old River and being exposed to the effects of the export pumps. Since 2009, a non-physical barrier utilizing sound, light, and a "bubble curtain" has been tested at this location in the spring to determine its effectiveness at discouraging fish passage. Depending upon the observed effectiveness of this barrier under various operational conditions, its installation may continue as part of Conservation Measure number 7 (*CM16 Non-physical Fish Barriers* [see Chapter 3, *Conservation Strategy*]). If the monitoring program indicates that the non-physical barrier is not effective at addressing passage concerns relating to the out-migrating salmonids under certain operational conditions, a rock barrier may be tested as an alternative means of minimizing fish passage into Old River. [7]

4.2.1.6.2 *Activity*

These barriers will likely continue to be utilized in the near-term in conjunction with the BDCP near-term conservation measures. The barriers are generally installed beginning in early April and are partially operated through the end of May while delta smelt are in south Delta channels. During June, once the risk to delta smelt has passed, the barriers are allowed to begin full operations and continue full operations through the remaining summer and fall. Removal of the barriers begins in early November. All barriers are completely removed by November 30. Long-term use of the barriers will be evaluated under the BDCP adaptive management program.

4.2.1.7 Maintenance and Monitoring Activities

4.2.1.7.1 *Background*

Maintenance activities are covered activities under the BDCP. Maintenance activities include actions necessary to maintain the capacity and operational features of the existing water diversion and conveyance facilities, as described in this chapter, including Banks Pumping Plant,

[6] The Department of Fish and Game has been responsible for directing DWR to install the fall barrier. Both DWR and DFG monitor the dissolved oxygen levels in the Stockton Deep Water Ship Channel. If dissolved oxygen is at a level that inhibits or prevents salmon from migrating up the San Joaquin River, then DFG directs DWR to install the barrier. This is a covered activity under BDCP and, therefore, can continue on into the future.

[7] The 2008 National Marine Fisheries Service Biological Opinion for the Temporary Barriers Project required that a three-year fisheries monitoring program using biotelemetry techniques be established to examine the movements and survival of juvenile salmon and juvenile steelhead through the channels of the south Delta. The biological opinion also required that predation effects associated with the project be examined. A pilot-scale biotelemetry study was conducted March-July 2009 to develop an understanding of the movement and survival of salmonids through the south Delta with specific focus at the three agricultural barrier locations. The pilot study was designed to identify movement patterns of predatory fish within the south Delta. Information gained from the pilot study was used to develop the 2010 and 2011 experimental design for the full-scale, mark-recapture, salmonid survival study. To meet these objectives, Hydroacoustic Technology Incorporated (HTI) acoustic tags and receivers were used as steelhead, salmon, largemouth bass, striped bass, and white catfish were tagged, released, and tracked in south Delta channels.

Clifton Court Forebay, the Temporary Barriers Project, Barker Slough Pumping Plant, North Bay Aqueduct, and Skinner Fish Facility. Maintenance activities also include canal maintenance; placement of riprap for bankline protection and erosion control; vegetation management and weed control; and operation and maintenance of electrical power supply facilities. Maintenance activities also include repair and replacement as needed to ensure continued operations of facility or system components.

Monitoring activities for the operation of the SWP are included under BDCP covered activities. This includes water quality and other SWP monitoring activities. For BDCP fishery and other biological monitoring activities see Section 4.2.7 *Monitoring and Research Program* below. DWR's Division of Operations and Maintenance conducts monitoring of chemical, physical and biological parameters to evaluate conditions of concern for drinking water, recreation, and fish and wildlife. Fish monitoring may also be conducted by DWR for the Temporary Barriers Project.

4.2.1.7.2 *Activity*

All SWP maintenance and monitoring described in this section that could affect species or modify critical habitat protected under ESA or CESA are covered activities, and the effects of those activities are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*).

4.2.2 New Water Facilities Construction, Operations and Maintenance

*[**Note to reviewers**: The tunnel/pipeline conveyance facility is described here as the new BDCP conveyance approach to allow for dual operations of the new north and existing south Delta diversions, however, it has not been decided if the conveyance facility would be a tunnel/pipeline or, alternatively, a canal facility.]*

4.2.2.1 Tunnel/Pipeline Facility Construction and Operations

4.2.2.1.1 *Background*

DWR is planning to construct new diversion and conveyance facilities that will be designed and operated to improve protections for fish by bringing water from the Sacramento River around the Delta to the existing water export pumping plants in the south Delta. This new tunnel/pipeline facility would allow for reductions in diversions from the existing SWP and CVP south Delta facilities and hence reduced entrainment of covered fish species. For a more detailed description of the biological benefits of the tunnel/pipeline see Chapter 3, *Conservation Strategy*. The new facility will include five intake structures located on the Sacramento River between Freeport and Courtland. These intakes will be fitted with state-of-the-art positive barrier fish screens. The conveyance would consist of a tunnel/pipeline system that will convey water diverted from the Sacramento River to a new regulating forebay connected to the existing Banks and Jones pumping facilities. The conveyance would follow an alignment generally through the central portion of the Delta to a new forebay located adjacent to and south of the existing Clifton Court

Forebay. Water would be conveyed to the existing Banks and Jones pumping plants serving the SWP and CVP, respectively. The tunnel/pipeline system would improve protections for water supplies from flood, earthquake, and sea level rise.

The system design would include:

- Five intake facilities with fish screens and pumping plants;
- 8 miles of pipeline (23 ft and 33 ft inside diameter) to convey water from intakes to an Intermediate Forebay;
- 750-acre Intermediate Forebay and an intermediate pumping plant;
- 35 miles of twin pipelines (33 ft inside diameter each) connecting the Intermediate Forebay to the Byron Tract Forebay;
- 630-acre Byron Tract Forebay; and
- 6 pump stations, surge towers, and gravity bypass system.

Other actions necessary to support the development and operation of a new tunnel/pipeline facility are covered under the BDCP. They include activities to improve local drainage systems affected by the new conveyance infrastructure, upgrade existing utilities and develop new utility infrastructure, establish temporary construction staging sites, install temporary and permanent roads, and dispose of spoils on certain sites. More detail on specific features of the tunnel/pipeline facility is provided in Appendix M, *Facilities Design Information*.

New intake and conveyance facilities specifications are summarized in Table 4-1.

Table 4-1. Summary of Tunnel/Pipeline Facility Physical Characteristics

Feature Description	*Approximate Characteristics*
Overall Project	
Conveyance Capacity (cfs)	15,000 cfs
Overall Length (miles)	47 miles
Intake Facilities	
Number of In-River-Screened Intakes	5 intakes
Flow Capacity at Each Intake (cfs)	3,000 cfs
Intake Pumping Plants	
6 Pumps per Intake plus one spare, Capacity per Pump (cfs)	500 cfs
Total Dynamic Head (ft)	30 to 57ft
Total Electric Load (MW)	78 MW
Pipelines	
Pipeline #1 connecting Intake #1 to Pipeline #2, maximum flow 3,000 cfs	
Pipeline Length (ft)	16,600 ft
Number of Pipeline Bores; Number of Shafts (total)	1 bores; 2 shafts
Pipeline Finished Inside Diameter (ft)	23 ft
Pipeline #2 connecting Intakes #1, 2, and 3 to Intermediate Forebay, maximum flow 9,000 cfs	
Pipeline Length (ft)	26,150 ft
Number of Pipeline Bores; Number of Shafts (total)	1 bores; 2 shafts
Pipeline Finished Inside Diameter (ft)	33 ft
Pipeline #3 connecting Intermediate Pumping Plant to Byron Tract Forebay, maximum flow 15,000 cfs	
Pipeline Length (ft)	185,000 ft
Number of Pipeline Bores; Number of Shafts (total)	2 bores; 14 shafts
Pipeline Finished Inside Diameter (ft)	33 ft
Intermediate Forebay	
Water Surface Area (acres)	750 acres
Active Storage Volume (AF)	5,250 AF
Intermediate Pumping Plant	
In Reach 2, at southern end of Intermediate Forebay	
Number of Pumps, Capacity per Pump (cfs)	10 at 1,500 (high head) 6 at 1,500 (low head)
Total Dynamic Head (ft)	0 to 90 ft
Total Electric Load (MW)	142 MW
Byron Tract Forebay	
Water Surface Area (acres)	630 acres
Active Storage Volume (AF)	4,300 AF
Power Requirements	
Total Conveyance Electric Load (MW)	230 MW

1

2

Chapter 3, Conservation Strategy, includes a description of the long-term operations criteria and adaptive ranges for SWP and CVP with dual operations, including the new intakes and tunnel/pipeline facilities. These measures have been designed to minimize the potential effects of water conveyance and diversion actions associated with the new intakes and tunnel/pipeline facilities on covered fish species and their habitat.

