Chapter 6
Plan Implementation

Contents

Tables

Figures

All figures appear at the end of the chapter.

Acronyms and Abbreviations

BDCP	Bay Delta Conservation Plan
BiOp	biological opinion
CalEPA	California Environmental Protection Agency
CALFED	California Bay-Delta Authority
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CVP	Central Valley Project
CWA	Clean Water Act
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
ERP	Ecosystem Restoration Program
ESA	federal Endangered Species Act
Fish & Game Code	California Fish and Game Code
FR	*Federal Register*
HCP	habitat conservation plan
MOA	Memorandum of Agreement
MLLW	mean lower low water
NCCPA	Natural Community Conservation Planning Act
NCCP	Natural Community Conservation Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
OCAP	Operational Criteria and Plan
RCRA	Resource Conservation and Recovery Act
Reclamation	Bureau of Reclamation
ROA	Restoration Opportunity Area
SARA	Superfund Amendments and Reauthorization Act
SFCWA	State and Federal Contractors Water Agency
State Water Board	State Water Resources Control Board
SWP	State Water Project
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service

Chapter 6
Plan Implementation

To effectively achieve the overall goals of ecosystem restoration and restored water supply and reliability, the Bay Delta Conservation Plan (BDCP or the Plan) sets out a conservation strategy that will be implemented over the 50-year permit duration. This chapter identifies the key issues related to plan implementation and describes the approaches that will be used to address those issues. This chapter establishes a schedule for the implementation of the conservation measures, which will guide the timing and sequencing of measures to enhance opportunities to advance the biological goals and objectives. It further describes requirements for planning, annual workplans and budgets, monitoring, compliance reporting, and scientific review to ensure transparency in decisions that lead to refinements in the manner in which the BDCP is implemented.

The chapter describes the regulatory assurances under the federal Endangered Species Act (ESA) and the Natural Community Conservation Planning Act (NCCPA) that will be provided to the Authorized Entities. It also describes the commitment of the Authorized Entities to respond to foreseeable changes in circumstances that may adversely affect covered species and habitats, and identifies a process by which changes that are not foreseeable can be addressed. The chapter identifies the circumstances under which regulatory authorizations may be suspended or revoked. See Chapter 3, *Conservation Strategy*, for a full description of the conservation measures. See Chapter 7, *Implementation Structure*, for a description of the BDCP implementation structure and decision-making process. Finally, see Chapter 8, *Implementation Costs and Funding Sources*, which sets out the assurances of funding for the BDCP.

6.1 Implementation Schedule

The implementation of the conservation measures will be guided by the schedules in Table 6-1 and Table 6-2. Table 6-1 provides the schedule for conservation measures that address water operations and other stressors, and Table 6-2 shows the implementation schedule for natural community preservation and restoration. The schedules were developed to meet the following goals.

- Ensure that key implementation actions occur early in the permit term to offset expected effects of covered activities and meet the NCCPA requirement for rough proportionality of effects and conservation.
- Ensure that implementation actions occur by the implementation deadlines established in Chapter 3, *Conservation Strategy*.
- Ensure that implementation actions occur on a feasible schedule and allow adequate time for landowner negotiation for acquisition, project planning, permitting, funding, design, and construction.
- Group the related implementation actions or covered activities together or in the proper sequence (e.g., implementing riparian restoration and channel margin enhancement together).
- Require natural community protection and restoration to occur in almost every time period to ensure that progress is always being made toward the total conservation requirement in year 40.

The schedule for natural community restoration (Table 6-1) establishes milestones defined by when restoration construction is completed, not the time at which a restoration site must meet its performance criteria because it will take years or even decades for restored natural communities to be fully functioning biologically. The cumulative outcomes of implementing BDCP natural community protection and restoration conservation measures under this implementation schedule are depicted in Figure 6-1.

The implementation schedule represents a reasonable estimate of the temporal sequence for implementation of the various interdependent implementation actions over the term of the BDCP (an implementation action is an action undertaken to support achievement of one or more biological objectives; implementation actions are components of conservation measures, but are usually limited in scope compared to the conservation measures). The BDCP is a large and complex plan and, to ensure successful implementation, the Implementation Office will need to retain a degree of flexibility to adjust the implementation schedule to best ensure that the biological goals and objectives are achieved. In addition, the timing of funding available from public sources for actions that conserve the species in the Plan Area (not mitigation), may dictate the timing of some implementation actions (Chapter 8, *Implementation Costs and Funding Sources*). Consequently, the actual timing of implementation of some implementation actions may vary from the implementation schedules in Table 6-1 and Table 6-2.

