

Section 23

Bay Delta Conservation Plan

This section describes the relationship between the Delta Plan and the Bay Delta Conservation Plan (BDCP), which is a cumulative project to be considered in connection with the Proposed Project and the alternatives, described in Section 22, Cumulative Impact Assessment.

23.1 Overview of BDCP and the Delta Plan

The BDCP is a multiple-stakeholder Habitat Conservation Plan (HCP) and Natural Community Conservation Plan (NCCP) to make significant contributions to the recovery of covered species and restore a more naturally functioning Delta ecosystem while securing a reliable freshwater source from the Delta for human use. The BDCP is currently being developed through a collaboration of the California Department of Water Resources (DWR), federal Bureau of Reclamation (Reclamation), Metropolitan Water District of Southern California, the Kern County Water Agency, the Santa Clara Valley Water District, Zone 7 Water Agency, San Luis and Delta-Mendota Water Authority, Westlands Water District, and Mirant Delta LLC (owners of an electric power generating facilities located near Antioch and Pittsburg, California). The BDCP HCP and NCCP permits and the related Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) are scheduled to be completed by December 2012 (CNRA 2011a). If approved, the BDCP would provide incidental take permits for covered species related to the following general categories of actions:

- ◆ The operation of existing State Water Project (SWP) Delta facilities and construction and operation of facilities for the movement of water entering the Delta from the Sacramento Valley watershed to the existing SWP and federal Central Valley Project (CVP) pumping plants located in the southern Delta;
- ◆ The implementation of any conservation actions that have the potential to result in take of species that are or may become listed under the federal Endangered Species Act (ESA), pursuant to the ESA at Section 10(a)(1)(B) and its implementing regulations and policies; and
- ◆ The diversion and discharge of water by Mirant for power generation in the western Delta.

If completed and approved by the California Department of Fish and Game (DFG), the BDCP must be considered by the Delta Stewardship Council (Council) and included in the Delta Plan as required by the Delta Reform Act (Water Code section 85320 et seq.). DWR is the California Environmental Quality Act (CEQA) lead agency for the BDCP. The Council is a responsible agency (Water Code section 85320(c)). DFG, State Water Resources Control Board (SWRCB), California Air Resources Control Board, California Department of Boating and Waterways, California Department of Transportation, California State Lands Commission, and San Francisco Bay Conservation and Development Commission are responsible or trustee agencies.

1 The BDCP is intended to help meet the same coequal goals as the Delta Plan (CNRA 2011a):

2 *Coequal goals means the two goals of providing a more reliable water supply for California and*
3 *protecting, restoring and enhancing the Delta ecosystem. The coequal goals shall be achieved in*
4 *a manner that protects and enhances the unique cultural, recreational, natural resource and*
5 *agricultural values of the Delta as an evolving place (Water Code section 85054).*

6 The BDCP is being prepared to help achieve the coequal goals by:

- 7 ♦ Providing a more reliable water supply for California by modifying conveyance facilities to
8 create a more natural flow pattern and prepare for seismic and climate change scenarios.
- 9 ♦ Providing for an adaptive management and monitoring program to enable the plan to adapt as
10 conditions change and new information emerges.
- 11 ♦ Providing a comprehensive science-based restoration program for the Delta.
- 12 ♦ Identifying sources of funding and science-based decision making for ecosystem improvements.
- 13 ♦ Providing the basis for permits under federal and state endangered species laws for activities
14 covered by the plan (CNRA 2011a).

15 It is anticipated that the BDCP will include actions to restore native fish, wildlife, and plant habitat in the
16 Delta; modify SWP and CVP Delta water conveyance facilities and operations in the Delta; and reduce
17 other ecological stressors that impair the function or the use of desirable habitat for ecosystem restoration
18 or recovery in the Delta, such as physical barriers to fish migration (such as levees, weirs, or gates), non-
19 native and invasive species, and poor water quality.

20 **23.2 Relationship of Delta Plan to BDCP**

21 This subsection describes the relationship between the BDCP, as a cumulative project, and the policies
22 and recommendations of the Delta Plan and alternatives that are related to the BDCP.

23 **23.2.1 Connected Roles of the Delta Stewardship Council and** 24 **Delta Conveyance Addressed in BDCP**

25 The Delta Reform Act potentially gives the Council three distinct but connected roles related to Delta
26 water conveyance: contingent authority to approve proposed conveyance improvements, authority to
27 generally recommend conveyance options in the Delta Plan, and authority to provide comments to other
28 agencies during the BDCP process.¹ These roles are discussed in the following subsections.

29 **23.2.1.1 Regulatory Authority over Conveyance**

30 As a practical matter, the Council would have occasion to decide (in a role with contingent authority to
31 approve proposed Delta conveyance improvements) what conveyance improvements are permissible only
32 if:

- 33 ♦ (a) an agency proposes a Delta conveyance improvement prior to the incorporation of the BDCP
34 into the Delta Plan,

¹ This is an attempt to summarize the Council's relationship with BDCP and conveyance for the purpose of clarity. However, it does not purport to summarize the Council's complete authority in this regard. The Council retains all authority provided to it under the Delta Reform Act.

- 1 ♦ (b) the proposed Delta conveyance improvement is a “covered action” under Water Code section
2 85057.5 (as described in Subsection 2.1.2), and
- 3 ♦ (c) the proposed Delta conveyance improvement, as a covered action, is appealed to the Council
4 as not being consistent with the Delta Plan.

5 For reasons explained in Subsection 23.2.1.2, it is unlikely that a State or local agency with authorization
6 to implement a Delta conveyance will adopt a conveyance improvement project prior to the issuance of
7 the HCP and NCCP permits and completion of the BDCP planning process (or prior to the official
8 termination of the BDCP process). Accordingly, it would not be useful at this time to include Delta Plan
9 regulatory policies that prescribe or limit conveyance concepts because they probably could not be
10 adopted prior to the completion of the BDCP process. If events in subsequent years reveal that BDCP will
11 not be successfully completed in a timely fashion, the Council could consider at that time whether to
12 amend the Delta Plan to prescribe conveyance.

13 The Delta Reform Act mandates that the Council’s Delta Plan “promote options” for improving
14 conveyance and storage to meet the coequal goals (Water Code section 85303). Therefore, the Council
15 has the authority to dictate in the Delta Plan the conveyance improvements it views as meeting the
16 coequal goals. In addition, proposed conveyance improvements that are “covered actions”² must be
17 consistent with the Delta Plan,³ and the Council would determine (upon appeal) consistency.⁴ Through
18 specifying conveyance improvements in the Delta Plan (should the Council do so), the consistency
19 requirement, and the Council’s appellate role over consistency determinations, the Council has the
20 authority to regulate conveyance improvements.

21 This is best viewed as *contingent* regulatory authority. The Council may never get to exercise this
22 *contingent* regulatory authority. Most relevantly and as a practical matter, occasion to exercise that
23 authority is contingent in the near term on BDCP.

24 Conveyance options are currently being studied in detail by the agencies and interested parties preparing
25 the BDCP and the related EIR/EIS. A public draft of the BDCP and the related EIR/EIS is planned for
26 release by mid-2012. Upon successful completion of the BDCP process (scheduled for December 2012),
27 and if BDCP meets certain requirements explained in Water Code section 85320(e), the BDCP becomes
28 part of the Delta Plan.⁵ Those requirements include:

- 29 ♦ Complies with the requirements for preparation of an NCCP (Chapter 10 [commencing with
30 Section 2800] of Division 3 of the Fish and Game Code).
- 31 ♦ Complies with CEQA (Division 13 [commencing with section 21000] of the Public Resources
32 Code), including a comprehensive review and analysis of all of the following:
- 33 • A reasonable range of flow criteria, rates of diversion, and other operational criteria required
34 to satisfy the criteria for approval of an NCCP (as provided in subdivision (a) of section 2820
35 of the Fish and Game Code), and other operational requirements and flows necessary for
36 recovering the Delta ecosystem and restoring fisheries under a reasonable range of hydrologic

² Proposed conveyance improvements would almost certainly be a covered action: Such a project would (1) be a CEQA project; (2) occur at least in part within the Delta; (3) be carried out, approved, or funded by a public agency; (4) would be covered by one or more provisions of the Delta Plan; and (5) have a significant impact on the coequal goals (Water Code section 85057.5.).

³ An agency proposing a conveyance covered action would have to certify that the project is consistent with the Delta Plan (Water Code section 85225).

⁴ The Council would review this consistency determination if and when it was appealed to the Council (Water Code section 85225.10; Council’s Appeals Procedures).

⁵ The DFG’s decision that BDCP meets the requirements for incorporation into the Delta Plan may be appealed to the Council under Water Code section 85320(e).

1 conditions, which will identify the remaining water available for export and other beneficial
2 uses.

- 3 • A reasonable range of Delta conveyance alternatives, including through-Delta, dual
4 conveyance, and isolated conveyance alternatives and including further capacity and design
5 options of a lined canal, an unlined canal, and pipelines.
- 6 • The potential effects of climate change, possible sea level rise up to 55 inches, and possible
7 changes in total precipitation and runoff patterns on the conveyance alternatives and habitat
8 restoration activities considered in the EIR.
- 9 • The potential effects on migratory fish and aquatic resources.
- 10 • The potential effects on Sacramento River and San Joaquin River flood management.
- 11 • The resilience and recovery of Delta conveyance alternatives in the event of catastrophic loss
12 caused by earthquake or flood or other natural disaster.
- 13 • The potential effects of each Delta conveyance alternative on Delta water quality.

14 Subsequently, if another government agency, such as DWR, proposes to implement the BDCP preferred
15 conveyance project and that project qualifies as a “covered action” (which is most likely), the BDCP
16 preferred conveyance project would be consistent with the Delta Plan regardless of whether the Delta
17 Plan had previously endorsed a different conveyance option. Accordingly, the Council’s regulatory
18 authority over conveyance is contingent upon a different conveyance project being proposed and
19 becoming a covered action prior to BDCP’s incorporation into the Delta Plan.

20 It is highly unlikely that a non-BDCP conveyance project would be proposed as a covered action to come
21 before the Council prior to BDCP completion (in accordance with the anticipated deadline for BDCP
22 completion) unless the BDCP process is terminated prior to completion.

23 For this reason, the Proposed Project does not include any regulatory policies regarding Delta
24 conveyance. In addition, BDCP has been underway since 2006, and in the last 5 years, the involved
25 agencies and interested parties have invested significant time, resources, and expertise in that process.
26 The lead agencies of the BDCP EIR/EIS are conducting extensive environmental analysis of the various
27 conveyance alternatives. The lead agencies include DWR, Reclamation, U.S. Fish and Wildlife Service
28 (USFWS), and National Marine Fisheries Service (NMFS). This EIR assumes that the BDCP agencies
29 and the BDCP EIR/EIS agencies will complete the planning and permitting process in accordance with
30 the published schedules; and that this EIR does not include the same extensive policy, scientific, and
31 environmental analysis that is being completed for the BDCP EIR/EIS.

32 The Proposed Project includes recommendations to DWR should the BDCP process not be completed by
33 January 1, 2014, for the Council to consider approaches to develop and complete the ecosystem and
34 conveyance planning process without BDCP. If the Council then decides to amend the Delta Plan to
35 include regulatory policies regarding Delta conveyance, the Council would do so only after extensive
36 analysis of the conveyance options and associated detailed environmental review.

37 **23.2.1.2 Authority to Recommend Options**

38 The Delta Plan shall promote options for new and improved infrastructure relating to the water
39 conveyance in the Delta, storage systems, and for the operation of both to achieve the coequal goals
40 (Water Code section 85304). Implicit in the Council’s regulatory authority relating to Delta conveyance⁶

⁶ The Delta Plan shall promote options for new and improved infrastructure relating to the water conveyance in the Delta, storage systems, and for the operation of both to achieve the coequal goals (Water Code section 85304).

1 is its authority to recommend to other agencies conveyance options it views as achieving the coequal
2 goals. This authority can be exercised through making recommendations about conveyance in the Delta
3 Plan (Water Code section 85304) and recommendations regarding implementation of BDCP (Water Code
4 section 85320(g)). The Council also has appellate authority over the issue of whether the BDCP, once
5 approved by DFG, meets the requirements in Water Code section 85320 (Water Code section 85320(e)).

6 The Act, therefore, gives the Council the authority to opine generally about improving Delta conveyance
7 as it may relate to the rest of the Delta Plan and the coequal goals. Accordingly, the Council has authority
8 to recommend to BDCP preferred Delta conveyance options that the BDCP process evaluates.

9 Nevertheless, for the same reasons that the Proposed Project at this time does not include any regulatory
10 policies regarding Delta conveyance, the Proposed Project likewise does not include any recom-
11 mendations regarding Delta conveyance. At this time, the agencies pursuing BDCP are best positioned to
12 develop and evaluate possible options and decide on the best Delta conveyance concept.

13 ***23.2.1.3 Authority to Comment during the BDCP Process***

14 The Delta Reform Act provides the Council with a consultation and CEQA responsible agency role in the
15 BDCP process (Water Code section 85320(c)). Thus, separately from the Delta Plan, the Council may
16 provide comments and guidance to the BDCP EIR/EIS lead agencies regarding the BDCP, including but
17 not limited to Delta conveyance options that the BDCP agencies should consider, study, and select.