Intake, Screen, and Tunnel/Pipeline Facilities Maintenance Activities

[***Note to reviewers****: Although all of the details of the tunnel/pipeline maintenance requirements have not yet been finalized by DWR, sufficient information has been provided for purposes of the Effects Analysis.*]

The proposed intake facilities will require routine or periodic adjustment and tuning to ensure operations are managed consistent with design intentions. Facility maintenance includes activities such as painting, cleaning, repairs, and other routine tasks that ensure the facilities are operated in accordance with design standards after construction and commissioning. Activities will involve performing routine, preventive, predictive, scheduled, and unscheduled maintenance aimed at preventing equipment/facility failure or deterioration.

Continuous general inspections will be important for monitoring and logging performance; recording the history of facility conditions and deterioration, and preventing mechanical and structural failures of project elements. Sediment removal will be carried out through suction dredging, mechanical excavation, and dewatering to remove sediment buildup. If large debris is found to have accumulated around intakes, removal would require underwater diving crews, boom trucks or rubber wheel cranes, and possibly a small barge and crew to rig the leads to the debris. While cleaning frequency will need to be varied for screen operations commensurate with debris load conditions in the river, the continuous traveling brush mechanisms, or other screen cleaning technologies applied, are expected to maintain a relatively clean screen face and adequate open area. Over time, biofouling can occlude the screens and jeopardize function. The key design provision for intake facilities is that all mechanical elements can be removable from the top surface for convenience of inspection, cleaning, and repairs, as needed. The intakes will feature top-side gantry crane systems for removal and insertion of screen panels, louver assemblies, and bulkheads. It is expected that all panels will require annual removal (at a minimum) for pressure washing. Additionally, individual intake bays will require dewatering (one pair at a time) for inspection and assessment of biofoul growth rates. Dewatering is accomplished by closing off portals with pre-fabricated bulkheads. Metalwork in intakes is expected to consist of plastics and austenitic steels (stainless); therefore, corrosion is not expected to be detrimental to the life of the facilities. Maintenance associated with these systems consists of replacing sacrificial (zinc) anodes at multi-year intervals.

Impact damage incurred by the intake facilities (such as boat collisions, debris impact, stone and sediment abrasion, etc.) may require repairs.

The only systems associated with the intakes involving power-driven and routinely moving parts are the screen cleaning systems and gantry crane hoist systems. Lubrication of bearings, continuity checks of limit/torque switches, and periodic inspections of equipment per manufacturer recommendations are the primary O&M tasks expected for these systems. Strip brushes for the screen cleaning systems will need replacement every several years.

Maintenance would be needed for the intake pumping plants, sedimentation basins, and solids lagoons. This includes service based on a schedule recommended by the manufacturers, mussel and solids removal, and checking and replacing worn parts. Major equipment repairs and overhauls will be conducted at a centralized maintenance shop. Routine site maintenance would include landscape maintenance, trash collection, and outdoor lighting repair or replacement.

Some of the critical considerations in terms of tunnel/pipeline maintenance will include evaluating whether the tunnel/pipeline needs to be taken out of service for inspection and, if so, how frequently this will be required. Typically, new water conveyance pipelines are inspected at least every 10 years for the first 50 years and more frequently after 50 years of age. Dewatering of the tunnel/pipeline facility for maintenance purposes is expected to be conducted but it is assumed that only one of the tunnel/pipelines at a time would be dewatered, allowing continued north Delta diversions to the Intermediate Forebay. Depending on the monthly demands diversion needs could be met or may be temporarily reduced. The entire dewatering and non-routine maintenance process would likely be complete in a month and can be timed for low diversion periods. Dewatering for maintenance would be conducted approximately once every 5, 10 or 20 years. This type of non-regular maintenance would require an additional set of pumps, temporarily located at either the Byron Tract Forebay or at one of the shafts along the tunnel/pipeline route. While these pumps will have some noise associated with them, their operation would be less than a month and would occur at 5, 10 or 20 year intervalsUse of remotely operated vehicles for inspection of the tunnel/pipeline would be inside the tunnel/pipeline with a crane at the shaft site to launch and retrieve the vehicle and possibly a portable generator to supply power. All work would be within the right-of-way at the shaft.

Forebay maintenance considerations would include regular harvesting of pond weed to maintain flow and forebay capacity, the installation of automatic trash raking equipment and disposal facilities, and potential sediment dredging approximately every 50 years. Maintenance requirements for the forebay embankments would include control of vegetation and rodents, embankment repairs in the event of island flooding and wind wave action, and monitoring of seepage flows. Maintenance requirements for the spillway would include the removal and disposal of any debris blocking the outlet culverts. Debris in the stilling basin would also have to be removed to ensure normal water flow through outlet culverts.

Additional activities may include maintenance of: powerlines (insulator washing and routine tower/pole maintenance and replacement) and interconnection substations; permanent roads and fencing; pipelines that could require excavation; back-up power supplies (e.g., testing); general buildings and facilities; and any permanent marine facilities such as barge uploading facilities

that provide access to tunnel/pipeline shaft locations (may require localized dredging and other maintenance work, such as painting, decking replacement/repair, and removing barnacles).

4.2.2.1.2 *Activity*

All construction, operations and maintenance of the new intakes, screens, pumps, and conveyance facilities described in this section are covered activities and the effects of those activities are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*). DWR is seeking ESA section 10 and NCCPA section 2835 permits for all maintenance of these new facilities not otherwise restricted by the BDCP Conservation Strategy.

4.2.2.2 Fremont Weir and Yolo Bypass Improvements and Maintenance

4.2.2.2.1 *Background*

The purpose of this activity is to modify the Fremont Weir and Yolo Bypass and operate the Fremont Weir to increase the availability of floodplain habitat for spawning and rearing for covered fish species, enhance food production within and downstream of the Yolo Bypass, and improve fish passage within and nearby the Yolo Bypass (see *CM2 Yolo Bypass Fish Habitat Improvements* in Chapter 3, *Conservation Strategy*). Specifically, the Fremont Weir and Yolo Bypass modifications and operations (1) improve rearing and spawning habitat for covered fish species; (2) provide for a higher frequency and duration of inundation of the Yolo Bypass; and (3) improve fish passage in the Yolo Bypass, Putah Creek, and past the Fremont and Sacramento weirs.

Ten physical modifications to the Fremont Weir and Yolo Bypass and their resulting effects are proposed as covered activities (additional details may be found in Chapter 3):

*[**Note to reviewers**: This conservation measure is under development and subject to change. Regardless of changes in the measure, coverage is requested for these activities.]*

1. Replace the Fremont Weir fish ladder. The covered activities include removing and replacing the existing Fremont Weir Denil fish ladder with new experimental fish passage facilities designed to allow for the effective passage of adult salmonids.
2. Install experimental sturgeon ramps. The covered activities include constructing experimental ramps at the Fremont Weir to allow for the effective passage of adult sturgeon and lamprey.
3. Construct a deep fish passage gates and channel. The covered activities include removing a section of the Fremont Weir, soil excavation, fitting the remaining notch with operable "fish passage gates" that allow controlled flow into the Yolo Bypass, and excavation of a deeper "fish passage channel" to convey water from the Sacramento River to the new fish passage gates, and from the fish passage gates to the Tule Canal to convey water from the Sacramento River, through the gates, and to the Tule Canal.

4. Modify the existing Fremont Weir stilling basin. The covered activities include modifications to the existing Fremont Weir stilling basin to ensure that the basin drains sufficiently into the deep fish passage channel.

5. Make improvements to the Sacramento Weir. The covered activities include excavation of a channel to convey water from the Sacramento River to the Sacramento Weir and from the Sacramento Weir to the Tule Canal/Toe Drain, construction of new gates at a portion of the weir, and minor modifications to the stilling basin of the weir to ensure proper basin drainage.