6.1.1 Performing Implementation Actions

As described in Chapter 3, *Conservation Strategy*, some conservation measures can be implemented soon after issuance of regulatory authorizations under the ESA and the NCCPA because they require minimal or no additional regulatory compliance (e.g., *CM1 Water Facilities and Operation*, *CM8 Grassland Natural Community Restoration, CM14 Stockton Deep Water Ship Channel Dissolved Oxygen Levels, CM17 Illegal Harvest Reduction, CM19 Urban Stormwater Treatment*). Implementation of these conservation measures can occur early in the permit term because, although additional planning is needed, they do not require additional review under the California Environmental Quality Act (CEQA) or National Environmental Policy Act (NEPA). Moreover, all of the "other stressors" conservation measures (*CM2 Yolo Bypass Fisheries Enhancement, CM13 Invasive Aquatic Vegetation Control, CM14 Stockton Deep Water Ship Channel Dissolved Oxygen Levels, CM15 Localized Reduction of Predatory Fishes, CM16 Nonphysical Fish Barriers, CM17 Illegal Harvest Reduction, CM18 Conservation Hatcheries, CM19 Urban Stormwater Treatment, CM20 Recreational Users Invasive Species Program,* and *CM21 Nonproject Diversions*) can begin implementation early and thus can be expected to yield benefits relatively early in the term of the Plan. However, most of the implementation actions will require additional planning and regulatory authorizations before they can be implemented. An overview of the general steps involved in implementing each conservation measure is provided below according to the following four elements.

- Property acquisition
- Planning and design
- Regulatory compliance
- Implementation activities

These elements are expected to be implemented concurrently. All are taken into account in the implementation schedules for each conservation measure (Table 6-1 and Table 6-2)

Table 6-1. Implementation Schedule for Water Facilities and Other Stressors Conservation Measures

Conservation Measure	Implementation[a] Estimated to Start	Explanation
CM1 Water Facilities and Operations	year 2	• Construction of the new north Delta diversion and conveyance facilities will begin approximately 2 years after permit issuance and continue for an estimated 9 to 10 years. • Operations could begin as early as year 11.
CM2 Yolo Bypass Fisheries Enhancement	year 10	• Because of the complexity of the projects planned, implementation will be phased (see CM2 in Chapter 3, *Conservation Strategy*, for a schedule). • Planning, design, environmental compliance, permitting, and construction for fish passage facilities will likely be completed first, by year 10. • Several years of study and adaptive management of fish passage facilities will be needed before more complex seasonally inundate floodplain restoration can occur. • Modifications to Fremont Weir, Lisbon Weir, Sacramento Weir, lower Putah Creek Channel, and related projects will be initiated by year 11 and operations by year 13.
CM13 Invasive Aquatic Vegetation Control	year 2	• Aquatic vegetation control will occur by year 2 to control the spread of Brazilian waterweed (*Egeria densa*) and other invasive species such as spongeplant. • Control will occur in tidal wetland restoration sites as they are implemented and as needed.
CM14 Stockton Deep Water Ship Channel Dissolved Oxygen Levels	year 1	• Continued funding for the current Stockton Deep Water Ship Channel dissolved oxygen diffuser demonstration project will be made available within 1 year of BDCP permit issuance.
CM15 Reduction of Predatory Fishes	year 3	• Approximately 2 years of planning, prioritization, and environmental compliance will be needed to determine most effective sites and techniques for predator removal actions. • Predator reduction efforts will begin by year 3 and continue throughout the permit term.
CM16 Nonphysical Fish Barriers	year 4	• The existing barrier at the head of Old River will continue as a pilot project. • Planning, environmental compliance, and installation of barriers at the Delta Cross Channel and Georgiana Slough are expected to take 3 years. • Timelines for subsequent barriers, if needed, are expected to be similar although planning and permitting times may be reduced.
CM17 Illegal Harvest Reduction	year 3	• Expansion of the California Department of Fish and Game Delta-Bay Enhanced Enforcement Program requires time to hire appropriate staff and purchase new vehicles and equipment. Enforcement actions under this conservation measure are expected to begin in year 3 of Plan implementation.

Conservation Measure	Implementation[a] Estimated to Start	Explanation
CM18 Conservation Hatcheries	years 4 and 7	• Planning, design, and construction of the expansion of the existing University of California, Davis conservation hatchery is expected to take 3 years, allowing operation by year 4. • Property acquisition, planning, and environmental compliance of the new California Department of Fish and Game hatchery are expected to take 3 years. Design, construction, and facility staffing is expected to take another 3 years.
CM19 Urban Stormwater Treatment	year 3	• Interagency agreements and program development are expected to take 2 years, with the program becoming operational in year 3 of Plan implementation. Individual actions under the program are expected to take approximately 5 years each to fund, design, permit, and construct.
CM20 Recreational Users Invasive Species Program	year 1	• Because this measure provides funding to support existing actions, implementation will begin in year 1 of Plan implementation, although full program development will likely take approximately 3 years.
CM21 Nonproject Diversions	year 3	• Interagency agreements and program development are expected to take 2 years, with the program becoming operational in year 3 of Plan implementation. Individual actions under the program are expected to take approximately 4 to 8 years each to design, permit, and construct.

Notes:

[a] Implementation is defined as the completion of construction and beginning of operations to benefit covered species, natural communities, and ecosystems.