18 **23.3 Development of the BDCP**

19 The BDCP is a voluntary undertaking initiated and funded by public water agencies with the active
20 participation of the DFG, USFWS, NMFS, environmental organizations, and other federal, State and local
21 organizations that are involved in development of a plan for the long-term sustainability of the Delta. The
22 BDCP approach is being developed to make significant contributions to the recovery of covered species
23 and to the restoration of a more naturally functioning ecosystem while securing a reliable freshwater
24 source for human use (DWR 2009).

25 The BDCP is being developed through a collaboration of DWR, Reclamation, Metropolitan Water
26 District of Southern California, the Kern County Water Agency, the Santa Clara Valley Water District,
27 Zone 7 Water Agency, San Luis and Delta-Mendota Water Authority, Westlands Water District, and
28 Mirant Delta LLC (owners of an electric power generating facilities located near Antioch and Pittsburg,
29 California). These entities, collectively known as the “Potentially Regulated Entities,” are preparing the
30 BDCP.

31 The goal of the BDCP participants is to formulate a plan that could ultimately be approved by USFWS
32 and NMFS as an HCP under the provisions of ESA section 10(a)(1)(B) and by DFG as an NCCP under
33 Fish and Game Code sections 2800 et seq. and/or the California Endangered Species Act (CESA) sections
34 2050 et seq.

35 DWR, and potentially SWP and CVP water contractors, intend to apply for ESA and CESA incidental
36 take permits⁷ for Delta water operations and management activities. The ESA and CESA incidental take
37 permits may also address species that are not currently listed as threatened or endangered, but that may
38 become listed because of changes and disturbances resulting from the covered activities. The BDCP is
39 also intended to be used as the basis for ESA compliance by Reclamation, including compliance with
40 Section 7 of the ESA in coordination with USFWS and NMFS.

⁷ Actions that harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage threatened and endangered species in any such conduct as “take.” “Incidental take” of threatened and endangered species occurs incidentally to implementation of an otherwise lawful activity, and not due to the primary purpose of the action.

23.3.1 Background

The Delta watershed, Delta, and Suisun Marsh provide important and unique fish and wildlife habitat and water supplies for water users in the Delta and those outside the Delta that use Delta water in the San Francisco Bay Area, San Joaquin Valley, Central Coast area, and Southern California. Over the past 150 years, competition for freshwater resources in the Delta and Delta watershed has escalated among beneficial uses of water, including fish and wildlife resources, agricultural users, municipal and industrial users, and power generation.

Water resources and fish and wildlife resources throughout the Delta watershed and Delta have been impacted by construction of levees, community development, and water resource projects that modified the flow patterns, changed water quality, removed native vegetation, entrained fish in water supply intakes/diversions, and enhanced conditions in which nonnative invasive species and predators thrive. Reliance on water from the Delta watershed and Delta has been increasing over the past 40 years as municipalities and agricultural areas have grown and the groundwater basins that these users had previously relied upon have become depleted. These factors, and many others, individually and in combination, contributed to the decline of fish and wildlife resources in California over the past 150 years.

In the past 20 years, federal and State agencies have focused on improving water quality and fish and wildlife habitat affected by the SWP and CVP systems. The Central Valley Project Improvement Act (CVPIA) was authorized on October 30, 1992.⁸ The CVPIA amended authorizations of the CVP to achieve a reasonable balance among competing demands for use of CVP water by adding:

- ◆ Fish and wildlife protection, restoration, and mitigation as a project purpose with equal priority as irrigation and domestic uses of CVP water; and
- ◆ Fish and wildlife enhancement as a project purpose with equal priority as power generation at CVP facilities.

In June 1994, federal and State agencies signed an agreement to coordinate their actions to meet water quality standards to protect the Bay-Delta estuary; coordinate the operation of the SWP and CVP more closely with recent environmental mandates; and develop a process to establish a long-term Bay-Delta solution to address four categories of problems: ecosystem quality, water quality, water supply reliability, and levee system vulnerability. This agreement led to the signing of the Bay-Delta Accord by relevant State and federal agencies and interested stakeholders, and implementation of the CALFED Bay Delta Program (CALFED) on December 15, 1994. CALFED was a consortium of 8 state and 10 federal agencies with management and regulatory responsibilities in the Bay-Delta estuary.

Following implementation of the CVPIA and CALFED programs in 2000, several Delta aquatic organisms listed as endangered or threatened under the ESA, CESA, or both continued to decline, including delta smelt and certain salmonids. In response to declining populations of threatened and endangered aquatic species, the USFWS and NMFS issued several biological opinions to modify operations of the SWP and CVP facilities, which resulted in reductions in export flows. During this same period, DWR completed several studies that identified a high risk of Delta levee failure that could place public lives and Delta property at risk, adversely affect Delta aquatic and terrestrial habitat, and cause long-term intrusion of salinity into the Delta that could result in interruption of the freshwater supplies for Delta water users. The DWR studies also described potential adverse effects to levee integrity, water quality, and water supplies that would be caused by up to 55 inches of sea level rise, which could occur by 2100. Levee failure and sea level rise also could cause long-term disruption of critical intrastate and

⁸ Title XXXIV of the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575).

1 interstate infrastructure links, including major highways, water and natural gas pipelines, and electrical
2 transmission lines.

3 **23.3.2 Initiation of the BDCP**

4 The BDCP was initiated in January 2006 when a group of federal and State agencies, water supply
5 agencies, and environmental and conservation organizations agreed to a Statement of Principles to
6 develop comprehensive conservation plan for the Delta (BDCP 2010a). Several of these entities signed a
7 Memorandum of Agreement in July 2006. Concurrently, the state Natural Resources Agency (known in
8 2006 as the California Resources Agency) initiated the BDCP and established the BDCP Steering
9 Committee. The BDCP Steering Committee consists of the entities that signed the Statement of Principles
10 and/or the Memorandum of Agreement. In December 2006, the Steering Committee members adopted the
11 Planning Agreement in accordance with the requirements of the NCCP Act. The Planning Agreement
12 contained the following Planning Goals for development of the HCP and NCCP processes:

- 13 ♦ Provide for the conservation and management of covered species within the planning area.
- 14 ♦ Preserve, restore, and enhance aquatic, riparian, and associated terrestrial natural communities
15 and ecosystems that support covered species within the planning area through conservation
16 partnerships.
- 17 ♦ Allow for projects that restore and protect water supply, water quality, ecosystem, and ecosystem
18 health to proceed within a stable regulatory framework.
- 19 ♦ Provide a means to implement covered activities in a manner that complies with applicable State
20 and federal fish and wildlife protection laws, including the NCCP Act or CESA, ESA, and other
21 environmental laws, including CEQA and National Environmental Policy Act (NEPA).
- 22 ♦ Provide a basis for permits necessary to lawfully take covered species.
- 23 ♦ Provide a comprehensive means to coordinate and standardize mitigation and compensation
24 requirements for covered activities within the planning area.
- 25 ♦ Provide a less costly, more efficient project review process that results in greater conservation
26 values than project-by-project, species-by-species review.
- 27 ♦ Provide clear expectations and regulatory assurances regarding covered activities occurring
28 within the planning area.

29 The HCP and NCCP processes use the comprehensive approach to conservation plans to avoid more
30 costly, and often less effective, project-by-project or species-by-species permit processes under ESA and
31 CESA. The HCP and NCCP processes are conducted by participants proposing to undertake the covered
32 activities on a voluntary basis using best available science, including independent science experts, in a
33 public process. For the BDCP, the covered activities include continued operations and maintenance of the
34 SWP and CVP facilities and improvements for existing and new facilities (including electric distribution
35 or transmission lines to facilities), SWP and CVP facilities operations related to emergency preparedness
36 or response, SWP and CVP facilities operations related to water transfers, continued operations and
37 maintenance of Mirant Delta LLC existing and future facilities, and conservation measures included in
38 the BDCP. The HCP and NCCP processes do not address challenges not related to the covered activities
39 or environmental conditions that the Potentially Regulated Entities cannot affect. For example, the BDCP
40 does not address all environmental challenges in the Delta, such as levee failures throughout the Delta, or
41 ecological stressors that do not occur in the Delta watershed or Delta, such as ocean harvest and ocean
42 water conditions. The HCP and NCCP processes also do not eliminate the need for other permits or the
43 authority of other agencies to approve or deny project approval (CNRA 2008).

23.3.3 Purpose of the BDCP

The purpose of the BDCP was addressed in the February 13, 2009, Notice of Preparation issued by DWR and the Notice of Intent issued by Reclamation, USFWS, and NMFS (DWR 2009, DOI and DOC 2010) and *Highlights of the BDCP* (CNRA 2010a):

- ◆ To obtain incidental take permits for the covered species that authorize take related to:
 - Construction and operation of existing and specific future facilities to convey water through the Delta from the Delta watershed in the Sacramento Valley to the existing SWP and CVP pumping plants in the southern Delta;
 - Implementation of any related conservation activities that have the potential to result in take of species that are or may become listed under the ESA and its implementing regulations and policies; and
 - Diversion and discharge of water by Mirant for power generation in the western Delta at existing power plants near Antioch and Pittsburg.
- ◆ To improve the ecosystem of the Delta by providing a comprehensive restoration programs for the Delta for the conservation and management of covered species through actions that will contribute to the recovery of the species; protect, restore, and enhance specific aquatic, riparian, and associated terrestrial natural communities and ecosystems; provide for an adaptive management and monitoring program; and identify sources of funding and new methods for decision making for ecosystem improvements.
- ◆ To provide a more reliable water supply for California, including BDCP participating water users that use Delta water, by modifying Delta conveyance facilities to create a more natural flow pattern in the Delta and allow for SWP and CVP operations when hydrologic conditions result in the availability of sufficient water, consistent with the requirements of State and federal law and the terms and conditions of SWP and CVP water delivery contracts and other existing applicable agreements.

The BDCP is planned to be implemented over a 50-year timeframe, including potential adaptations in response to results of the monitoring program to evaluate effectiveness of the conservation measures.

23.3.4 Project Area

The BDCP planning area consists of the aquatic and terrestrial ecosystems and natural communities and adjacent riparian and floodplain natural communities within the Delta. The BDCP includes conservation actions outside the Delta that advance the goals and objectives of the BDCP within the Delta, including as appropriate, conservation actions in Suisun Marsh and Yolo Bypass (CNRA 2010a).

23.3.5 Potential BDCP Concepts

The BDCP concepts described in this subsection were identified through review of written information presented at the BDCP Steering Committee meetings between 2006 and 2011, scoping reports that summarized BDCP EIR/EIS 2008 and 2009 scoping processes, written comments received by the Council between 2010 and 2011 on the Delta Plan, and scoping comments received by the Council on the 2010/2011 Delta Plan Program EIR scoping process.

The BDCP process is underway, and the final range of alternatives to be considered for BDCP and the BDCP EIR/EIS has not been defined at this time. Therefore, for the purposes of this cumulative impact assessment, a range of concepts was identified through a review of the BDCP information and comments received by the Council.

1 The concepts have been identified for the following three general categories that are used by the BDCP
2 process (CNRA 2010a):

- 3 ♦ Aquatic and terrestrial habitat ecosystem improvements
- 4 ♦ Other ecological stressors reduction
- 5 ♦ Water flow and Delta conveyance improvements

6 *23.3.5.1 Potential Aquatic and Terrestrial Habitat Ecosystem Improvements* 7 *Concepts for BDCP*

8 Aquatic and terrestrial habitat ecosystem improvements within the Delta, Suisun Marsh, and Yolo Bypass
9 were identified by the BDCP process to reestablish ecological processes related to the interaction between
10 land-based and water-based ecosystems to benefit fish and to resemble natural estuarine functions. The
11 identified aquatic and terrestrial habitat ecosystem improvement concepts include:

- 12 ♦ **Tidal Habitat Restoration:** The amount of tidal marsh restoration identified in previous analysis
13 has ranged from approximately 125,000 acres (BDCP 2008a) to 65,000 acres (CNRA 2010a).
14 Restoration also could include subsidence reversal, as described in Subsection 2.2.4.4, on
15 Sherman and Jersey islands and Little Franks Tract using dredge spoils excavated from Decker
16 and Brannan islands, rice straw bales, or injection of fine clay from dredge spoils. Restoration has
17 been proposed for the following areas. At this time, however, specific plans are being developed
18 only for portions of Cache Slough, Dutch Slough, and Cosumnes and Mokelumne rivers
19 confluence:
 - 20 • Cache Slough complex (including, but not limited to, Haas Slough, Hastings Cut, Lindsey
21 Slough, Barker Slough, Calhoun Cut, Liberty Island, Little Holland, Yolo Ranch, Shag
22 Slough, Little Egbert Tract, and Prospect Island).
 - 23 • Cosumnes and Mokelumne rivers confluence (including, but not limited to, McCormack-
24 Williamson and New Hope tracts, lands adjoining Snodgrass Slough, South Stone Lake, and
25 Lost Slough).
 - 26 • Northern Delta between the eastern boundary of the Sacramento Deep Water Ship Channel
27 and the Sacramento River.
 - 28 • East Delta (including, but not limited to, Canal Ranch, Bract, Shin Kee, and Rio Blanco tracts
29 and Terminous Tract north of State Highway 12).
 - 30 • West Delta (including, but not limited to, Dutch Slough; Decker Island; portions of Sherman,
31 Jersey, Bradford, Twitchell, Brannon, Webb, and Grand islands; and portions of the north
32 bank of the Sacramento River between Rio Vista and Collinsville).
 - 33 • South Delta (including, but not limited to, Fabian Tract, and Bacon, Union, Middle Roberts,
34 and Lower Roberts islands).
 - 35 • Suisun Marsh and Suisun Bay (including along the southern shoreline near the previous site
36 of the Concord Naval Weapons Station).
- 37 ♦ **Seasonally Inundated Floodplain:** The amount of floodplain restoration and enhancement
38 identified in previous analysis has ranged from approximately 39,000 acres (BDCP 2008b) to
39 60,000 acres (The Bay Institute et al. 2008) to 31,000 acres (CNRA 2010a). Restoration and
40 expansion of the floodplain have been suggested in Yolo Bypass, the Cosumnes and Mokelumne
41 rivers confluence, and along the San Joaquin, Old, and Middle rivers. Floodplain areas also could
42 include managed wetlands that are not directly connected to the floodplain, such as wetlands

1 managed for habitat on Staten Island and in Suisun Marsh. This type of habitat has been
2 suggested for Bouldin Island and Holland Tract.