6. Make improvements to the Tule Canal/Toe Drain and Lisbon Weir. The covered activities include physical modifications to passage impediments in the Tule Canal and Toe Drain (e.g., road crossings and agricultural impoundments) and redesigning Lisbon Weir to improve fish passage while maintaining or improving water capture efficiency for irrigation.

7. Realign Lower Putah Creek. The covered activities include realigning Lower Putah Creek to improve upstream and downstream passage of Chinook salmon and steelhead in Putah Creek, and restoring floodplain habitat to provide benefits of seasonal floodplain habitat.

8. Create a notch in the Fremont Weir and a connecting channel. These covered activities include the addition of new operable gates on the weir that allow for the control of the timing, duration, and frequency of inundation of the Yolo Bypass during non-flood stage periods of the Sacramento River.

9. Modify the Yolo Bypass. The covered activities include grading, removal of existing berms, levees, and water control structures, construction of berms or levees, re-working of agricultural delivery channels, and earthwork or construction of structures to reduce Tule Canal/Toe Drain channel capacities.

10. Create a gated westside channel. The covered activities include the creation of a gated channel to provide flows into Yolo Bypass along the west side, and potential modification of the existing configuration of the discontinuous channels along the western edge of the Yolo Bypass.

Maintenance of Fremont Weir and Yolo Bypass Improvements

Routine maintenance of the Fremont Weir and Yolo Bypass are covered activities. Vegetation maintenance activities may include mowing, discing, livestock grazing, dozing, spraying, and/or hand-cutting of young willow groves, cottonwoods, arundo, brush, debris, and young selected oak trees. Trees with a trunk diameter of four inches or greater may be pruned up six feet from the ground. Clearing of areas will be done in stripes to open areas for water flow and to avoid islands and established growth. On a non-routine, but periodic basis, sediment will be removed from the Fremont Weir area using graders, bulldozers, excavators, dump trucks, or other machinery. Outside of the new channel, sediment removal of approximately one million cubic-

yards (MCY) within one mile of the weir can be reasonably expected to occur on an average of approximately every five years based on recent maintenance history. Primarily inside the new channel, an additional one million cubic yards every other year of sediment removal is anticipated as a conservative estimate of sediment management. Where feasible, work will be conducted under dry conditions; if necessary some dredging may be required to maintain connection along the deepest part of the channel for fish passage. Where agreements can be made with landowners, sediment may be disposed of on properties in the immediate vicinity of the Fremont Weir area. It may also be used as source material for levee or restoration projects, or otherwise beneficially reused.

The spatial extent of the maintenance activities would be expected to be from the Sacramento River to the Fremont Weir, the Fremont Weir to the Yolo Bypass, and between the associated levees.

4.2.2.2.2 *Activity*

All activities related to the construction, maintenance, replacement, and operations of the facilities described in this section are covered by the BDCP. In addition, construction of facilities necessary to provide electrical power to these facilities will also be covered by the Plan. The operations of the new Fremont Weir gates under the near- and long-term criteria and adaptive range as described in Chapter 3, *Conservation Strategy*, are also covered by the BDCP.

4.2.2.3 North Bay Aqueduct Alternative Intake Project

4.2.2.3.1 *Background*

The BDCP will cover all operational components of the North Bay Aqueduct Alternative Intake Project. The project includes an additional intake on the Sacramento River that will operate in conjunction with the existing North Bay Aqueduct intake at Barker Slough (described in Section 4.2.1, *Operations and Maintenance of Existing SWP Facilities*). The project would be used to accommodate projected future peak demand of up to 240 cfs. The construction of any new facilities (any intakes, pipelines, and supporting facilities) associated with the North Bay Aqueduct Alternative Intake Project is not covered under the BDCP. Consequently, any such State and/or federal regulatory compliance requirements that would be applicable to the development of the project would be addressed through processes separate and apart from the BDCP.

Combined operations of a new intake on the Sacramento River and the existing intake at Barker Slough would be included under BDCP covered activities for future peak demand of up to 240 cfs. Operations of the North Bay Aqueduct Sacramento River intake will conform, in combination with the new BDCP intake facilities on the Sacramento River, to the water operations criteria and adaptive range as described in Chapter 3, *Conservation Strategy*. The North Bay Aqueduct Alternative Intake Project may also consider an alternative that would involve the export of water from the Sacramento River through the proposed BDCP North Delta facilities.

4.2.2.3.2 *Activity*

The BDCP will cover all water operations components of implementing the North Bay Aqueduct Alternative Intake Project.

4.2.3 Power Generation Water Use - Mirant Delta, LLC

Mirant Delta's covered activities are those activities associated with the generation of power at its Pittsburg and Contra Costa power plants (the "Delta Plants"). These activities can be divided into two categories: 1) current power generation activities, and water intake and discharge flows associated with those activities; and 2) recurrent maintenance activities required to ensure continued operation of those existing facilities.

4.2.3.1 Existing and Future Plant Operations

4.2.3.1.1 *Background*

The Pittsburg Power Plant is located on the southern shore of Suisun Bay near Pittsburg, California (Figure 4-1), and the Contra Costa Power Plant is located 12 miles upstream on the southern bank of the San Joaquin River near Antioch, California (Figure 4-1).

The Delta Plants have a total generating capacity of 2,090 gross megawatts (1,985 net megawatts). Mirant's generating units burn natural gas and are designed to be cooled by water from the Sacramento-San Joaquin River Delta. Cooling water is drawn into the plants through 9.5 mm (3/8 inch) screens, pumped to condensers, used to cool spent steam and then discharged immediately back into the Delta. Source waters for the Delta Plants' cooling water systems are characteristic of this part of the Bay-Delta that separates the upstream, freshwater Delta from the downstream, saltwater bays.

Pittsburg Power Plant

The Pittsburg Power Plant (PPP) consists of seven natural gas-fired generating units, four of which have been retired. PPP Units 5&6 were built in 1960 and 1961, respectively, and generate a total of 660 gross megawatts (gMW) of power. PPP Unit 7 was built in 1972 and generates 740 gMW. Cooling water for the PPP is withdrawn from Suisun Bay through two adjacent shoreline intake structures. Units 5&6, both once-through cooled units, are each serviced by two variable frequency circulating water pumps (CWP) that withdraw water from the Units 5&6 intake structure. Each pump has a maximum design flow of 115.6 million gallons per day (MGD) (354.7 acre-feet (AF)/day) or 231.1 MGD (709.3 AF/day) per unit. The approach water velocity in front of the bar racks can range from 0.5 to around 0.2 feet per second depending upon how much electric generation is needed and the number of the variable frequency pumps in operation. Unit 7, which is equipped with two mechanical-draft cooling towers and a large cooling water canal, withdraws make-up water through the Units 1-7 intake structure. Unit 7's closed-cycle system uses up to 43.6 MGD (133.9 AF/day) of make-up water.

In addition to the Units 5-7 cooling water intake requirements, the PPP withdraws water from the Units 1-4 intake structure for station water supplies, for intermittent intake screen washing, and for fire suppression purposes. At maximum operation, these additional uses account for approximately 43.6 MGD (133.7 AF/day). The total current design flow for all PPP operations is approximately 549.4 MGD (1,686.2 AF/day).

Contra Costa Power Plant

The Contra Costa Power Plant (CCPP) consists of seven natural gas-fired generating units, five of which have been retired. Units 6&7 were built in 1964 and generate a total of 690 gMW of power. Units 6&7 are equipped with once-through cooling which utilizes water withdrawn from the San Joaquin River. Units 6&7 are each serviced by two variable frequency circulating water pumps (CWP) that each have a maximum design flow of 152,800 gpm, or 220 MGD (675 AF/day). The total design flow for both Unit 6 and Unit 7 is approximately 305,600 gpm, or 440 MGD (1,351 AF/day). The approach water velocity in front of the bar racks can range from 0.6 to around 0.2 feet per second depending upon how much electric generation is needed and the number of the variable frequency pumps in operation.

In addition to the Unit 6 and Unit 7 cooling water intake requirements, the CCPP utilizes water for station water supplies, for intermittent intake screen washing, and for fire suppression purposes. At maximum operation, these additional uses account for approximately 22 MGD (67.5 AF/day). The total current design flow for all CCPP operations is approximately 462 MGD (1,418 AF/day).

Variable Frequency Drive (VFD) Circulating Water Pump Operations

The circulating water pumps at CCPP Units 6&7 and PPP Units 5-6 are mixed flow vertical centrifugal pumps equipped with A-C induction motor drives. The drives have been modified to utilize VFD controls, as well as to operate at full rated speed. The VFD controls provide a means to vary drive speed by varying frequency. For a centrifugal pump, flow is proportional to pump speed. Therefore as frequency and drive/pump speed are reduced, pump flow is also reduced proportionally (i.e., 50% pump speed => 50% pump flow).

When operating in VFD mode, the circulating water pump speed/flow is typically at its minimum level when the unit is at minimum load. The minimum circulating water pump speed/flow is limited by both the pump and motor design and the system head requirements. For PPP Units 5&6 and CCPP Units 6&7 minimum flow is 50% of design and minimum load is ~25–45 MW. As unit load increases, pump speed and flow are increased in accordance with unit conditions. Maximum circulating water speed/flow, 95–100% of design, is typically reached at ~90–145 MW for PPP Units 5&6 and CCPP Units 6&7. River water temperature, tide, condenser vacuum, steam flow, etc., all have an effect on circulating water flow requirements.

Current Actual Operational Cooling Water Flows

Actual flow rates at the Delta Plants have steadily decreased in recent years to be consistently substantially below all maximum permitted flow limits. Capacity utilization rates (the ratio between the annual net generation of power and the total net capability of the facility to generate power) at the Plants have steadily declined in recent years, and intake flows have correspondingly decreased (Table 4-2). While the California Independent System Operator (CAISO) requires that the Delta Plants be available at any time during the year, the Delta Plants are primarily used during California's peak energy demand periods, particularly in the crucial summer months.

Table 4-2.Electrical capacity utilization and cooling water flows for CCPP and PPP from 2004 to 2008

Plant/Year	*Capacity Utilization (MWh)/(MW Capacity* hours of generation)*			*Combined Annual Cooling Water Flows (MG/yr)*	*Combined Annual Cooling Water Flows (million AF/yr)*
CCPP	**Unit 6**	**Unit 7**		**Units 6&7**	**Units 6&7**
2004	4.1	21.7		60,926	0.19
2005	1.2	10.1		29,874	0.09
2006	0.8	3.9		15,641	0.05
2007	1.4	3.3		12,879	0.04
2008	1.9	3.4		18,004	0.06
PPP	**Unit 5**	**Unit 6**	**Unit 7**	**Units 5&6**	**Units 5&6**
2004	24.0	20.8	9.5	71,751	0.22
2005	12.5	7.3	1.8	34,710	0.11
2006	7.7	5.3	1.4	25,112	0.08
2007	2.7	2.6	0.8	11,562	0.04
2008	2.3	2.4	0.8	14,859	0.05

In addition to once-through cooling flows, Mirant discharges process wastewater and stormwater (quantity and quality of discharges are subject to permits issued by the State Water Resources Control Board and San Francisco and Central Valley Regional Water Quality Control Boards).

Mirant's operations are constrained by (1) its Clean Water Act National Pollution Discharge Elimination System (NPDES) permits and specifically by Clean Water Act section 316(b) of the federal Clean Water Act; (2) incidental take permits issued by the National Marine Fisheries Service and U.S. Fish and Wildlife Service pursuant to the Endangered Species Act; (3) a Memorandum of Understanding with the California Department of Fish and Game authorizing incidental take of species listed under the California Endangered Species Act; and (4) regulatory requirements imposed by federal and State energy agencies. These independent regulatory constraints may alter Mirant's covered activities for the purposes of the BDCP in both the short-term and long-term.

Future Operations

The remaining PPP units (Units 5-7, of which Units 5-6 use once-through cooling and Unit 7 uses closed-cycle cooling) are currently contracted through a tolling agreement with PG&E

through the end of 2010. Over the course of 2010, Mirant Delta will determine whether the PPP units (1) will be retired, (2) will continue to operate for a certain term in their existing configuration followed by retirement (as at CCPP Units 6-7 discussed below), or (3) will continue to operate for a certain term with retrofits to reduce or eliminate the use of once-through cooling. Mirant Delta anticipates that, under any of these scenarios, capacity utilization at the PPP units will be consistent with the last five years of operations and will remain in the low single digits, with the units being called on to run for reliability purposes primarily in August and September.

The State Water Resources Control Board recently issued its statewide once-through cooling policy which provides for the gradual phase-out of once-through cooled units throughout California and includes a compliance due date of 2017 for the PPP. Independent of ESA/CESA requirements, Mirant Delta's once-through cooled units will be required to comply with this policy.

Mirant Delta entered into a tolling agreement with PG&E in 2009 providing for the continued operation of the remaining CCPP units (Units 6-7) until April 30, 2013, at which time Mirant Delta will permanently retire CCPP Units 6-7, the only remaining once-through cooled units at the CCPP. The CCPP units are called on to operate for reliability purposes, primarily in August and September, and capacity utilization rates have been and are anticipated to continue to be in the low single digits.

4.2.3.1.2 *Activity*

Mirant Delta, LLC is seeking ESA section 10 and NCCPA section 2835 permits for all existing and future operations of the CCPP and PPP not otherwise restricted by BDCP operating criteria.

4.2.3.2 Existing and Future Plant Maintenance, Modification Activities, and Monitoring Activities

4.2.3.2.1 *Background*

Maintenance Dredging, Equipment Maintenance, Modifications and De-commissioning, and Levee and Flood Control Maintenance

Maintenance and modification activities include those routine and non-routine activities that maintain the capacity and operational features of the existing power generation facilities at the Delta Plants described above. These activities include periodic maintenance dredging in front of and in the plant cooling water intake structures to remove naturally occurring accumulated sediments to ensure that the approach velocity of cooling water entering the intake structure remains relatively uniform across the intake screen and as close to design levels as possible, and to prevent undue damage to the facility from sediment in the cooling water and the related abrasion and wear of power plant equipment, such as condenser tubes and circulating water pumps. Dredging is also sometimes required around the docks and in the discharge outfalls to remove the sediment buildup so that these structures can function and operate as designed. These activities also include recurrent equipment maintenance and modifications (such as

shoreline and pier maintenance, maintenance and repair of all improvements, infrastructure, roads, electrical facilities, underground linear facilities, vegetation management, etc.), as well as modifications to existing facilities and infrastructure as needed to ensure continued power generation; levee maintenance (such as placement of riprap for shoreline protection and erosion control) as needed to protect the power generation facilities; and flood control maintenance (such as maintenance of Willow Creek at the PPP) as needed. As existing power generation units are retired, de-commissioning activities may include demolition and/or removal of improvements and fixtures as needed. Regarding de-commissioning activities, simply retiring the units would not involve any construction or demolition activities and therefore would have no physical effects. If and when demolition occurs, most improvements would be located on disturbed uplands within the industrial site footprint and would not impact natural habitats. Shoreline improvements (e.g. cooling water intake structures), would likely be retired in place, however, if these structures are removed, restoration of the associated bankline would be conducted and would be a covered activity.

Aquatic Studies & Covered Species Monitoring

Mirant Delta is conducting, and will recurrently conduct, aquatic and covered species studies and monitoring, specifically involving data collection in the vicinity of the plants, in front of the intake and outfall structures, and within the cooling water system.

4.2.3.2.2 *Activity*

All maintenance, modification, de-commissioning, and monitoring described in this section that could affect species or modify critical habitat protected under ESA or CESA are covered activities, and the effects of those activities are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*).

4.2.4 Habitat Restoration, Enhancement, and Management Activities

Habitat restoration, enhancement, and management activities are covered activities under BDCP include all actions that may be undertaken to implement the physical habitat conservation measures described in Chapter 3, *Conservation Strategy*. Types of actions necessary to implement habitat restoration and enhancement conservation measures are anticipated to include, but are not limited to:

- Grading, excavation, and placement of fill material;
- Breaching, modification, or removal of existing levees and construction of new levees;
- Modification, demolition, and removal of existing infrastructure (e.g., buildings, roads, fences, electric transmission and gas lines, irrigation infrastructure);
- Construction of new infrastructure (e.g., buildings, roads, fences, electric transmission and gas lines, irrigation infrastructure);
- Removal of existing vegetation and planting/seeding of vegetation;

- Controlling the establishment of nonnative vegetation to encourage the establishment of target native plant species; and
- Control of nonnative predator and competitor species (e.g., feral cats, rats, and nonnative foxes).