- 3 ♦ **Riparian and Channel Margin Habitat:** The amount of riparian and channel margin habitat
4 identified in previous analyses have ranged from approximately 12,000 acres and 46 miles,
5 respectively (BDCP 2008a), to 5,000 acres and 40 miles, respectively (CNRA 2010a). Riparian
6 and channel margin habitat restoration have been suggested to occur in the following areas:
- 7 • Riparian habitat in the Cosumnes and Mokelumne rivers confluence, eastern Delta, western
8 Delta, and southern Delta areas.
 - 9 • Channel margin along the Sacramento River between Freeport and Walnut Grove,
10 San Joaquin River between Vernalis and Mossdale, Sutter and Steamboat sloughs, and
11 Mokelumne River within the Delta.
 - 12 • Reconnection of streams and sloughs previously separated through construction of levees and
13 flood management structures, including:
 - 14 ○ Reconnect Elk, Sutter, and Steamboat sloughs and improve connections with the
15 Sacramento River for all of these sloughs.
 - 16 ○ Reconnect Elk, Miner, and Duck sloughs.
 - 17 ○ Improve connections within the Cosumnes and Mokelumne rivers corridors with
18 Snodgrass Slough and Stone Lakes National Wildlife Refuge.
 - 19 ○ Reconnect Cosumnes and Mokelumne rivers corridors with western Delta through
20 reestablishment of sloughs across Brannon-Andrus Island to improve connections
21 between Staten, Twitchell, and Sherman islands.
 - 22 ♦ **Grassland Communities:** Grassland habitat restoration could occur in the Delta through sowing
23 of native species and removal of non-native plants. Grasslands restoration has been suggested on
24 up to 2,000 acres of grasslands in the western Delta to provide connectivity to the Jepson Prairie
25 area and in the southwestern Delta with protections from future development on 8,000 acres of
26 existing natural grasslands (CNRA 2010a).
 - 27 ♦ **Vernal Pool Complex:** Vernal pool restoration could occur in lands used for grazing through
28 elimination of grazing, grading to restore pool areas, removing nonnative plants, and placing seed
29 and invertebrates from similar vernal pools. Vernal pool restoration, in conjunction with
30 restoration of alkali seasonal wetlands, has been suggested on up to 200 acres in Suisun Marsh
31 and eastern Contra Costa County with protections from future development on 300 acres of
32 existing vernal pool habitat (CNRA 2010a).
 - 33 ♦ **Nontidal Marsh:** Nontidal marsh restoration could occur through reconnection of streams to
34 upland habitat. Nontidal marsh restoration has been suggested on up to 400 acres in Yolo Bypass
35 and near the Cosumnes-Mokelumne rivers confluence, especially near giant garter snake habitat
36 preserves at Yolo Basin/Willow Slough or Caldoni Marsh/White Slough (CNRA 2010a).
 - 37 ♦ **Agricultural Lands:** Agricultural land preservation to support and protect Swainson's hawk,
38 white-tailed kite, greater sandhill crane, tricolored blackbird, and giant garter snake populations
39 has been suggested for 12,000 to 28,000 acres of non-rice agricultural lands and 4,600 acres of
40 rice lands in the Delta (CNRA 2010a).

1 23.3.5.1.1 Recent BDCP Proposal

2 According to the Natural Resources Agency's *Highlights of the BDCP* (CNRA 2010a), most of the lands
3 for ecosystem improvements have not been identified and selection criteria are being developed. Initial
4 selection criteria could include selection of projects that would have available land with a minimal effect
5 on existing land uses, cost-effective restoration activities, minimal effects on mosquito vector control, and
6 secured payments-in-lieu of taxes to counties. The types of locations would be evaluated for the following
7 characteristics: ability to achieve multiple biological objectives for multiple species; proximity to other
8 channels and habitats that could benefit from improvements and become part of habitat corridors;
9 contribution to natural transition between aquatic and upland habitats; and minimal effects on other
10 stressors that could reduce benefits.

11 The *Highlights of the BDCP* identified the following targets for ecosystem restoration and enhancement:

12 ♦ **Tidal Habitat Restoration:** Restoration of 65,000 acres of freshwater and brackish tidal habitat.

- 13 • At least 5,000 acres of freshwater tidal habitat in the Cache Slough Complex Restoration
14 Opportunity Area.
- 15 • At least 1,500 acres of freshwater tidal habitat in the Cosumnes and Mokelumne Restoration
16 Opportunity Area.
- 17 • At least 2,100 acres of freshwater tidal habitat in the West Delta Restoration Opportunity
18 Area.
- 19 • At least 5,000 acres of freshwater tidal habitat in the South Delta Restoration Opportunity
20 Area.
- 21 • At least 7,000 acres of brackish water tidal habitat within Suisun Marsh Restoration
22 Opportunity Area.
- 23 • The freshwater and brackish tidal habitat restoration targets would be achieved on the
24 following time schedule:
 - 25 ○ 14,000 acres developed within the first 10 years of plan implementation.
 - 26 ○ 25,000 acres (cumulative) developed by year 15 of plan implementation.
 - 27 ○ 65,000 acres (cumulative) developed by year 40 of plan implementation.

28 ♦ **Seasonally Inundated Floodplain Management:** Restoration of 10,000 to 20,000 acres of
29 seasonally inundated floodplains. Seasonally inundated floodplain restoration targets would be
30 achieved on the following time schedule:

- 31 • At least 1,000 acres restored within the first 15 years of plan implementation.
- 32 • At least 10,000 to 20,000 acres (cumulative) restored within the first 40 years of plan
33 implementation.

34 ♦ **Channel Margin Enhancement:** Channel margin habitat restoration of 20 to 40 miles of
35 channels. Although specific locations have not been identified, the following general conceptual
36 locations have been identified:

- 37 • At least 5 miles along the Sacramento River between Freeport and Walnut Grove.
- 38 • At least 5 miles along the San Joaquin River between Vernalis and Mossdale.

- 1 • Remaining 10 to 30 miles along the channels listed above for the Sacramento and San
2 Joaquin rivers, Steamboat and Sutter Sloughs channels that are protected by federally
3 managed levees, and salmonid migration channels in the interior Delta, such as the North and
4 South Forks of the Mokelumne River.
- 5 • Channel margin habitat restoration targets (as measured along one bank line of the channels)
6 would be achieved on the following time schedule:
- 7 ○ At least 5 miles enhanced within the first 10 years of plan implementation.
- 8 ○ At least 10 miles (cumulative) enhanced within the first 20 years of plan implementation.
- 9 ○ At least 15 miles (cumulative) enhanced within the first 25 years of plan implementation.
- 10 ○ At least 20 to 40 miles (cumulative) enhanced within the first 30 years of plan
11 implementation.
- 12 ◆ **Riparian Habitat Restoration:** Riparian habitat restoration would occur on up to 5,000 acres of
13 riparian forest and scrub to be restored in association with tidal and floodplain habitat and
14 channel margin habitat restoration. Riparian habitat restoration targets would be achieved on the
15 following time schedule:
- 16 • At least 400 acres restored within the first 15 years of plan implementation.
- 17 • At least 5,000 acres (cumulative) restored within the first 40 years of plan implementation.
- 18 ◆ **Grassland Communities Restoration:** Grassland habitat restoration would occur on up to
19 2,000 acres of grasslands in the western and southwestern Delta, and up to 8,000 acres of existing
20 grasslands habitat would be protected.
- 21 ◆ **Vernal Pool Complex Restoration:** Vernal pool area restoration would occur on up to 200 acres
22 in Suisun Marsh and eastern Contra Costa County with a matrix of grassland and alkali seasonal
23 wetlands, and up to 300 acres of existing vernal pool habitat would be protected.
- 24 ◆ **Nontidal Marsh Restoration:** Nontidal marsh restoration would occur on up to 400 acres in
25 Yolo Bypass and near the Cosumnes and Mokelumne rivers confluence.
- 26 ◆ **Management of Agricultural Lands:** Between 12,000 and 28,000 acres of non-rice agricultural
27 lands and 4,600 acres of rice lands would be managed to support and protect Swainson's hawk,
28 white-tailed kite, greater sandhill crane, tricolored blackbird, and giant garter snake populations.
- 29 ◆ **Yolo Bypass Fishery Enhancement:** Increase the frequency and duration of water flowing from
30 the Sacramento River into the Yolo Bypass at or near Fremont Weir (BDCP 2010a).
31 Modifications to Yolo Bypass for improved fish passage could include:
- 32 • Replace existing Fremont Weir fish ladder to improve passage of adult salmonids with
33 operable barriers that include fish passage facilities and improvements to existing stilling
34 basins.
- 35 • Ramps at Fremont Weir to improve passage of adult sturgeon and lamprey.
- 36 • Fish passage improvements at Sacramento Weir.
- 37 • Channel improvements within Yolo Bypass to improve access and passage in the existing
38 Tule Canal and Toe Drain.

- 1 • Realign Lower Putah Creek at the Yolo Bypass Wildlife Area to become a more natural
2 channel, increase available low-flow floodplain area, create managed shallow water habitat,
3 provide opportunities to increase riparian habitat, and improve upstream and downstream
4 passage of salmon and steelhead in Putah Creek.
- 5 • The final improvements could also include considerations resulting from ongoing evaluations
6 of establishing fish passage along the west side of the Yolo Bypass, which could provide a
7 connection with the Sacramento River near the confluence with the Colusa Basin Drain,
8 Knights Landing Ridge Cut, or other western tributaries to the Yolo Bypass.

9 **23.3.5.2 Potential Other Ecological Stressors Reduction Concepts for BDCP**

10 The BDCP process developed a *Points of Agreement for Continuing into the Planning Process* (“2007
11 *Points of Agreement*”) (BDCP 2007b) to establish basic approaches on strategies for in-Delta habitat
12 restoration and enhancement and potential improvements to the Delta water conveyance system. The
13 *2007 Points of Agreement* described concepts for ecosystem improvements that had been identified as of
14 2007 (discussed in Subsection 23.3.5.1) and “other conservation actions designed to help address a
15 number of stressors on covered species other than water conveyance facilities and operations.” Actions to
16 reduce other ecological stressors are focused on the following:

- 17 ♦ Exposure to contaminants
- 18 ♦ Nonnative species competition and predation
- 19 ♦ Entrainment of fish and other organisms at intake facilities not owned by SWP or CVP
- 20 ♦ Harvest of fish by commercial or sport fishing
- 21 ♦ Reduced genetic diversity and integrity due to hatchery operations
- 22 ♦ Effects of climate change

23 Other ecological stressors reduction concepts within the Delta, Suisun Marsh, and Yolo Bypass were
24 identified by the BDCP process to reduce the adverse affects on aquatic species that are not related to
25 physical habitat communities or water operations considered in the BDCP covered activities. Many of
26 these actions cannot be implemented by the Potentially Regulated Entities under the BDCP because other
27 agencies are responsible for implementation. In those cases, agreements between the BDCP Potentially
28 Regulated Entities and other government agencies could be used to provide funding or other resources
29 (BDCP 2010a). Identified concepts to reduce other ecological stressors include the following:

- 30 ♦ **Methylmercury Management:** Minimize the potential for habitat restoration actions that
31 periodically inundate areas due to tidal action or seasonal flows to increase the bioaccumulation
32 of methylmercury (BDCP 2010a).
- 33 ♦ **Non-native Aquatic Vegetation Control:** Control growth of Brazilian waterweed (*Egeria*
34 *densa*), water hyacinth (*Eichhornia crassipes*), and other nonnative submerged and floating
35 aquatic vegetation in tidal marsh restoration areas by applying existing methods used by the
36 California Department of Boating and Waterways Aquatic Pest Control Program (BDCP 2010a).
- 37 ♦ **Stockton Deep Water Ship Channel Dissolved Oxygen Levels:** Modify the existing DWR
38 aeration facility, if necessary, and continue operations in the Stockton Deep Water Ship Channel
39 (BDCP 2010a).
- 40 ♦ **Predator Control:** Control predators at locations where they occur in high density, including old
41 structures that hang over or enter the water; abandoned vessels; intakes/diversions; specific
42 locations in the San Joaquin River downstream of Old River, and Georgiana, Sutter, and
43 Steamboat sloughs; and release sites for salvaged fish from the CVP and SWP facilities
44 (BDCP 2010a).