Habitat management actions include all activities undertaken to maintain the intended functions of protected, restored, and enhanced habitats over the term of the BDCP. Habitat management actions are anticipated to include, but are not limited to:

- Minor grading, excavation, and filling to maintain infrastructure and habitat functions (e.g., levee maintenance, grading or placement of fill to eliminate fish stranding locations);
- Maintenance of infrastructure (e.g., buildings, roads, fences, electric transmission and gas lines, irrigation infrastructure, fences);
- Maintaining vegetation and vegetation structure (e.g., grazing, mowing, burning, trimming); and
- Ongoing control of terrestrial and aquatic nonnative plant and wildlife species.

The scope of the physical habitat actions provided for under the BDCP is presented in Table 4.3. The extent of the habitat and natural communities conservation actions set out in this section reflects both an assessment of the long-term conservation needs of individual covered species (i.e., habitat function, quantity, connectivity, and distribution), and an analysis of existing and future constraints that could affect habitat conservation, including land surface subsidence, habitat values, and land use.

Table 4-3. Extent of BDCP Natural Communities and Habitat Types Conserved Over the Term of the BDCP

[Note to reviewers: Acreages provided are subject to change based on results of Effects Analysis and revisions to Conservation Strategy]

Conserved Natural Community/Habitat Type	*Extent of Natural Community and Habitat Type Conserved*[1]		
	Protected[2]	**Enhanced**	**Restored**
Seasonally Inundated Floodplain	0	Increased frequency and duration of Yolo Bypass flooding[3]	10,000
Freshwater and Brackish Tidal, Subtidal, and Transition Habitats	0	0	65,000
Channel Margin	0	0	20 linear miles
Riparian	0[4]	0	5,000[6]
Grassland	8,000[4]	0	2,000[5]
Nontidal PerennialEmergent Wetland and Nontidal Perennial Aquatic	0[4]	0	400
Alkali Seasonal Wetland Complex	400	0	0
Vernal Pool Complex	300	0	200
Managed Seasonal Wetland	0	TBD	TBD
Agricultural Habitat	16,620-32,640	0	0

[1]All values are in acres unless otherwise noted.

[2]Though not included in the *Enhanced* column, all protected natural communities/habitat types will also be managed to maintain or increase their habitat functions for covered species.

[3]Enhancement of the existing Yolo Bypass floodplain would be provided with operation of a modified Fremont Weir to increase the duration and frequency of seasonally inundated floodplain habitat. The conditions under which this increased inflow would be provided are described in conservation measure *CM2, Yolo Bypass Fisheries Enhancement.*

[4]An undefined additional extent of these natural communities/habitat types are likely to be protected in small patches where they occur within larger patches of other protected natural communities/habitat types (e.g., existing patches of riparian habitat within preserved agricultural lands would be protected).

[5]Some of the restored grassland may be restored within the transitional component of restored tidal habitat and thus the total land base required for grassland restoration may be less than shown.

[6]Riparian habitat restoration will all occur within the restoration lands for seasonally inundated floodplain, channel margin, and freshwater tidal areas.

A primary conservation goal of the BDCP is to restore 80,000 acres of tidal habitat, riparian habitat, and new floodplain for the benefit of fish, wildlife, and plants and ecosystem processes in the Delta and Suisun Marsh. The BDCP physical habitat conservation program is organized geographically across the northern, eastern, southern and western regions of the Delta. It is also organized by habitat type, and temporally into near-term and a long-term implementation phases. The schedule for protection, enhancement, and restoration of physical habitat is described in Chapter 6, Implementation Plan. Protection, enhancement, and restoration of other natural communities and habitats would be undertaken in both the near-term and long-term implementation periods as described in Chapter 6, Implementation Plan. In the near-term, prior to completion of the tunnel/pipeline facility, the BDCP targets for habitat restoration include 14,000 acres of tidal habitat. Within 15 years, the goal is for tidal habitat restoration to reach 25,000 acres and riparian restoration to reach 400 acres and the addition of 1,000 acres of new

seasonally inundated floodplain habitat. By year 40, the BDCP goal is to have established 65,000 acres of tidal habitat, 5,000[10] acres of riparian habitat, and 10,000 acres of new seasonally inundated floodplain.[11]

In the near-term BDCP implementation period, actions to restore tidal habitat and riparian habitats will likely be directed at the Cache Slough, West Delta, and Suisun Marsh Restoration Opportunity Areas (ROAs) in Conservation Zones 1, 2, 5 and 11 (see Figure 3.1). The initial focus on these locations reflects the anticipated productivity benefits that may be achieved in the near-term prior to changes to the existing through Delta conveyance system. These near-term elements of the habitat program will parallel adjustments in water management and flow regimes that are designed together to realize substantial improvements in aquatic productivity and function for covered species while the structural long-term improvements are constructed. Following commencement of dual water conveyance operations (i.e., the long-term BDCP implementation period), restoration of tidal and riparian habitat would continue in these Conservation Zones and would be expanded significantly into Conservation Zones 4 and 7.

4.2.5 Activities to Reduce Contaminants

Activities to reduce contaminants that could result in incidental take are covered activities under BDCP. A more detailed discussion of these activities is provided in Chapter 3. These activities include the following:

- **Control of Methylmercury Load in BDCP Restoration Sites -** The purpose of this measure is to minimize the methylation of inorganic mercury in BDCP habitat restoration areas caused by BDCP restoration actions. The BDCP Management Entity will minimize to the extent practicable any increase in mercury methylation associated with habitat restoration conservation measures through the design and implementation of restoration projects. The BDCP Management Entity will work with DWR and the Central Valley Regional Water Quality Control Board (CVRWQCB) to identify and implement methods for minimizing the methylation of mercury in BDCP restoration areas.

4.2.6 Activities to Reduce Predators and Other Sources of Direct Mortality

Activities to reduce predators and other sources of direct mortality that could result in incidental take are covered activities under BDCP. A more detailed discussion of these activities is provided in Chapter 3. These activities include the following:

- **Reduce Effects of Predators -** Reduce local effects of predators on covered fish species by conducting focused predator control in high predator density locations. The BDCP

10 Portions of the 5,000 acres of riparian would be included within the 10,000 acres of floodplain and 65,000 acres of tidal habitat.

11 The 10,000 acre target for new floodplain restoration does not include floodplain habitat enhanced in the Yolo Bypass under a separate conservation measure.

Management Entity will reduce the local effects of predators on covered fish species by conducting focused predator control using a variety of methods in locations in the Delta that are known to have high densities of predators ("predator hot spots").

- **Non-physical Barriers -** The purpose of this conservation measure is to improve the survival of outmigrating juvenile salmonids by using non-physical barriers to re-direct them away from channels in which survival is lower. The BDCP Management Entity will install non-physical barriers at the junction of channels with low survival of outmigrating juvenile salmonids to deter fish from entering these channels.
- **Control Nonnative Submerged and Floating Aquatic Vegetation in BDCP Tidal Habitat Restoration Areas -** The BDCP Management Entity will control the growth of Brazilian waterweed (*Egeria densa*), water hyacinth (*Eichhornia crassipes*), and other nonnative submerged and floating aquatic vegetation (SAV and FAV) in BDCP tidal habitat restoration areas.

4.2.7 Monitoring and Research Programs

As described in Chapter 3, various types of monitoring activities will be conducted during BDCP implementation including preconstruction surveys, construction monitoring, compliance monitoring, effectiveness monitoring, and system monitoring. In addition, focused research will be undertaken or contracted to develop information necessary to better inform BDCP implementation. Such monitoring and research activities could result in incidental take and these activities are covered activities under BDCP. Though individual instances of take are expected to be minor, there are likely to be many such instances over a long period of time.