- 1 ♦ **Non-Physical Fish Barriers:** Install non-physical barriers to direct the fish away from channels
2 in which survival is lower, including the Head of Old River; the Delta Cross Channel; Georgiana
3 Slough; and possibly Turner Cut, Columbia Cut, the Delta-Mendota Canal intake, and Clifton
4 Court Forebay. Non-physical barriers could include a combination of sound, light, and bubbles
5 (BDCP 2010a).
- 6 ♦ **Hatchery and Genetic Management Plans:** Implement hatchery and genetic management plans
7 to minimize the potential for genetic and ecological impacts of hatchery-reared salmonids on wild
8 salmonid stocks for all State Chinook salmon and steelhead hatcheries in the Central Valley
9 (BDCP 2010a).
- 10 ♦ **Illegal Harvest:** Increase the enforcement of fishing regulations in the Delta and bays to reduce
11 illegal harvest of salmonids and sturgeon by providing funds to hire more staff (BDCP 2010a).
- 12 ♦ **Conservation Hatcheries:** Establish new and expand existing conservation propagation
13 programs for delta smelt and longfin smelt, including support to develop a delta smelt and longfin
14 smelt conservation hatchery by USFWS to house a delta smelt refugial population, expand the
15 refugial population of delta smelt, and establish a refugial population of longfin smelt at the
16 University of California, Davis Fish Conservation and Culture Laboratory (BDCP 2010a).
- 17 ♦ **Ammonia Load Reduction:** Evaluate the need to reduce discharge of ammonia and ammonium
18 from wastewater treatment plants to protect aquatic species (BDCP 2009a).
- 19 ♦ **Endocrine Disrupting Compounds Load Reduction:** Evaluate the need to reduce discharge of
20 endocrine-disrupting compounds from wastewater treatment plants to protect aquatic species
21 (BDCP 2009a).
- 22 ♦ **Pesticides and Herbicides Load Reduction:** Support efforts by the Central Valley Regional
23 Water Quality Control Board (Central Valley RWQCB) to reduce toxics from discharges from
24 agricultural activities (BDCP 2009a).
- 25 ♦ **Toxic Contaminant Load Reduction from Urban Runoff and Stormwater Flows:** Support
26 efforts to reduce toxics from urban runoff and stormwater discharges, including pyrethroids
27 (BDCP 2009a).
- 28 ♦ **Reduce Risk for Future Introduction of Non-Native Aquatic Species from Recreational
29 Watercraft:** Support DFG to conduct recreational watercraft inspections and public outreach
30 (BDCP 2009a).
- 31 ♦ **Rapid Detection and Response to New Introductions of Non-Native Aquatic Species in Delta
32 Waterways:** Support DFG to form a rapid-response team with legal authority to control and
33 eradicate invasive species (BDCP 2009a).
- 34 ♦ **Reduce Risk for Establishment of Zebra and Quagga Mussels in the Delta:** Support
35 continuation and expansion of ongoing Zebra Mussel Rapid Response Plan for California
36 (BDCP 2009a).
- 37 ♦ **Increase Harvest of Nonnative Predatory Fish:** Develop a proposal to DFG, USFWS, and
38 NMFS for a submittal to the California Fish and Game Commission to allow relaxing of size
39 limits and number of fish caught per day for fish that are predators of salmon, and possibly smelt
40 and sturgeon, in the Delta. These fish could include centrarchids, such as large-mouth bass, and
41 striped bass (BDCP 2009a).

- 1 ♦ **Reduce Harvest of Sacramento Splittail:** Develop a proposal to DFG and USFWS for a
2 submittal to the California Fish and Game Commission to conduct evaluations to establish legal
3 limits for Sacramento splittail catch (BDCP 2009a).
- 4 ♦ **Reduce Harvest of Wild Salmon Stock by Establishing a Mark-Select Fishery:** Encourage
5 the California Fish and Game Commission and Pacific Fish Marine Council to implement a
6 “mark-select” fishery program to protect wild fish populations. Under this type of program, fish
7 hatchery personnel remove or clip the adipose fin of fish prior to release. Fishing regulations are
8 modified to require the release of all fish without the marked adipose fin (BDCP 2009a).
- 9 ♦ **Construct Fish Screens or Relocate and/or Consolidate Intakes/Diversions in the Delta:**
10 Support the ongoing Bureau of Reclamation’s Anadromous Fish Screen Program and DFG’s Fish
11 Screen and Passage Program to reduce entrainment risk in the Delta and Delta watershed
12 (BDCP 2009a).
- 13 ♦ **Establish “No-Wake” Zones near Delta Shallow-water Habitat:** Support the Department of
14 Boating and Waterways to establish low-boat-speed regulations near tidal marsh and shallow
15 water habitat along rivers and sloughs (BDCP 2009a).
- 16 ♦ **Toxic Spill Response:** Support and expand DFG Office of Spill Prevention and Response
17 programs (BDCP 2009b).
- 18 ♦ **Blackwater (wastewater) and Ballast Water Hull Fouling Reduction:** Support DFG’s,
19 U.S. Coast Guard’s, and Central Valley RWQCB’s ongoing programs to control discharges from
20 commercial and recreational vessels (BDCP 2009b).
- 21 ♦ **Coordinate with Managers of Seasonal Wetlands to Improve Water Quality of Flows**
22 **Discharged from Wetlands:** Coordinate with Central Valley RWQCB to increase dissolved
23 oxygen concentrations and reduce mercury concentrations in the surface waters adjacent to the
24 managed wetlands (BDCP 2008c).
- 25 ♦ **Fund Ongoing and New Programs:** Support existing and potential programs that would
26 improve water quality and aquatic habitat but may not have adequate funding for full
27 implementation, including (BDCP 2008c) the following:
- 28 • Education and outreach for DFG’s Invasive Species Program
29 • Recreational boaters to be aware of methods to reduce pollutants
30 • Awareness to reduce illegal harvest of fish
31 • Measures for public to appropriately dispose of pharmaceuticals
32 • DFG’s Delta-Bay Enhanced Enforcement Program
33 • Voluntary agricultural chemical management plans
34 • Programs to develop methods to reduce adverse impacts of dredging
35 • Real-time monitoring of contaminants including oil spills
- 36 ♦ **Recommend that Environmental Documentation address Hazard Analysis and Critical**
37 **Control Points Plans:** Support development of Hazard Analysis and Critical Control Points
38 Plans for all environmental documents to reduce the potential for conditions that support
39 nonnative invasive species (BDCP 2008c).

1 23.3.5.2.1 Recent BDCP Proposal

2 According to *Highlights of the BDCP*, the initial focus of the BDCP should be on the following measure
3 to reduce other ecological stressors:

- 4 ♦ Methylmercury management
- 5 ♦ Nonnative aquatic vegetation control
- 6 ♦ Stockton Deep Water Ship Channel dissolved oxygen levels
- 7 ♦ Predator control
- 8 ♦ Non-physical fish barriers
- 9 ♦ Hatchery and genetic management plans
- 10 ♦ Illegal harvest
- 11 ♦ Conservation hatcheries

12 The BDCP participants have agreed that implementation of the measures listed above would improve the
13 ecosystem conditions for covered species. The BDCP process also identified other potential conservation
14 measures that could adversely affect ecosystem conditions for covered species, but the BDCP process has
15 not been able to specifically quantify or define the interactions of the potential stressors with the condition
16 of species and habitat in a manner that would identify specific conservation measures. In early 2010, the
17 BDCP Steering Committee identified these stressors as “important related actions” that should be
18 considered through monitoring and the adaptive management process. These stressors include:

- 19 ♦ Ammonia load reduction
- 20 ♦ Endocrine disrupting compounds load reduction
- 21 ♦ Agricultural pesticides and herbicides runoff reduction
- 22 ♦ Stormwater and urban runoff toxic contaminants reduction
- 23 ♦ Nonnative aquatic organisms introduction risk reduction
- 24 ♦ Nonnative species introduction detection and response improvement
- 25 ♦ Nonnative predatory fish harvest increase
- 26 ♦ Mark-selective fishery implementation
- 27 ♦ Non-Project diversions entrainment reduction

28 ***23.3.5.3 Potential Water Flow and Delta Conveyance Improvements for BDCP***

29 Changes in Delta inflow and outflow patterns and modification of the SWP and CVP intake/diversion
30 facilities were identified in the BDCP process as a conservation measure to reduce stress on the Delta
31 ecosystem. On December 14, 2010, the United States District Court for the Eastern District of California
32 remanded the 2008 biological opinion for the Delta smelt to USFWS for further revisions. On September
33 20, 2011, the same Court remanded the 2009 biological opinion for several salmonid species to NMFS for
34 further revisions.

35 The BDCP process is developing operations criteria to describe flow criteria at specific locations in the
36 Delta, Delta outflow, and diversion patterns for existing and new intakes located within the Delta. These
37 operations criteria would be developed based upon water quality, Delta inflows from all tributaries, Delta
38 outflow, and presence of specific aquatic species in the Delta. In addition to the intake/diversion facilities,
39 the operations criteria also addresses operations of the existing Delta Cross Channel gates, which allow
40 water to be conveyed from the Sacramento River to the San Joaquin River through the southern
41 Mokelumne River system, and the Montezuma Slough Salinity Control Gates in Suisun Marsh, which
42 allow more water to flow from the Delta through Suisun Bay.

1 The following basic Delta conveyance concepts were identified in the BDCP process and other processes:

- 2 ♦ **Through-Delta Conveyance:** Continue to divert water in the southern Delta at existing or
3 modified intakes/diversions for SWP and CVP operations.
- 4 ♦ **Isolated Conveyance:** Divert water from the Sacramento River at new intakes/diversions and
5 convey the water to the existing SWP and CVP pumping plants.
- 6 ♦ **Dual Conveyance:** Combine Through-Delta Conveyance and Isolated Conveyance to allow
7 operational flexibility.

8 Each of these conveyance concepts could be implemented in a variety of ways.

9 23.3.5.3.1 Through-Delta Conveyance Concepts

10 Identified Through-Delta conveyance concepts would involve continued use of the south Delta SWP and
11 CVP intake/diversion facilities:

- 12 ♦ Continued use of SWP and CVP south Delta intakes/diversions with improved fish-handling
13 facilities. This concept could result in changes in construction of the following features:
 - 14 • Modifications to Clifton Court to reduce predator populations and promote fish passage from
15 radial gates to salvage facilities.
 - 16 • Modifications to fish-collection, handling, transport, and release facilities at the Banks and
17 Jones pumping plants fish-salvage facilities.
 - 18 • Operable barriers to reduce fish entrainment and reduce salinity intrusion into the central and
19 south Delta.
 - 20 • Dredging of channels (DWR and Reclamation 2006; BDCP 2007A; Metropolitan 2007;
21 Reclamation 2009; DWR, Reclamation, USFWS, and NMFS 2010).
- 22 ♦ Continued use of SWP and CVP south Delta intakes/diversions with extensive levee
23 modifications (also known as “fortification” or “armoring” of the levees). This concept could
24 result in changes in construction of the following features:
 - 25 • Levee modifications, including setback levees, along critical waterways to convey water from
26 the Sacramento River to the San Joaquin River. One plan depends upon an expansion of the
27 Delta Cross Channel diversion concept and included construction of 115 miles of setback
28 levees along the Mokelumne and Middle rivers corridors.
 - 29 • These plans are focused on protection of the water supply corridors, and therefore, do not
30 involve improving all levees in the Delta. Hence, the water supply corridor would require
31 protection if other Delta levees failed and saltwater intruded into the central Delta. To protect
32 the water supply corridor, operable barriers would be constructed along the Mokelumne and
33 Middle rivers corridors at the cross channels.
 - 34 • Dredging of existing channels. One study estimated dredging would occur along 57 miles of
35 channels.
 - 36 • Some plans diverted water from the Mokelumne River into a tunnel under the San Joaquin
37 River to convey water directly to Middle River (DWR and Reclamation 2006; PPIC 2008;;
38 CALFED 2008; DWR 2007; DWR 2011; Reclamation 2009; DWR, Reclamation, USFWS,
39 and NMFS 2010).