4.2.8 Other Conservation Actions

All other conservation actions included in BDCP Chapter 3, *Conservation Strategy*, that could result in incidental take, not described above, are covered activities. Although take levels are expected to be low, other conservation actions that could result in take of covered species and therefore require authorization as covered activities are included. Examples of actions include:

- **Dissolved Oxygen -** The purpose of this conservation measure is to maintain dissolved oxygen concentrations above levels that impair covered fish species in the Stockton Deep Water Ship Channel during periods when covered fish species are present. The BDCP Management Entity will operate and maintain an oxygen aeration facility in the Stockton Deep Water Ship Channel to increase dissolved oxygen concentrations.
- **Conservation Hatcheries -** The purpose of this conservation measure is to establish new and expand existing conservation propagation programs for delta and longfin smelt. The BDCP Management Entity will support: (1) the development of a delta and longfin smelt conservation hatchery by the USFWS to house a delta smelt refugial population and provide a source of delta and longfin smelt for supplementation or reintroduction, if deemed necessary by Fishery Agencies, and (2) the expansion of the refugial population

of delta smelt and establishment of a refugial population of longfin smelt at the University of California, Davis Fish Conservation and Culture Laboratory to serve as a population safeguard in case of a catastrophic event in the wild.

4.2.9 Emergency Actions

The Plan covers emergency activities related to facilities constructed and operated under the BDCP and emergency activities within BDCP habitat conservation lands (including both restored and protected habitats) necessary to prevent and minimize the loss of human life, property, critical infrastructure, and sensitive natural resources. Emergency activities are the immediate response actions that may occur in response to such events as failure of water operations infrastructure, levee failure, fire, toxic or hazardous materials spills, or other natural disasters and accident response. By their nature, these events and the response actions to them cannot be planned for or directed to areas with less sensitive resources.

Emergency actions include, but are not limited to: initial temporary repair of water operations infrastructure; initial repair of structures damaged by flooding associated with levee failure where such repairs cannot be delayed due to the imminent loss of life or property; initial repair, replacement, and/or removal of damaged or failed structures and associated facilities; emergency fire fighting actions; temporary shoring-up of levees; emergency cleanup of spilled hazardous materials and/or waste; evacuation of injured persons or livestock; and use of motorized vehicles for conducting emergency activities.

Once an emergency has been addressed, the BDCP includes planned responses to deal with the aftermath of the emergency. Planned responses following emergency actions that have substantial effects on covered species or natural communities (e.g., vegetation rehabilitation after a major fire) are considered remedial actions to changed circumstances or adaptive management. Section 6.3.2 *Changed Circumstances* describes the required planned responses to levee failures, fires, failure of water operations infrastructure, toxic or hazardous spills, and other such events. Other planned responses may be conducted as part of the adaptive management process (see Section 3.7, *Adaptive Management Program*).

4.3 FEDERAL ACTIONS ASSOCIATED WITH THE BDCP

The activities described in this section have been designated as "federal actions associated with the BDCP." These actions consist of CVP-related activities within the Delta that are authorized, funded, or carried out by Reclamation. These federal actions differ from "covered activities," which encompass those BDCP actions that are the responsibility of non-federal entities. The federal actions associated with the BDCP are subject to the ESA section 7 consultation process; and as such, Reclamation will consult with USFWS and NMFS regarding the effect of these actions on listed species and designated critical habitat. For the federal actions set out in this section, the BDCP is intended to provide the basis for a biological assessment (BA) to support section 7 consultations with the federal fish and wildlife agencies. Reclamation's actions that are

outside the scope of the BDCP will be addressed as part of a consultation that covers the totality of CVP-related operations.

4.3.1 CVP Operations and Maintenance

This section describes actions by Reclamation related to the operations and maintenance of existing CVP facilities in the Delta that will be addressed in the BDCP.

The CVP's Delta Division[12] facilities within the Plan Area consist of the Delta Cross Channel (DCC); the eastern portion of the Contra Costa Canal, including the Contra Costa Water District's (CCWD) diversion facility at Rock Slough; the Jones Pumping Plant (formerly Tracy Pumping Plant); the Tracy Fish Collection Facility (TFCF); and the northern portion of the Delta Mendota Canal (DMC) (Figures 4-1 and 4-2). These CVP facilities are used to convey water from the Sacramento River in the north Delta to the south Delta and to export that water from the Delta into canals and pipelines that carry it to agricultural and municipal and industrial (M&I) contractors to the south and west of the Delta. These facilities are integral components of the CVP and contribute to the functional capacity of the overall system. This section describes these facilities, their operational requirements, and the actions necessary to maintain their viability. The operation and maintenance of these facilities are not only integral to the water supply system, but are also important to the BDCP Conservation Strategy and the protection and conservation of the aquatic ecosystem and covered fish species.

The existing CVP facilities described in this section would be operated under both the BDCP near-term and long-term implementation, but with differing operating criteria following completion of new facilities. The BDCP near- and long-term operational criteria and adaptive operational range are described in Chapter 3, *Conservation Strategy*, and include descriptions of operations of CVP facilities in the Plan Area.

All operations and maintenance of CVP facilities described in this section are federal actions associated with the BDCP and the effects of those actions are addressed by the BDCP Conservation Strategy (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*) and will be covered in the BDCP section 7 consultation.

4.3.1.3 Delta Cross Channel

4.3.1.3.1 *Background*

The DCC is a gated diversion channel between the Sacramento River, near Walnut Grove, and Snodgrass Slough (Figure 4-1). Flows into the DCC from the Sacramento River are controlled by two 60-foot by 30-foot radial gates. When the gates are open, water flows from the Sacramento River through the cross channel to Snodgrass Slough and from there to channels of the lower

[12] The Delta Division is one of several CVP divisions covering various geographical areas and facilities of the CVP including the American River, Friant, East Side, Sacramento River, San Felipe, West San Joaquin, and Shasta/Trinity River divisions. The CVP Delta Division includes facilities within the Plan Area (described in this chapter) and facilities outside the Plan Area (not included in this chapter).

Mokelumne River and into the central Delta. Once in the central Delta, the water is conveyed primarily via Old and Middle rivers to the Jones Pumping Plant by the draw of the pumps. The DCC operation improves water quality in the interior Delta by improving circulation patterns of good quality water from the Sacramento River towards Delta diversion facilities.

Reclamation operates the DCC in the open position to (1) improve the transfer of water from the Sacramento River to the export facilities at the SWP Banks (see description of SWP facilities) and CVP Jones pumping plants; (2) improve water quality in the southern Delta; and (3) reduce salt water intrusion rates in the western Delta. During the late fall, winter, and spring, the gates are often periodically closed to protect out-migrating salmonids from entering the interior Delta where they are subject to higher levels of predation and greater potential for entrainment at the CVP and SWP south Delta export facilities. When flows in the Sacramento River at Sacramento reach 20,000 to 25,000 cfs (on a sustained basis) the gates are closed to reduce potential scouring and flooding that might occur in the channels on the downstream side of the gates.

4.3.1.3.2 *Action*

See Chapter 3, *Conservation Strategy*, for a description of operations of the DCC gates under the BDCP to provide for protection of salmon in conjunction with water conveyance. Reclamation is seeking ESA section 7 authorization for all operations and maintenance of the DCC consistent with BDCP operations conservation measures.

4.3.1.4 C.W. Jones Pumping Plant

4.3.1.4.1 *Background*

The CVP and SWP use the Sacramento River, San Joaquin River, and Delta channels to transport water to pumping plants located in the south Delta (Figures 4-1 and 4-2). The CVP's Jones Pumping Plant, about five miles northwest of Tracy, consists of six available pumps. The Jones Pumping Plant is located at the end of an earth-lined intake channel about 2.5 miles in length. Jones Pumping Plant has a physical capacity of 5,100 cfs and State Water Resources Control Board (Water Board) permitted diversion capacity of 4,600 cfs with maximum pumping rates typically ranging from 4,500 to 4,300 cfs during the peak of the irrigation season and approximately 4,200 cfs during the winter non-irrigation season until construction and full operation of the proposed DMC/California Aqueduct Intertie. The winter-time physical constraints on the Jones Pumping Plant operations are the result of a DMC freeboard constriction near O'Neill Forebay, O'Neill Pumping Plant capacity, and the current water demand in the upper sections of the DMC.

4.3.1.4.2 *Action*

See Chapter 3, *Conservation Strategy*, for description of south Delta operations of CVP and SWP under the BDCP to provide for protection of covered fish species in conjunction with water conveyance and diversion. Reclamation is seeking ESA section 7 authorization on all operations and maintenance of the Jones Pumping Facility not otherwise restricted by the BDCP operating criteria.