- 1 ♦ Continued use of SWP and CVP south Delta intakes/diversions with salinity gates in the western
2 delta. This concept could result in changes in construction of an operable barrier at Chipps Island
3 with boat locks and fish passage facilities to maintain a fresh water lake in the Delta (PPIC 2008;
4 DWR, Reclamation, USFWS, and NMFS 2010; DWR 1960).
- 5 ♦ Continued use of SWP and CVP south Delta intakes/diversions with isolated fish passage and
6 water supply corridors in the south Delta (also known as “Delta Corridors” or “Separate
7 Corridors”). This concept could result in the following changes:
 - 8 • Expanded use of the Delta Cross Channel gates to convey more water from the Sacramento
9 River to the south Delta SWP and CVP pumping plants. Currently, the Delta Cross Channel
10 gates only are operated during specific periods according to criteria from regulatory agencies
11 to reduce the risk of fish being swept from the Sacramento River into the lower Mokelumne
12 River system and then through Middle River into Clifton Court.
 - 13 • New fish screens with operable gates and boat locks along the Sacramento River at the Delta
14 Cross Channel and Georgiana Slough. Water would be conveyed through the lower
15 Mokelumne River system and across the San Joaquin River to Middle River and to
16 Victoria Canal.
 - 17 • The western end of Victoria Canal would be blocked and water would be conveyed into
18 Clifton Court for continued conveyance to the existing SWP and CVP pumping plants.
 - 19 • Operable barriers would need to be considered on adjacent Snodgrass Slough to reduce risk
20 to salmon migration in the upper Mokelumne River.
 - 21 • Operable barriers would be constructed along cross channels between Old River and Middle
22 River to isolate Middle River for water supply flows and Old River for fish passage.
 - 23 • Operable barriers at the Head of Old River and San Joaquin River would cause the San
24 Joaquin River flows to continue in Old River to facilitate fish passage. A small pumping plant
25 would transfer some water into the existing lower San Joaquin River channel to maintain
26 water quality and facilitate downstream flows in the existing San Joaquin River channel.
 - 27 • Operable barriers also could be constructed along Threemile Slough or Sevenmile Slough to
28 improve fish passage and water quality in the central and south Delta.
 - 29 • Dredging would occur along the channels.
 - 30 • Levee modifications, including setback levees, may be constructed along the water supply
31 corridor (BDCP 2007A; PPIC 2007; JSA 2007; Metropolitan 2007; SDWA and CDWA
32 2007; SDWA 2009; CNRA 2010a; DWR, Reclamation, USFWS, and NMFS 2010; Delta
33 Plan EIR Scoping Comments).

34 23.3.5.3.2 Isolated Delta Conveyance Concepts

35 Identified Isolated Delta conveyance concepts would involve new intakes/diversions constructed along
36 the Sacramento River or its tributaries and an isolated conveyance to convey the water to the existing
37 south Delta SWP and CVP pumping plants:

- 38 ♦ New intakes/diversions along the Sacramento River between Freeport and Walnut Grove with an
39 isolated conveyance to the existing south Delta SWP and CVP pumping plants. This concept
40 could result in construction of the following features:
 - 41 • New intakes along the Sacramento River with fish screens and pumping plants.

- 1 • New canals or pipeline/tunnels to connect the intakes to the new forebay (also known as a
2 surface water reservoir) constructed on existing agricultural land near the existing SWP
3 Clifton Court Forebay. New channels would be constructed to connect the new forebay to the
4 existing SWP and CVP pumping plants.
- 5 • If a pipeline/tunnel is constructed, new surge pipes that rise about 150 to 200 feet could be
6 constructed at some pumping plants.
- 7 • If a pipeline/tunnel is constructed, a new intermediate forebay with a pumping plant would be
8 constructed in the northern Delta to provide temporary storage prior to continued conveyance
9 to the new forebay near Clifton Court Forebay.
- 10 • If a canal is constructed, pipelines/tunnels would be constructed at major crossings of rivers
11 or wetlands, railroads, highways, channels between islands or tracts, or water or natural
12 gas pipelines.
- 13 • If a canal is constructed, bridges and road realignments could be required.
- 14 • New electrical transmission and distribution lines would be constructed to the new pumping
15 plants and possibly along the conveyance corridor if electrical excavators or electrical tunnel
16 machines would be used to construct canals or tunnels, respectively.
- 17 • Abandon existing south Delta SWP and CVP intakes/diversions (BDCP 2007A; Metropolitan
18 2007; PPIC 2008; CALFED 2008; DWR 2007; DWR 2011; CNRA 2010a; DWR,
19 Reclamation, USFWS, and NMFS 2010; Delta Plan EIR Scoping Comments).
- 20 ♦ New intakes/diversions along the Sacramento River between Freeport and Walnut Grove with an
21 isolated conveyance to the San Joaquin River. This concept could result in construction of the
22 following features:
- 23 • Conveyance facilities as described above for an isolated facility with intakes along the
24 Sacramento River between Freeport and Walnut Grove.
- 25 • Conveyance facilities would be constructed only to the San Joaquin River, and the existing
26 south Delta SWP and CVP intakes/diversions would continue to be operated. This concept
27 would provide freshwater from the Sacramento River into the central and south Delta (DWR,
28 Reclamation, USFWS, and NMFS 2010).
- 29 ♦ New intakes/diversions along the Sacramento River between Knights Landing and the Feather
30 River confluence near Fremont Weir with an isolated conveyance to the existing south Delta
31 SWP and CVP pumping plants. This concept could result in construction of the following
32 features:
- 33 • Conveyance facilities as described above for an isolated facility with intakes along the
34 Sacramento River between Freeport and Walnut Grove.
- 35 • Conveyance facilities could be constructed along the western edge of the Sierra Nevada
36 foothills to provide water supplies to other communities in the southern Sacramento Valley or
37 northern San Joaquin Valley (DWR, Reclamation, USFWS, and NMFS 2010).
- 38 ♦ New intakes/diversions along the Sacramento River between Feather River confluence near
39 Fremont Weir and the American River confluence near Sacramento River with an isolated
40 conveyance to the existing south Delta SWP and CVP pumping plants. This concept could result
41 in construction of the following features:

- 1 • Conveyance facilities as described above for an isolated facility with intakes along the
2 Sacramento River between Freeport and Walnut Grove.
- 3 • Conveyance facilities could be constructed along the western edge of the Sierra Nevada
4 foothills to provide water supplies to other communities in the southern Sacramento Valley or
5 northern San Joaquin Valley (DWR, Reclamation, USFWS, and NMFS 2010).
- 6 ♦ New intakes/diversions along the Sacramento River near West Sacramento into the Sacramento
7 Deep Water Ship Channel with an isolated conveyance to the existing south Delta SWP and CVP
8 pumping plants. This concept could result in construction of the following features:
 - 9 • New intakes along the Sacramento River with fish screens and pumping plants.
 - 10 • Modification to the Sacramento Deep Water Ship Channel near the Port of West Sacramento
11 and construction of a boat lock at the southern end of the channel.
 - 12 • New intake/diversion fish screens and a pumping plant along the Sacramento Deep Water
13 Ship Channel near the southern end of the channel.
 - 14 • New tunnel/pipeline to convey water across the western Delta to Contra Costa County near
15 Oakley and a canal from that location to a new forebay near the existing SWP Clifton Court
16 Forebay. New channels would be constructed to connect the new forebay to the existing SWP
17 and CVP pumping plants.
 - 18 • Along the canal, pipelines/tunnels would be constructed at major crossings of rivers or
19 wetlands, railroads, highways, channels between islands or tracts, or water or natural gas
20 pipelines. Bridges and road realignments could be required.
 - 21 • New electrical transmission and distribution lines would be constructed to the new pumping
22 plants and possibly along the conveyance corridor if electrical excavators or electrical tunnel
23 machines would be used to construct canals or tunnels, respectively.
 - 24 • Abandon existing south Delta SWP and CVP intakes/diversions (DWR, Reclamation,
25 USFWS, and NMFS 2010).

26 23.3.5.3.3 Dual Delta Conveyance Concepts

27 Dual Delta conveyance concepts would involve combinations of through-Delta conveyance concepts and
28 isolated Delta conveyance concepts in a manner that would allow flexibility to divert from the north Delta
29 and south Delta to protect aquatic habitat and maintain or enhance freshwater flows in the central and
30 south Delta.

31 23.3.5.3.4 Capacity of Delta Conveyance Concepts

32 Most of the Isolated Delta Conveyance concepts considered capacities up to 15,000 cubic feet per second
33 (cfs) because the existing installed capacities of the SWP and CVP pumping plants are 10,670 and
34 4,600 cfs, respectively, for a total capacity of approximately 15,000 cfs. Currently, the SWP pumping
35 plant operations are restricted to less than 10,670 cfs under existing regulations from federal and State
36 agencies.

37 Numerous comments submitted as part of the BDCP EIR/EIS and Delta Plan EIR scoping processes
38 identified the need to evaluate BDCP conveyance capacities of less than 15,000 cfs. Specifically, the
39 comments suggested concepts for Isolated Delta Conveyance capacities of 1,000 cfs, 3,000 cfs, 4,000 cfs,
40 6,000 cfs, 9,000 cfs, 12,000 cfs, and 15,000 cfs.

1 The scoping comments did not address increasing the capacity of the Through-Delta Conveyance
2 concepts above the current restrictions of 10,670 cfs under existing regulations from federal and State
3 agencies.

4 23.3.5.3.5 Recent BDCP Proposal

5 The BDCP process is currently developing alternatives. The Natural Resources Agency *Highlights of the*
6 *BDCP* (CNRA 2010a) identified an array of alternatives to be considered in the BDCP process, as
7 summarized in Table 23-1, and is continuing to consider additional concepts that may be developed
8 through ongoing workshops. Each alternative would have different assumptions related to constraints of
9 timing and amounts of water that could be diverted from new and existing intakes, Delta outflow or
10 inflow, and salinity concentrations at specific locations in the Delta at specific times. Each alternative
11 would include implementation of measures to reduce other ecological stressors, as described in
12 Subsection 23.3.5.2.1.

13 Several subconcepts for the Isolated Delta Conveyance and the isolated conveyance part of the Dual Delta
14 Conveyance also are being considered by the BDCP:

- 15 ♦ **Eastern Canal with Pipeline/Tunnels at Major Crossings:** The canal is to be evaluated as an
16 unlined earthen canal and a lined earthen canal. The eastern canal could include the following
17 features:
 - 18 • Approximately 5.9 miles of pipelines (each “pipeline” would consist of two parallel 16-foot-
19 inside-diameter pipes) and/or canals to connect the intakes/diversions to the canal.
 - 20 • Approximately 40 miles of canal with 2.1 miles of pipelines/tunnels to cross the Mokelumne
21 and Cosumnes rivers confluence, San Joaquin River, and Old River near Clifton Court
22 Forebay. Eight siphons under Stone Lake Drain; Beaver, Hog, Sycamore, White, and
23 Disappointment sloughs; railway; and Middle River. The canal could require modification of
24 18 bridges and could possibly need to address 150 utility conflicts including a crossing of the
25 East Bay Municipal Utility District Mokelumne Aqueducts.
 - 26 • New 3,000- to 15,000-cfs pumping plant along the canal (capacity would be the same as the
27 intake/diversion capacity).
 - 28 • New 630-acre Byron Tract Forebay located to the south of the existing Clifton Court Forebay
29 and new channels to connect the forebay to the existing SWP and CVP pumping plants
30 (BDCP 2010b, BDCP 2010c).
- 31 ♦ **Western Canal with Pipeline/Tunnels at Major Crossings:** The canal is to be evaluated as an
32 unlined earthen canal and a lined earthen canal and could include the following features:
 - 33 • Approximately 2 miles of pipelines (each “pipeline” with two parallel 16-foot-inside-
34 diameter pipes) and/or canals to connect the intakes/diversions to the canal.
 - 35 • Approximately 38 miles of canal with 17 miles of pipelines/tunnels to cross the western Delta
36 and the San Joaquin River from near Ryer Island to near Hotchkiss Tract. Nine siphons under
37 Elk, Duck, Miner, Rock, and Italian sloughs; railway; Main Canal; Kellogg Creek; and
38 Kendall Creek Overflow. The canal could require modification of 20 bridges and 300 utility
39 conflicts.
 - 40 • New 580-acre Byron Tract Forebay located to the northwest of the existing Clifton Court
41 Forebay and new channels to connect the forebay to the existing SWP and CVP pumping
42 plants (BDCP 2010b, BDCP 2010c).

- 1 ♦ **Pipeline/Tunnel:** The pipeline/tunnel could include the following features:
- 2 • Approximately 1 mile of pipelines (each “pipeline” with two parallel 16-foot-inside-diameter
- 3 pipes) and 5 miles of 29-foot-inside-diameter pipeline/tunnels to connect the
- 4 intakes/diversions to the main pipeline/tunnel or intermediate forebay. Each pumping plant
- 5 may require a surge tower.
- 6 • New 750-acre intermediate forebay in the north Delta near Courtland and with a 3,000- to
- 7 15,000-cfs-capacity pumping plant (capacity would be the same as the intake/diversion
- 8 capacity).
- 9 • Approximately 35 miles of pipelines/tunnels to cross the Delta and the San Joaquin River.
- 10 The pipeline/tunnel could require modification of 70 utility conflicts.
- 11 • New 600-acre Byron Tract Forebay located to the south of the existing Clifton Court Forebay
- 12 and new channels to connect the forebay to the existing SWP and CVP pumping plants
- 13 (BDCP 2010b, CNRA 2011a).

Table 23-1
Potential Array of Alternatives being Considered for the BDCP Effects Analysis Process

Potential Alternative	Habitat Restoration	Conveyance	Capacity of Intakes/Diversions from Sacramento River
No Project Alternative	8,000 acres tidal marsh per biological opinions issued by USFWS and NMFS	Through-Delta Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions.	None
No Action Alternative		Operations continued as under existing conditions.	
Alternative 1	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1)	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Steering Committee Handout, February 11, 2010 without specific fall Delta outflow criteria (known as “Fall X2”).	15,000 cfs Five 3,000-cfs intakes/diversions from Freeport to Courtland; all intakes/diversions upstream of Sutter and Steamboat Sloughs
Alternative 1A	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1)	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Working Draft, March 25, 2011 as attachment to <i>Rationale for Five Agency Proposed Alternative BDCP Initial Project Operations Criteria</i> , May 18, 2011, with Fall X2.	15,000 cfs. Five 3,000-cfs intakes/diversions from Freeport to Courtland; two intakes/diversions downstream of Sutter and Steamboat Sloughs

Table 23-1
Potential Array of Alternatives being Considered for the BDCP Effects Analysis Process

Potential Alternative	Habitat Restoration	Conveyance	Capacity of Intakes/Diversions from Sacramento River
Alternative 2	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1)	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Steering Committee Handout, February 11, 2010 with Fall X2.	6,000 cfs Two 3,000-cfs intakes/diversions from Freeport to Clarksburg
Alternative 2A	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1)	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Working Draft, March 25, 2011 as attachment to <i>Rationale for Five Agency Proposed Alternative BDCP Initial Project Operations Criteria</i> , May 18, 2011, with Fall X2.	9,000 cfs Three 3,000-cfs intakes/diversion from Freeport to Courtland; all intakes/diversions upstream of Sutter and Steamboat Sloughs
Alternative 2B	Up to 25,000 acres of restored and protected habitat (as described for the initial phases in Subsection 23.3.5.1.1)	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Steering Committee Handout, February 11, 2010, with Fall X2, Old and Middle River and San Joaquin River flow criteria as in existing conditions.	3,000 cfs One 3,000 cfs intake/diversion or two 1,500-cfs intakes/diversions from Freeport to Clarksburg
Alternative 3	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1)	Isolated Conveyance Abandon existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Steering Committee Handout, February 11, 2010, with Fall X2 (modified due to no south Delta intakes/diversions).	15,000 cfs Five 3,000-cfs intakes/diversions from Freeport to Courtland; all intakes/diversions upstream of Sutter and Steamboat Sloughs
Alternative 4	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1) plus additional 20 miles of channel margin habitat and 10,000 acres of seasonally inundated floodplain	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations as described in BDCP Steering Committee Handout, February 11, 2010, with Fall X2.	9,000 cfs Three 3,000-cfs intakes/diversions from Freeport to Courtland; two intakes/diversions downstream of Sutter and Steamboat Sloughs

Table 23-1
Potential Array of Alternatives being Considered for the BDCP Effects Analysis Process

Potential Alternative	Habitat Restoration	Conveyance	Capacity of Intakes/Diversions from Sacramento River
Alternative 4A	Up to 113,000 acres of restored and protected habitat (as described in Subsection 23.3.5.1.1)	Dual Conveyance Continued use of existing south Delta SWP and CVP intakes/diversions. Operations to be developed to increase Delta outflow up to 1.5 million acre-feet/year.	9,000 cfs Three 3,000-cfs intakes/diversions from Freeport to Courtland; all intakes/diversions upstream of Sutter and Steamboat Sloughs
Alternative 5	Up to 113,000 acres of restored and protected habitat (generally as described in Subsection 23.3.5.1.1 with changes in the south Delta to accommodate separate water supply and fish passage corridors)	Through-Delta Continued use of existing south Delta SWP and CVP intakes/diversions. Establish Separate Corridor for water supply along Mokelumne and Middle rivers and fish passage along Old River. Operations as described in BDCP Steering Committee Handout, February 11, 2010, with Fall X2.	Up to 15,000-cfs intake/diversion along Sacramento River at Delta Cross Channel and Georgiana Slough

Source: CNRA 2011b, CNRA 2010b

1 23.4 Relationship of BDCP Alternatives to Delta 2 Plan EIR Alternatives

3 The Proposed Project, No Project Alternative, and Alternatives 1A, 1B, 2, and 3 include recom-
4 mendations to complete the BDCP and policies and/or recommendations related to Delta ecosystem
5 restoration, continued use or modification of Delta conveyance, and reductions of other ecosystem
6 stressors, as summarized below.

7 23.4.1 Proposed Project (Fifth Staff Draft Delta Plan)

8 The Proposed Project address concepts similar to BDCP's; specifically, the Proposed Project includes
9 these policies and recommendations:

- 10 ♦ Delta ecosystem restoration (ER P2, ER P3, ER R1, ER R2, ER R3, ER R5, and RR P2)
- 11 ♦ Delta conveyance (ER R8)
- 12 ♦ Reduction of other ecosystem stressors (ER P5, ER R6, ER R7, WQ R6, and WQ R8)
- 13 ♦ Implementation of adaptive management measures for all covered actions (GP 1)

14 The Proposed Project includes policies that would require future ecosystem restoration programs to be
15 consistent with the Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta
16 Ecological Management Zone and the Sacramento and San Joaquin Valley Regions (DFG 2011) with
17 minor alterations (ER P2).

1 The Proposed Project also would require future non-habitat restoration programs located outside of
2 incorporated cities, their spheres of influence, and similar land use planning designations for
3 unincorporated communities to avoid or mitigate adverse impacts that would preclude the opportunity for
4 future habitat restoration in accordance with the draft DFG plan (ER P3).

5 The Proposed Project recommends that initial ecosystem restoration be focused in Cache Slough
6 Complex, Cosumnes River–Mokelumne rivers confluence, Lower San Joaquin River floodplain, Suisun
7 Marsh, and Yolo Bypass (ER R1 and RR P2), and recommends that the Sacramento–San Joaquin Delta
8 Conservancy should develop plans for implementation of large-scale ecosystem restoration (ER R2).

9 The Proposed Project also includes several recommendations to facilitate implementation of ecosystem
10 restoration, including completion of negotiations among USFWS, NMFS, DFG, and water supply
11 agencies regarding a habitat credit agreement for phased development of ecosystem restoration programs
12 (ER R3), and recommendations for completion of negotiations between USFWS and land owners for
13 development of Safe Harbor Agreements (ER R5).

14 The Proposed Project includes four recommendations related to reduction of other ecological stressors,
15 including reduction of non-native invasive species (ER R6); water quality improvements related to
16 reductions in methylmercury, selenium, pesticides, and emerging contaminants (WQ R6 and WQ R8);
17 and collaborative development of recommendations to reduce ecological stressors (ER R7).

18 The Proposed Project recommends that DWR and other agencies complete the BDCP HCP and NCCP
19 consistent with the provisions of the Delta Reform Act by December 31, 2014 (ER R8), and if the HCP
20 and NCCP are not complete by that date, the Council would consider alternative approaches to develop
21 ecosystem restoration and Delta conveyance planning programs.

22 **23.4.2 No Project Alternative**

23 The No Project Alternative would provide for continuation of existing Delta conveyance for the SWP and
24 CVP (as this EIR describes in Section 3, Water Resources); completion of the ongoing ecosystem
25 restoration program at Dutch Slough in the western Delta; and continuation of programs to reduce other
26 ecological stressors, including continuation of ongoing programs for prevention and removal of nonnative
27 invasive species in the Delta such as *Egeria densa*, and completion of fish screens at Rock Slough.

28 The No Project Alternative does not assume other programs that are being evaluated but have not
29 completed final planning (including environmental documentation) or received permits because these
30 programs are not well defined or reasonably foreseeable. Therefore, the No Project Alternative does
31 include projects that are under construction, such as Freeport Regional Water Authority water supply
32 system (including the intake/diversion facility near Freeport). The No Project Alternative does not include
33 projects that are currently being evaluated, such as ecosystem restoration at the Cosumnes-Mokelumne
34 rivers confluence.

35 **23.4.3 Alternative 1A**

36 Alternative 1A includes policies and recommendations that address concepts similar to BDCP's,
37 including Delta ecosystem restoration, Delta conveyance, reduction of other ecosystem stressors, and
38 implementation of adaptive management measures for all covered actions.

39 Alternative 1A includes policies that would require future ecosystem restoration programs to be
40 consistent with the Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta
41 Ecological Management Zone and the Sacramento and San Joaquin Valley Regions (DFG 2011) with
42 minor alterations.

1 Alternative 1A would also require future non-habitat restoration programs located outside of incorporated
2 cities, their spheres of influence, and similar land use planning designations for unincorporated
3 communities to avoid or mitigate adverse impacts that would preclude the opportunity for future habitat
4 restoration in accordance with the Conservation Strategy for Restoration of the Sacramento-San Joaquin
5 Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions (DFG 2011).

6 Alternative 1A recommends that initial ecosystem restoration be focused in Cache Slough Complex,
7 Cosumnes River–Mokelumne rivers confluence, Lower San Joaquin River floodplain, Suisun Marsh, and
8 Yolo Bypass; and that the Sacramento-San Joaquin Delta Conservancy should develop plans for
9 implementation of large-scale ecosystem restoration.

10 Alternative 1A also includes several recommendations to facilitate implementation of ecosystem
11 restoration, including completion of negotiations among USFWS, NMFS, DFG and water supply
12 agencies regarding habitat credit agreements for phased development of ecosystem restoration programs,
13 and makes recommendations for completion of negotiations between USFWS and land owners for
14 development of Safe Harbor Agreements.

15 Alternative 1A includes recommendations related to reduction of other ecological stressors, including
16 reduction of nonnative invasive species; water quality improvements related to reductions in
17 methylmercury, selenium, pesticides, and emerging contaminants; and collaborative development of
18 recommendations to reduce ecological stressors.

19 Alternative 1A recommends that the Council monitor the progress of BDCP and incorporate the final
20 BDCP into the Delta Plan if the BDCP is consistent with the Delta Reform Act, and recommends that the
21 Council, Delta Conservancy, and BDCP proponents coordinate implementation of BDCP. If the BDCP is
22 not completed consistent with the Delta Reform Act, Alternative 1A recommends that Council consider
23 how to proceed with developing ecosystem stressor reduction actions identified in the Delta Plan
24 independently of the BDCP.

25 **23.4.4 Alternative 1B**

26 Alternative 1B includes recommendations that address the concepts similar to BDCP's, including Delta
27 ecosystem restoration, Delta conveyance, reduction of other ecosystem stressors, and implementation of
28 adaptive management measures for all covered actions.

29 Alternative 1B includes recommendations that DFG, USFWS, NMFS, and local interests develop goals,
30 objectives, and performance measures for Delta ecosystem restoration projects with initial ecosystem
31 restoration focused on Prospect Island, Little Holland Tract, and Yolo Ranch in Cache Slough;
32 completion of Dutch Slough in the western Delta; and Tule Red property in the Suisun Marsh. Alternative
33 1B would not include other ecosystem restoration recommendations in the Proposed Project, including
34 ecosystem improvements in Yolo Bypass, other areas of Cache Slough, other areas of Suisun Marsh,
35 Cosumnes and Mokelumne rivers confluence, or the Lower San Joaquin River. Alternative 1B also
36 recommends that the Sacramento-San Joaquin Delta Conservancy should develop prioritization of
37 ecosystem restoration programs. Alternative 1B also includes completion of negotiations between
38 USFWS and land owners for development of Safe Harbor Agreements.

39 Alternative 1B includes recommendations related to reduction of other ecological stressors, including
40 reduction of nonnative invasive species such as *Egeria densa*, removal of striped bass fishing restrictions
41 and bag limits, and water quality improvements related to reductions in nutrients and ammonia.

42 Alternative 1B recommends that DWR and other agencies complete the BDCP HCP and NCCP
43 consistent with the provisions of the Delta Reform Act by December 31, 2014, and recommends that if
44 the HCP and NCCP are not complete by that date, the Council would conduct a public process to develop

1 Delta conveyance planning concepts and the Delta Conservancy would prioritize habitat projects that
2 were suggested by BDCP.

3 **23.4.5 Alternative 2**

4 Alternative 2 includes policies and recommendations that address the concepts similar to BDCP's,
5 including Delta ecosystem restoration, reduction of other ecosystem stressors, and implementation of
6 adaptive management measures for all covered actions.

7 Alternative 2 includes recommendations to not complete the ongoing evaluations by DWR and
8 Reclamation for Surface Water Storage Investigations. Alternative 2 includes recommendations to
9 reestablish Tulare Lake with natural inflows from the Kern, Kings, Kaweah, and Tule rivers to store
10 about 2.5 million acre-feet of water with minimal modifications of existing berms, as proposed by the
11 San Joaquin Valley Leadership Forum. The Tulare Lake Basin Surface Storage Facility also could store
12 water from the San Joaquin River, Friant Kern Canal, or California Aqueduct following construction of
13 conveyance from Tulare Lake to these locations.