4.3.1.5 Tracy Fish Collection Facility

4.3.1.5.1 *Background*

At the head of the intake channel leading to the Jones Pumping Plant, TFCF louver screens intercept fish that are then collected, held, and transported by tanker truck to Delta release sites away from the south Delta facilities. The TFCF uses behavioral barriers consisting of primary and secondary louvers to guide entrained fish into holding tanks. The primary louvers are located in the primary channel just downstream of the trashrack structure. The secondary louvers are located in the secondary channel just downstream of the traveling water screen. The louvers allow water to pass through onto the Jones Pumping Plant but the openings between the slats are tight enough and angled against the flow of water in such a way as to prevent most fish from passing between them and instead enter one of four bypass entrances along the louver arrays. The holding tanks on hauling trucks used to transport salvaged fish to release sites are injected with oxygen and contain an eight parts per thousand salt solution to reduce stress on fish. The CVP uses two release sites, one on the Sacramento River near Horseshoe Bend and the other on the San Joaquin River immediately upstream of the Antioch Bridge.

4.3.1.5.2 *Action*

See Chapter 5, *Effects Analysis,* for a description of the level of take associated with the operations of the TFCF. Reclamation is seeking ESA section 7 authorization for all operations and maintenance of the TFCF consistent with the BDCP operating criteria.

4.3.1.6 Contra Costa Water District Diversion Facilities

4.3.1.6.1 *Background*

Contra Costa Water District (CCWD) diverts water from the Delta for irrigation and municipal and industrial (M&I) uses under CVP contract and under its own water rights. Under its CVP contract, CCWD can divert water at Rock Slough for direct use and divert water at its intake on Old River near State Route 4 (designated CCWD's Old River Intake) and its new intake on Victoria Canal near Middle River (designated CCWD's Middle River Intake) for either direct use or for storage. Under its own State Water Board permit and license, CCWD can divert water for direct use at Mallard Slough, and under its own Los Vaqueros water right permit, CCWD can divert water at its Old River and Middle River intakes for storage in Los Vaqueros Reservoir.

CCWD's water system includes intake facilities at Mallard Slough, Rock Slough, Old River, and Victoria Canal near Middle River (Middle River intake); the Contra Costa Canal and shortcut pipeline; Contra Loma Reservoir; the Martinez Terminal Reservoir; and the Los Vaqueros Reservoir. The Rock Slough intake facilities, the Contra Costa Canal, the shortcut pipeline, the Contra Loma Reservoir, and the Martinez Terminal Reservoir are owned by Reclamation, and operated and maintained by CCWD under contract with Reclamation. Mallard Slough Intake, Old River Intake, Middle River Intake (on Victoria Canal), and Los Vaqueros Reservoir are owned and operated by CCWD.

CCWD's operations are governed by Biological Opinions issued to Reclamation under separate Section 7 consultations (hereafter, "CCWD-specific BOs"). CCWD's operations are included in the project description and modeling for the long-term CVP/SWP operations Biological Assessment, which resulted in the current Biological Opinions on CVP/SWP operations (USFWS 2008; NMFS 2009). CCWD also has California Endangered Species Act take authorization for all its operations under a 2081 permit issued in 2009 by the California Department of Fish and Game.

Reclamation and CCWD are currently planning two projects to modify facilities: addition of a fish screen to the Rock Slough Intake and expansion of the Los Vaqueros Reservoir. For each of these projects, Reclamation, in coordination with CCWD, consulted with the USFWS and NMFS under Section 7, and CCWD, in coordination with Reclamation, has consulted with DFG.[13]

Rock Slough Fish Screen

The Rock Slough Intake is located about four miles southeast of Oakley, where water flows into the earth-lined portion of the Contra Costa Canal. This section of the canal is open to tidal influence and continues for four miles to Pumping Plant 1, which has capacity to pump up to 350 cfs into the concrete-lined portion of the canal. Prior to completion of the Los Vaqueros Project in 1997, this was CCWD's primary diversion point. Consistent with Central Valley Project Improvement Act (CVPIA) and as required by the USFWS Biological Opinion for the Los Vaqueros Project (USFWS 1993), Reclamation, in collaboration with CCWD, is in the process of constructing a fish screen at the Rock Slough intake. This project is covered by a separate ESA Section 7 consultation. With the completion of this project, all of CCWD's Delta intakes will include positive barrier fish screens. CCWD's other intakes (Mallard Slough, Old River and the new Middle River intake on Victoria Canal) are screened.

Los Vaqueros Reservoir Expansion Project

CCWD has certified the environmental documents for an expansion of Los Vaqueros Reservoir from its current 100,000 acre-feet to 160,000 acre-feet. CCWD is in the process of completing permits and final design, and expects to begin construction in 2011, with completion of the expansion in 2012. The expansion will improve CCWD water quality, water supply reliability and emergency storage, and will have the effect of shifting CCWD diversions from drier periods to wetter periods. The expansion will not increase CCWD overall diversions from the Delta or modify any Delta facilities; operation of the expanded reservoir will continue to be governed by existing CCWD-specific biological opinions. The expansion will impact terrestrial habitat and species within the Los Vaqueros watershed, which is outside of the Delta; CCWD and Reclamation are currently consulting with USFWS (under Section 7) to develop a biological opinion covering the terrestrial impacts, mitigation, and adaptive management, separate and independent from the BDCP section 7 consultation.

[13] For the Los Vaqueros project, consultation has been initiated but not completed.

4.3.1.6.2 *Action*

Reclamation would include CCWD's operations described above in the BDCP ESA Section 7 Biological Assessment as part of the existing operations. CCWD is not an ESA Section 10 permit applicant under BDCP, and operation of CCWD facilities will not change under the BDCP. However, all operations and maintenance of CCWD facilities described in this section that could affect species or modify designated critical habitat protected under ESA will be included in the analysis of Delta operations in the BDCP Section 7 Biological Assessment. This will ensure that existing and ongoing operations in the Delta are accurately analyzed in the consultation on the effects of the BDCP and CVP operations. If, as a result of the BDCP ESA Section 7 consultation, any of the criteria for reinitiation of consultation set forth in the CCWD-specific Biological Opinions are triggered, Reclamation and CCWD will reinitiate consultation under ESA Section 7.

4.3.1.7 Central Valley Project Diversions

4.3.1.7.1 *Background*

The volume of water delivered by the CVP is and will continue to be variable, but in any year will be equal to the amount of water that is hydrologically available and that can be diverted under current contractual rights consistent with the terms and conditions of the BDCP Conservation Strategy and then-existing permits and regulations. Reclamation delivers water transported through facilities in the Delta to senior water rights contractors, long-term CVP water service contractors, refuges and waterfowl areas, and temporary water service contractors south of the Delta. The total volume under contract, including Level 2 refuge supplies, is approximately 3.3 MAF. Additionally, the CVP provides Level 4 refuge water totaling approximately 100,000 AF. In addition, as part of the San Joaquin River Restoration Program implementation, Reclamation anticipates submitting a petition to add a point of diversion to the State Water Board to allow re-diversion of the restoration flows either upstream of or in the Delta. Moreover, in wet hydrologic conditions when CVP storage is not available, Delta is in excess conditions, water is made available under temporary contracts for direct delivery. The volume of water available for conveyance through the Delta is a result of hydrologic conditions, upstream reservoir operations, upstream demands, regulatory constraints on CVP operations, and from transfers of water from upstream water users to south of Delta water users.

4.3.1.7.2 *Action*

See Chapter 3, *Conservation Strategy*, for description of near-term and long-term operations and adaptive range of CVP and SWP under the BDCP to provide for protection of covered fish species in conjunction with water conveyance and diversion. All CVP diversions described in this section are federal actions associated with the BDCP, and the effects of those actions are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*) and will be covered in the BDCP section 7 consultation. Water passing through the Delta associated with water transfers (e.g., Drought Water Bank and Dry Year Water Purchase

Programs) is also a covered action. Reclamation is seeking ESA section 7 authorization for all CVP diversions consistent with the BDCP operating criteria.

4.3.1.8 Associated Maintenance and Monitoring Activities

4.3.1.8.1 *Background*

Maintenance and replacement means those activities that maintain the capacity and operational features of the existing CVP water diversion and conveyance facilities described above including the DCC, Jones Pumping Plant, TFCF, and Contra Costa Diversion Facilities. Maintenance activities include maintenance of electrical power supply facilities; maintenance as needed to ensure continued operations and replacement of facility or system components when necessary to maintain system capacity and operational capabilities; and upgrades and technological improvements of facilities to maintain system capacity and operational capabilities.