14 Alternative 2 includes recommendations that aquatic and terrestrial habitat be developed to complement
15 restoration of Delta flows to support public trust resources, and Delta ecosystem restoration would be
16 developed in cooperation with in-Delta and upstream interests to provide a desirable mix of aquatic
17 habitat restoration and sustainable agriculture. Ecosystem restoration would be developed based upon
18 SMART (Specific, Measurable, Achievable, Relevant to the goal, and Time bound) biological objectives
19 based upon a logic chain approach for a full range of species (not limited to threatened and endangered
20 species) and ecosystem functions.

21 Alternative 2 recommends that initial ecosystem restoration be focused in Cache Slough Complex,
22 Cosumnes River–Mokelumne rivers confluence, Lower San Joaquin River floodplain, Suisun Marsh, and
23 Yolo Bypass; and that the Sacramento-San Joaquin Delta Conservancy should develop plans for
24 implementation of large-scale ecosystem restoration. Alternative 2 also includes a policy that a 1-mile-
25 wide floodplain be established to the east of the Sacramento Deep Water Ship Channel. Alternative 2 also
26 includes several recommendations to facilitate implementation of ecosystem restoration, including
27 completion of negotiations among USFWS, NMFS, DFG, and water supply agencies regarding habitat
28 credit agreements for phased development of ecosystem restoration programs; and for completion of
29 negotiations between USFWS and land owners for development of Safe Harbor Agreements.

30 Alternative 2 includes recommendations related to reduction of other ecological stressors, including
31 reduction of nonnative invasive species; water quality improvements related to reductions in
32 methylmercury, selenium, pesticides, and emerging contaminants; and collaborative development of
33 recommendations to reduce ecological stressors.

34 Alternative 2 includes policies and recommendations to reduce future development and relocate existing
35 development and infrastructure within deep floodplains in the Delta.

36 Alternative 2 recommends that the BDCP focus on decreased physical vulnerability to levees, increased
37 predictability of Delta supplies without increased Delta diversion, and maximum ecosystem protection.
38 Alternative 2 recommends that the BDCP process analyze conveyance facilities that provide a range of
39 conveyance capacities and operational criteria, including operational criteria that would consider local
40 and regional water supplies to reduce reliance on Delta supplies, public trust flow criteria, increased
41 storage capacities for water supply agencies located outside the Delta that use Delta water, and
42 abandonment of existing south Delta SWP and CVP intakes/diversions. Alternative 2 recommends that
43 the SWRCB restrict the maximum total amount of Delta exports, including water contracts, water rights,
44 water delivered to refuges, and water transfers to 3 million acre-feet/year. Alternative 2 also recommends

1 that the SWRCB and/or other regulating agencies prohibit the use of water exported from the Delta for
2 irrigation of drainage-impaired farmlands.

3 **23.4.6 Alternative 3**

4 Alternative 3 includes policies and recommendations that address the concepts similar to BDCP's,
5 including Delta ecosystem restoration, Delta conveyance, reduction of other ecosystem stressors, and
6 implementation of adaptive management measures for all covered actions.

7 Alternative 3 includes recommendations that the initial focus of ecosystem restoration should occur on
8 publicly owned lands not currently being used for productive farmland, and that buffer zones be created
9 between restored lands and agricultural lands. Alternative 3 also includes recommendations that the
10 ecosystem restoration programs be compliant with existing and future local HCP and NCCP plans and not
11 reduce the availability of water supplies for habitat in the Delta that uses Delta farmlands. Alternative 3
12 recommends that initial ecosystem restoration be focused in the Yolo Bypass and Cosumnes River–
13 Mokelumne rivers confluence, and that the Sacramento-San Joaquin Delta Conservancy should develop
14 plans for implementation of large-scale ecosystem restoration. Alternative 3 also includes
15 recommendations for completion of negotiations among USFWS and land owners for development of
16 Safe Harbor Agreements and Good Neighbor Agreements.

17 Alternative 3 includes recommendations related to reduction of other ecological stressors, including
18 reduction of non-native invasive species; water quality improvements related to reductions in
19 methylmercury, selenium, pesticides, and emerging contaminants; and collaborative development of
20 recommendations to reduce ecological stressors.

21 Alternative 3 recommends that DWR and other agencies complete the BDCP HCP and NCCP consistent
22 with the provisions of the Delta Reform Act by December 31, 2014, and recommends that if the HCP and
23 NCCP are not complete by that date, the Council would consider alternative approaches to develop
24 ecosystem and Delta conveyance planning programs to reduce or avoid environmental impacts, including
25 a concept with continued operations of the existing south Delta intakes, an isolated fish passage corridor
26 from the San Joaquin River to the Delta along Old River, and an isolated water passage corridor from the
27 Sacramento River to the SWP and CVP south Delta pumping plants along the southern Mokelumne and
28 Middle rivers.

29 **23.5 BDCP as a Cumulative Project**

30 The BDCP is a separate and distinct program from the Delta Plan with different lead entities, which could
31 cause impacts similar or related to those of the Proposed Project and alternatives. The Proposed Project
32 and the alternatives contain policies and/or recommendations that address some of the issues considered
33 in the BDCP process, as described in Subsection 23.2.2. At this time, the specific details of BDCP have
34 not been defined, and because the BDCP is a voluntary program, there is no mandate to complete the
35 BDCP within a specific schedule or with specific features or operations. However, if the BDCP is
36 approved by DFG in compliance with Water Code section 85320 and approved as a federal HCP, the
37 Council is required to incorporate the BDCP into the Delta Plan (Water Code section 85320(e)).

38 Because the BDCP is still being developed and the Proposed Project and alternatives do not make
39 recommendations for specific BDCP facilities or operations, this EIR considers the BDCP as a
40 cumulative project. The analysis of impacts that could be created as a result of the combination of the
41 Proposed Project or alternatives with implementation of a range of BDCP concepts is presented in
42 Subsection 23.6. The focus of this cumulative impacts analysis is on whether the incremental contribution
43 of the Proposed Project or alternatives to any potentially cumulative impact of the BDCP could be
44 cumulatively considerable and thus significant (CEQA Guidelines section 15065(a)(3)).

23.6 Cumulative Impacts of Implementation of BDCP

As described in Subsection 23.2.2, many BDCP features are also addressed in the Proposed Project and alternatives. However, physical improvements associated with implementation of BDCP ecosystem improvements, reduction of other ecological stressors, and Delta conveyance could result in more extensive construction and operation of the following features than set forth by the Proposed Project and alternatives:

- ◆ Floodplain, riparian habitat (including channel margins), and tidal marsh restoration and enhancement
- ◆ Projects to reduce other stressors, including nonnative invasive species.
- ◆ Intakes/diversions in the Delta
- ◆ Levee maintenance and setback levees in the Delta

BDCP could result in less construction of local and regional water supplies than under the No Project Alternative, and either more or less construction of construction of local and regional water supplies than under the Proposed Project and alternatives, depending upon the capacity of the Delta conveyance facility that is ultimately selected in the BDCP process.

At this time, the final features of the BDCP process are not defined, and the BDCP EIR/EIS is not complete. Therefore, it is not possible to fully predict the cumulative impacts of the BDCP in combination with implementation of the Delta Plan. This subsection describes potential cumulative impacts that could occur as a result of implementation of the BDCP concepts identified in the scoping process for this EIR, the BDCP process, and other processes described above. The cumulative impacts described below are similar in nature to those described in Section 22, Cumulative Impact Assessment, and it is anticipated that mitigation measures described in Section 22 also may be considered for the BDCP process.

As stated in Section 22, the BDCP is one of the cumulative projects this EIR considers. The BDCP's potentially significant cumulative impacts are described below.

23.6.1 Water Resources

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could increase the extent of degraded water quality during construction as a consequence of increased sedimentation and siltation during construction in surface waters. Construction within the Delta also could lead to potential release of hazardous materials during construction (e.g., gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, paint thinner) or the disruption of hazardous materials by disturbance (e.g., dredging).

Physical improvements associated with BDCP-related operation of ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could change water quality in some portions of the Delta by increasing the extent and duration of time for fresh water or saline water. For example, expansion of tidal marsh areas in the western Delta or Suisun Marsh could expand areas with brackish or saline water in those areas. Another example would involve increased Delta outflow in accordance with Fall X2 provisions would extend the period of time that fresh water conditions would occur in the western Delta during fall months. Changes in Through-Delta

1 conveyance also could change water quality in the central and south Delta if barriers were used along the
2 San Joaquin River to convey most of the San Joaquin River flows through Old River instead of the
3 existing San Joaquin River channel.

4 Physical improvements associated with BDCP-related operation of ecosystem restoration and
5 enhancement and Delta conveyance, in addition to the Delta Plan, could change groundwater supplies or
6 recharge potential. Construction of ecosystem restoration and enhancement could change groundwater
7 flow patterns near the projects because groundwater recharge could be more likely on inundated lands
8 than the existing islands or tracts. Construction of canals could change groundwater flow patterns near the
9 projects because the canal bottoms could be constructed below the groundwater level and canal
10 construction could include impermeable barriers to reduce seepage into the canal. These impermeable
11 barriers could reduce the natural groundwater flow across the canal corridor and thereby reduce
12 groundwater recharge in adjacent areas. If the canals do not include impermeable barriers, groundwater
13 could seep into the canals, thereby reducing groundwater elevations to near wells. If groundwater seeps
14 out of the canals, groundwater could rise on adjacent lands, which could cause crop damage if the
15 groundwater entered the root zone. Construction of canals and pipelines also could change groundwater
16 flow patterns as a consequence of groundwater pumping during construction dewatering activities.

17 **23.6.2 Biological Resources**

18 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
19 of other stressors, and Delta conveyance, in addition to the Delta Plan, could impact sensitive natural
20 communities (e.g., wetlands and riparian habitat), special-status species, or the habitat of common fish
21 and wildlife species (ecosystem restoration projects only). Impacts could occur as a result of many
22 different processes, including ground disturbance, construction of facilities in areas that provide habitat,
23 or indirect effects (e.g., dust, noise) during construction, changes in instream flow or water quality
24 conditions, and conversion of existing land uses and habitats into restored and enhanced ecosystems.

25 Physical improvements associated with BDCP-related ecosystem restoration and enhancement and large
26 Delta conveyance facilities (including canals, forebays, and intakes/diversions), in addition to the Delta
27 Plan, could potentially increase interference with the movement of any native resident or migratory fish or
28 wildlife species or with established native resident or migratory wildlife corridors. For example, canal
29 construction at streams could interfere with migratory patterns of the giant garter snake (BDCP 2010b).

30 Physical improvements associated with BDCP-related ecosystem restoration and enhancement and large
31 Delta conveyance facilities (including canals and forebays), in addition to the Delta Plan, could
32 potentially conflict with local requirements protecting biological resources or the provisions of adopted
33 habitat conservation or protection plans if they are constructed in areas covered by these plans. For
34 example, if the BDCP process acquires an area for tidal marsh restoration, and an established HCP or
35 NCCP identifies the same area for grassland or row/field crop habitat types, there could be a conflict
36 unless the HCP or NCCP entity previously acquired the land or similar agreements with the land owner.
37 The geographic scope of this potential conflict would be limited to areas with approved plans for
38 biological resources protection, such as areas considered under the Eastern Contra Costa County and
39 San Joaquin County HCP and NCCP or other approved habitat protection areas.

40 **23.6.3 Delta Flood Risk**

41 The BDCP would not make any direct contribution to placing occupied structures within flood and other
42 hazard areas because BDCP would not involve construction of housing or other urban development.

43 Physical improvements associated with BDCP-related ecosystem restoration and enhancement and Delta
44 conveyance, in addition to the Delta Plan, are not likely to expose people or structures to flood hazards as
45 a consequence of construction within or adjacent to existing levees; this is because the design of levee

1 modifications for floodplain, riparian habitat (including channel margins), and tidal marsh restoration and
2 enhancement, siphons, and intakes/diversions would be required by federal and State law to be completed
3 in accordance with the requirements and or guidelines of the U.S. Army Corps of Engineers (USACE),
4 Federal Emergency Management Agency, Central Valley Flood Protection Board, DWR, and local flood
5 management agencies.

6 Physical improvements associated with BDCP-related operation of Delta conveyance, in addition to the
7 Delta Plan, are not likely to change surface water drainage patterns because the design of canals can be
8 assumed to be completed in accordance with the requirements of USACE, DWR, Central Valley Flood
9 Protection Board, and local flood management agencies to collect and convey surface water flows on
10 either side of the canal. Current studies prepared by BDCP indicated that canal facilities would be
11 enclosed in siphons or pipelines/tunnels under major streams, sloughs, and rivers to avoid changing
12 drainage patterns at these areas.

13 Physical improvements associated with BDCP-related operation of Delta conveyance forebays, in
14 addition to the Delta Plan, are not likely to expose people or structures to flood hazards near the forebays
15 because the design of the facilities would be required by federal and State law to be completed in
16 accordance with the requirements of USACE, DWR, Central Valley Flood Protection Board, and local
17 flood management agencies to include emergency spillways to convey water into the adjacent rivers.

18 **23.6.4 Land Use and Planning**

19 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
20 of other stressors, and Delta conveyance, in addition to the Delta Plan, could cause a long-term and
21 permanent disruption of local development patterns, including disruption as a consequence of road
22 closures or rerouting. Short-term disruptions could occur from construction activities that cut off
23 roadways and bridge access, thereby isolating communities during construction, but would not create
24 significant land use impacts because they would be temporary. Cumulative construction traffic impacts
25 are discussed in Subsection 23.4.17, below. Project features that could divide communities include levee
26 modifications (e.g., breaches for ecosystem restoration) and large Delta conveyance facilities (e.g., canals
27 and forebays).

28 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
29 of other stressors, and Delta conveyance, in addition to the Delta Plan, could potentially conflict with land
30 use plans adopted for the purpose of mitigating or avoiding an environmental impact if the projects are
31 developed in locations where they would conflict with protected resources or be incompatible with
32 existing land uses (e.g., on agricultural land or placing noise-producing facilities near homes) based on
33 the applicable land use plans, policies, or regulations (e.g., zoning code). In addition, operation of these
34 projects could create land use conflicts if they are incompatible with adjacent uses.

35 **23.6.5 Agriculture and Forestry Resources**

36 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
37 of other stressors, and Delta conveyance, in addition to the Delta Plan, could involve the conversion of
38 farmland to accommodate ecosystem restoration or enhancement or Delta conveyance, and could conflict
39 with existing agricultural zoning and Williamson Act contracts. These effects could be temporary
40 (e.g., spoils storage, soil compaction from heavy equipment, pipeline construction), which would not be a
41 significant impact, or permanent.

42 Physical improvements associated with BDCP-related construction of Delta conveyance, in addition to
43 the Delta Plan, could cause conversion of oak woodland forestlands but would not conflict with existing
44 Timberland Production Zones.

23.6.6 Visual Resources

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, would introduce new physical features into the existing landscape, which could degrade visual quality, affect scenic vistas and scenic resources, and introduce new sources of light and glare. Project features that could substantially alter existing rural landscapes with high visual quality could include expansion of floodplains and riparian habitat, intakes/diversions, pumping plants (including surge towers), forebays, canals, siphons, new bridges, and levee modifications. These effects could be temporary (e.g., stockpiling of dredge spoils) or permanent (e.g., restoring agricultural fields to wetlands, which would change the agrarian character of some Delta areas; new buildings; security lights for new facilities; large earthen structures at canals and forebays).

23.6.7 Air Quality

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could conflict with adopted air quality plans (e.g., State Implementation Plan, Air Quality Management Plan) or substantially contribute to an air quality violation. These impacts could occur during construction – primarily from construction equipment emissions – or during project operations. Construction-related emissions for projects would arise from a variety of activities, including: (1) generation of fugitive dust by equipment used for grading, excavation, building temporary construction roads, and other earth-moving activities; (2) fugitive dust from travel by construction equipment, haul trucks, and worker vehicles on paved and unpaved surfaces; (3) fugitive dust from creating borrow sites and from storing and handling materials; and (4) exhaust from fuel combustion in construction equipment, trucks, and worker vehicles. These conditions could be created by construction and operation of any type of project, especially projects with large footprints of disturbance. Operation-phase emissions could occur from fuel consumption (e.g., from maintenance activities) and from treatment processes (e.g., chemical feeds). These impacts could be reduced with use of electrical construction equipment, such as electrical excavators, tunnel drilling equipment, and barges.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in exposure of sensitive receptors to objectionable odors during operations. Various types of projects may generate odors from sources such as algal growth at wetlands and anaerobic digestion of solids at wetlands or pumping plants sedimentation basins (due to ammonia and hydrogen sulfide emissions).

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could expose sensitive receptors to substantial pollutant concentrations (e.g., carbon monoxide, toxic air contaminants). These impacts are most likely to occur during construction, primarily as a consequence of exhaust from construction equipment, trucks, and worker vehicles.

23.6.8 Cultural Resources

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in disturbance or destruction of prehistoric or historic archaeological resources; historic buildings, structures, and linear features; and unrecorded human remains. Construction projects also could result in the alteration or removal of character-defining features of a cultural landscape.

23.6.9 Geology and Soils

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, is unlikely to expose people or structures to seismic hazards including fault rupture and strong ground motion. Project features with the greatest risk of loss, injury, or death are levee modifications, canals, and forebays. These structures and their foundations would be required to be designed in accordance with federal and state seismic safety requirements to reduce this risk.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, are unlikely to expose people or structures to unstable geological conditions including unstable geology (e.g., loss of bearing value, lateral spreading, subsidence, liquefaction, collapse), expansive soils, landslides, and high-organic-matter soils. Projects located in sites with these geological constraints may experience greater hazardous conditions during construction and greater risk of structural damage to complete projects. Project features with the greatest risk of loss, injury, or death include levee modifications, large structures (e.g., pumping plants), canals, and forebays. These structures and their foundations would be required to be designed in accordance with federal and state seismic safety requirements to reduce this risk.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, are unlikely to expose people or structures to expansive soils. Projects located in sites with expansive soils may experience greater hazardous conditions during construction and greater risk of structural damage to complete projects. Project features with the greatest risk include levee modifications, large structures (e.g., pumping plants), canals, and forebays. These structures and their foundations would be required to be designed in accordance with federal and state seismic safety requirements to reduce this risk.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in a loss of topsoil associated with ground disturbance during construction with resulting erosion and sedimentation impacts. Construction of levees for ecosystem restoration and enhancement and Delta conveyance, canals, and forebays could require extensive amounts of soils to construct these features.

Physical improvements associated with BDCP-related Delta conveyance, in addition to the Delta Plan, could result in a loss of topsoil associated with placement of soil excavated from construction sites and dredge spoils with resulting erosion or loss of permeability unless materials are placed in a manner that incorporates the materials and the topsoil.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could require locating facilities in remote areas without access to municipal wastewater systems. In these cases, onsite septic systems would be required to be designed in accordance with state and local environmental health requirements. If the soils are unable to support onsite septic systems, the facilities may be required to collect and haul waste products to a wastewater treatment plant.

23.6.10 Paleontological Resources

Physical improvements associated with BDCP-related Delta conveyance, in addition to the Delta Plan, could result in destruction of paleontological resources. These conditions could be created by construction of pumping plants, pipelines/tunnels, and forebays at depths below currently disturbed soils in geological formations that include paleontological resources.

1 **23.6.11 Mineral Resources**

2 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
3 of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in a loss of access to
4 known mineral resources, including sites delineated in local plans throughout the Delta for natural gas
5 wellfields.

6 **23.6.12 Hazards and Hazardous Materials**

7 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
8 of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in exposure of the
9 environment and sensitive receptors to hazardous materials such as gasoline, diesel fuel, motor oil,
10 hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. This
11 includes the potential release of existing onsite hazardous materials that are disrupted or uncovered during
12 construction.

13 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
14 of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in new areas of
15 standing water at wetlands that could increase the potential creation of mosquito breeding habitat unless
16 features are designed and maintained in accordance with requirements and guidelines of the local vector
17 control agencies.

18 **23.6.13 Noise**

19 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
20 of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in exposure of
21 sensitive receptors to excessive temporary, short-term construction noise. Projects with considerable
22 heavy equipment use near residences or similar receptors, or that require a large number of vehicle trips
23 (e.g., to haul materials), are likely to have the greatest construction noise impacts. These types of projects
24 include large ecosystem restoration projects in addition to ecosystem restoration projects identified in the
25 Delta Plan and Delta conveyance projects.

26 Physical improvements associated with BDCP-related Delta conveyance, in addition to the Delta Plan,
27 could result in temporary and short-term exposure of sensitive receptors to excessive groundborne
28 vibrations. Projects that may induce substantial groundborne vibration during construction are those with
29 considerable heavy equipment use (especially pile-driving and vibratory equipment) near fragile historic
30 structures, vibration-sensitive equipment (e.g., some medical and manufacturing businesses), or
31 residences.

32 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
33 of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in the long-term
34 exposure of sensitive receptors to excessive noise from operations. Facilities that treat water to reduce
35 other stressors and pumping plants at the intakes/diversions and forebays of the Delta conveyance are
36 likely to have the greatest operational noise impacts.

37 **23.6.14 Population and Housing**

38 Physical improvements associated with BDCP-related ecosystem restoration and enhancement and Delta
39 conveyance, in addition to the Delta Plan, could displace housing and/or people, which would necessitate
40 the construction of replacement housing elsewhere. This type of impact related to BDCP activities would
41 occur in agricultural and rural areas and not affect large numbers of homes that could not be
42 accommodated within the Delta area.

23.6.15 Public Services

Physical improvements associated with operation of BDCP-related ecosystem restoration and enhancement features, in addition to the Delta Plan, could place additional demands on public services, such as police, fire, and ambulance service, by increasing potential need for these services in remote areas of the Delta counties to serve the needs of additional visitors to the restored ecosystem areas.

23.6.16 Recreation

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could impair, degrade, or eliminate recreational facilities and activities and conflict with adopted recreation plans and policies in the following ways:

- ◆ Ecosystem restoration and enhancement programs could eliminate levees that currently support marinas.
- ◆ Ecosystem restoration and enhancement programs could inundate shoreline trails, launching ramps, and use areas (e.g., docks, tie-ups).
- ◆ Ecosystem restoration and enhancement programs could change existing freshwater marshes to saline tidal marsh, which would reduce freshwater waterfowl habitat and associated hunting opportunities.
- ◆ Increased harvest of nonnative predatory fish, including striped bass and largemouth bass, could initially increase recreational opportunities for bass fishing but reduce those opportunities over the long term.

These types of impacts may require recreational users to travel longer distances to other recreation sites or continue recreation in modified areas with different recreational opportunities.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, in addition to the Delta Plan, could place additional demands on recreation facilities, which could lead to demands that are greater than capacities of boat launches and parking lots used by recreationists in the ecosystem restoration areas.

23.6.17 Transportation, Traffic, and Circulation

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could conflict with adopted plans and policies for roadway performance, bicycle and pedestrian paths and trails, and transit performance. These impacts could occur by blocking access or otherwise interfering with established routes, increasing traffic congestion (e.g., from construction vehicles), or by damaging road surfaces during construction, and most likely would be temporary in nature. Current studies prepared by BDCP indicated that canal facilities would be enclosed in siphons or pipelines/tunnels to be routed underneath railroads and major highways, and bridges would be constructed over local roadways disrupted by the canal facilities to avoid long-term disruption of transportation.

Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction of other stressors, and Delta conveyance, in addition to the Delta Plan, could conflict with adopted plans and policies for navigation, ports, waterways, and ferries. These impacts could occur by reducing the width of rivers or sloughs through construction of cofferdams or use of floating dredging equipment and barges during construction and most likely would be temporary in nature. Operable barriers, intakes/diversion structures with protective navigation buoys, and shallow tidal marshes within ecosystem

1 restoration and enhancement areas would be designed to maintain navigation in the main river and slough
2 channels, although transit times could be delayed due to the need to operate boat locks or reduce boat
3 speeds in the rivers and sloughs. These changes could result in longer emergency access times along
4 established boat access routes.

5 **23.6.18 Utilities and Service Systems**

6 Physical improvements associated with BDCP-related ecosystem restoration and enhancement could
7 place additional demands on municipal wastewater system through disposal of wastes from new portable
8 restrooms at construction sites or at new park areas at ecosystem restoration and enhancement locations.

9 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
10 of other stressors, and Delta conveyance, in addition to the Delta Plan, could place additional demands on
11 solid waste services through disposal of demolition debris, sediment collected at intakes/diversions and
12 pumping plants, and dredge spoils.

13 **23.6.19 Climate Change and Greenhouse Gas Emissions**

14 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
15 of other stressors, and Delta conveyance, in addition to the Delta Plan, could result in an increase in
16 greenhouse gas emissions. Greenhouse gas emissions are primarily generated during construction
17 activities as a consequence of considerable use of heavy equipment and construction vehicle trips (e.g., to
18 haul materials). Every project that includes a physical disturbance has the potential for a substantial
19 increase in greenhouse gas emissions with the impact proportionate to the size of the construction activity.
20 Some projects could result in additional greenhouse gas emissions during operations. Operation-phase
21 greenhouse gas impacts could occur from fuel consumption, carbon emissions from oxidation of
22 disturbed soils (such as during agricultural cultivation), and indirectly as a result of increased electricity
23 use (e.g., pumping plants).

24 Physical improvements associated with BDCP-related ecosystem restoration and enhancement, reduction
25 of other stressors, and Delta conveyance, in addition to the Delta Plan, could conflict with applicable
26 plans, policies, and regulations adopted for the purpose of reducing greenhouse gas emissions unless
27 specific measures were implemented to reduce greenhouse gas emissions, such as the use of electrical
28 excavators, tunnel drilling equipment, and barges.

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