Monitoring activities refers to those actions necessary for monitoring water quality and fisheries as conditioned by water rights permits and biological opinions, those actions undertaken as a result of the CVPIA and agreements, and any additional monitoring under the BDCP as described in Chapter 3, *Conservation Strategy*, for which Reclamation is responsible. These actions include routine daily, annual or other periodic sampling of water quality constituents as well as trawls for various fish species in the Delta (including actions associated with the Interagency Ecological Program). Reclamation currently operates and maintains more than 20 monitoring stations in the Delta which provide near-realtime water quality data. As the BDCP Conservation Strategy is implemented, the nature of, and requirements for, monitoring would be expected to change.

4.3.1.8.2 *Action*

All CVP maintenance and monitoring described in this section are federal actions associated with the BDCP, and the effects of those actions are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*) and will be covered in the BDCP section 7 consultation.

4.4 JOINT FEDERAL AND NON-FEDERAL ACTIONS

This section describes activities that will be carried out jointly by DWR and Reclamation. These actions are categorized as covered activities under ESA section 10 and NCCPA section 2835 for DWR because of DWR's involvement in these joint actions. The activities identified in this section for federal actions by Reclamation are not "covered activities" for the purposes of the ESA Section 10(a)(1)(b) permit. These federal actions are actions that occur within the Delta which will be coordinated with DWR to support DWR's compliance with the ESA Section 10 permit. Reclamation's activities are subject to ESA section 7, and Reclamation will consult under ESA section 7 on those actions. The Section 7 consultation will also include other CVP operations that are not within the Plan Area.

4.4.1 Joint Point of Diversion Operations

4.4.1.1 Background

Under State Water Board Decision 1641 (D-1641) (December 1999; revised March 2002), Reclamation and DWR are authorized to use/exchange diversion capacity between the Projects to enhance the beneficial uses of both Projects. The use of one Project's diversion facility by the other Project is referred to as the Joint Points of Diversion (JPOD). There are a number of requirements in D1641 that restrict JPOD to protect water quality and fishery resources.

In general, JPOD capabilities are used to accomplish four basic CVP-SWP objectives:

- When wintertime excess pumping capacity becomes available during Delta excess conditions and total CVP-SWP San Luis storage is not projected to fill before the spring pulse flow period, the project with the deficit in San Luis storage may elect to use JPOD capabilities.
- When summertime pumping capacity is available at Banks Pumping Plant and CVP reservoir conditions can support additional releases, the CVP may elect to use JPOD capabilities to enhance annual CVP south of Delta water supplies.
- When summertime pumping capacity is available at Banks or Jones Pumping Plant to facilitate water transfers, JPOD may be used to further facilitate the water transfer.

During certain coordinated CVP-SWP operation scenarios for fishery entrainment management, JPOD may be used to shift CVP-SWP exports to the facility with the least fishery entrainment impact while minimizing export at the facility with the most fishery entrainment impact.

4.4.1.2 Activity/Action

All in-Delta JPOD operations are included as either covered activities or federal actions associated with the BDCP and the effects of those activities/actions are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*). Those actions associated with Reclamation will receive authorization through the ESA section 7 consultation process and those actions associated with DWR will be covered under ESA section 10 permits and section 2835 permits issued pursuant to the NCCPA.

4.4.2 Operations of New Water Intake and Conveyance Facilities

4.4.2.1 Background

DWR would own and operate the new intake and conveyance facilities and their operations would be covered activities as described in Section 4.2.2, *New Facilities Construction, Operation, and Maintenance*. Reclamation and/or the CVP Contractors would enter into agreements to wheel CVP water through the new facilities and this action by Reclamation would be an associated federal action.

4.4.2.2 Activity/Action

All operations of new intake and conveyance facilities are included as either covered activities or federal actions associated with the BDCP and the effects of those activities/actions are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*). Those actions associated with Reclamation will receive authorization through the ESA section 7 consultation process and those actions associated with DWR will be covered under ESA section 10 permits and section 2835 permits issued pursuant to the NCCPA.

4.4.3 Transfers

4.4.3.1 Background

State and federal laws enacted governing water use in California promote the use of water transfers to manage water resources, particularly water shortages, provided that certain conditions of transfer are adopted to protect source areas and users. Transfers requiring export from the Delta are conducted at times when pumping and conveyance capacity at the CVP or SWP export facilities is available to move the water. Additionally, operations to accomplish these transfers must be carried out in coordination with CVP and SWP operations, such that the capabilities of the Projects to exercise their own water rights or to meet their legal and regulatory requirements are not diminished or limited in any way.

CVP and SWP contractors have independently acquired water and arranged for its pumping and conveyance through SWP facilities. State Water Code provisions grant other parties access to unused conveyance capacity, although SWP contractors have priority access to capacity not being used by DWR to meet SWP contract amounts.

4.4.3.2 Activity/Action

Delta operations involving water passing through the Delta associated with water transfers are covered activities and federal actions, however, the effects on place of origin and use are not proposed for coverage. The effects of Delta water operations, including transfers, are addressed in Chapter 5, *Effects Analysis*.

4.4.4 Suisun Marsh Facilities Operations and Maintenance

4.4.4.1 Background

The existing Suisun Marsh facilities consist of:

- Suisun Marsh Salinity Control Gates;
- Morrow Island Distribution System;
- Roaring River Distribution System;

- Goodyear Slough Outfall; and
- Various salinity monitoring and compliance stations throughout the Marsh.

Since the early 1970s, the California Legislature, State Water Board, Reclamation, DFG, Suisun Resource Conservation District (SRCD), DWR, and other agencies have engaged in efforts to preserve beneficial uses of Suisun Marsh to mitigate for potential impacts on salinity regimes associated with reduced freshwater flows to the marsh. Initially, salinity standards for Suisun Marsh were set by the State Water Board's Decision 1485 to protect alkali bulrush production, a primary waterfowl plant food. Subsequent standards set under the State Water Board's D-1641 reflect the intention of the State Water Board to protect multiple beneficial uses. A contractual agreement between DWR, Reclamation, DFG and SRCD includes provision for measures to mitigate the effects of SWP and CVP operations and other upstream diversions on Suisun Marsh channel water salinity. The Suisun Marsh Preservation Agreement requires DWR and Reclamation to meet specified salinity standards, sets a timeline for implementing the Plan of Protection, and delineates monitoring and mitigation requirements.

Existing operations and maintenance of Suisun Marsh facilities are or will be covered for ESA and CESA compliance through existing or imminent authorizations from USFWS, NMFS and DFG and are not proposed for coverage under the BDCP authorizations.

The BDCP includes conservation actions that will change land use and water operations in Suisun Marsh over time. These changes in land use and water operations are covered activities and are addressed by the BDCP. See Chapter 3, *Conservation Strategy*, for descriptions of tidal brackish marsh restoration (CM4 *Tidal Habitat Restoration*) and operations of the Suisun Marsh Salinity Control Gates (*CM1 Water Facilities Operation*). The existing operation and maintenance of the Suisun Marsh Salinity Control Gates would not change until BDCP actions require changes in the operation of the gates at which time the activities would be covered by BDCP. Generally, as habitat restoration in Suisun Marsh is conducted with the implementation of BDCP conservation measures, and changes in land uses occur, the operation of the Suisun Marsh Salinity Control Gates will trend towards limiting the operation of the gates and increasing the period during which the gates allow tidal inflows into Montezuma Slough to provide for the conservation of covered fish species in conjunction with all other water operations under BDCP.

4.4.4.2 Activity/Action

The BDCP covers future construction, operations, and maintenance in Suisun Marsh identified in CM 1 and CM 4 in Chapter 3, *Conservation Strategy* for operations of the salinity gates and for implementation of tidal habitat restoration. This future construction, operations, and maintenance in Suisun Marsh is included as covered activities and associated federal actions and the effects of those activities/actions are addressed by the BDCP (see Chapter 3, *Conservation Strategy* and Chapter 5, *Effects Analysis*). Those actions associated with Reclamation will receive authorization through the ESA section 7 consultation process and those actions

1 associated with DWR will be covered under ESA section 10 permits and section 2835 permits
2 issued pursuant to the NCCPA.