Table 6-2. Implementation Schedule for Natural Community Protection and Restoration Conservation Measures

Conservation Measure	Total Requirement (acres)	Minimum Amount of Acquisition or Restoration by 5-Year Time Periods[a]									
		Near-Term (acres)		Early Long-Term (acres)	Late Long-Term (acres)						
		1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50
BDCP Reserve System											
CM3 Natural Communities Protection and Restoration											
Valley/foothill riparian	750		750								
Vernal pool complex	600	200	200	200							
Alkali seasonal wetland complex	150		120	5	5	5	5	5	5		
Grassland	8,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000		
Managed wetland [b]	1,500	500	1,000								
Managed wetland (natural community)[c]	5,000	850	850	600	550	550	550	550	500		
Cultivated lands (non-rice)	45,405	7,300	7,300	6,300	4,905	4,900	4,900	4,900	4,900		
Cultivated lands (rice)[d]	1,500	150	150	200	200	200	200	200	200		
Nontidal marsh[e]	50	10	15	5	5	5	5	5			
Total Acquisition	**62,955**	**10,010**	**11,385**	**8,310**	**6,665**	**6,660**	**6,660**	**6,660**	**6,605**		
CM4 Tidal Natural Communities Restoration											
Tidal brackish emergent wetland	3,000	500	500	1,025	175	200	200	200	200		
Tidal freshwater emergent wetland	13,900	2,600	2,600	2,600	1,300	1,200	1,200	1,200	1,200		
Tidal perennial aquatic (below MLLW)	10,000	1,250	1,250	1,250	1,250	1,250	1,250	1,250	1,250		
Tidal wetland of any type	28,100	3,300	3,300	3,300	3,600	3,700	3,700	3,600	3,600		
Adjacent upland[f]	10,000	500	500	1,500	1,500	1,500	1,500	1,500	1,500		
Subtotal: Tidal wetland restoration[g]	**65,000**	**8,150**	**8,150**	**9,675**	**7,825**	**7,850**	**7,850**	**7,750**	**7,750**		
CM5 Seasonally Inundated Floodplain Restoration	**10,000**			**1,000**	**1,800**	**1,800**	**1,800**	**1,800**	**1,800**		
CM6 Channel Margin Enhancement (miles)	**20**		**5**		**5**	**5**	**5**				
CM7 Riparian Natural Community Restoration	**5,000**	**400**	**400**	**300**	**750**	**750**	**750**	**800**	**850**		
CM8 Grassland Natural Community Restoration	**2,000**	**570**	**570**	**340**	**100**	**100**	**100**	**100**	**120**		

Conservation Measure	Total Requirement (acres)	Minimum Amount of Acquisition or Restoration by 5-Year Time Periods[a]									
		Near-Term (acres)		Early Long-Term (acres)	Late Long-Term (acres)						
		1 to 5	6 to 10	11 to 15	16 to 20	21 to 25	26 to 30	31 to 35	36 to 40	41 to 45	46 to 50
CM9 Vernal Pool and Alkali Seasonal Wetland Complex Restoration[h]											
Vernal pool complex	67	20	20	27							
Alkali seasonal wetland	72	29	29	5	5	4					
CM10 Nontidal Marsh Restoration[e]											
Nontidal marsh restoration	1,200	200	200	100	100	150	150	150	150		
Managed wetland	320	160	160								
Total Restoration[i]	**83,659**	**9,529**	**9,529**	**11,447**	**10,580**	**10,654**	**10,650**	**10,600**	**10,670**		
Total Acquisition and Restoration	**146,614**	**27,689**	**29,064**	**29,432**	**25,070**	**25,164**	**25,160**	**25,010**	**25,025**		

Notes:

[a] See text for the rationale for the requirements by time period. In some cases, acquisition or restoration within a time period may be greater than shown in order to stay ahead of permanent and long-term temporary loss and meet the NCCP standard for rough proportionality of impacts and conservation.

[b] Managed wetland preservation to meet Objective SMHM1.1 for salt marsh harvest mouse.

[c] Managed wetland preservation to meet Objective MWNC1.1 to support populations of native waterfowl.

[d] 1,500 acres of rice, or "rice equivalent" will be protected to contribute to giant garter snake conservation. Rice equivalent is muted tidal or nontidal marsh restoration that meets the reserve design criteria described in CM4.

[e] 50 of the 1,200 acres of nontidal marsh restoration could substitute for 50 acres of nontidal marsh protection if those 50 acres meet habitat enhancement requirements for tricolored blackbird.

[f] The preservation or restoration of uplands adjacent to tidally restored sites to accommodate sea level rise. Grassland preservation that occurs to achieve this objective does not contribute toward the 8,000 acres of grassland preservation or the 2,000 acres of grassland restoration.

[g] The minimum requirement for tidal restoration is 55,000 acres. Protection of adjacent upland will add another 10,000 acres to accommodate sea level rise (i.e., land available for upslope migration of tidal wetlands as sea level rises).

[h] Alkali seasonal wetland and vernal pool complex restoration objectives requires no net loss of wetted acres. Actual restoration of alkali seasonal wetland and vernal pool complex acreage will depend on the amount lost and the density of wetted acres in the restored areas. Restoration numbers reflect that required with maximum allowable impacts and assumed density of wetted area of 15%.

[i] Excludes channel margin enhancement (in miles).

MLLW = mean lower low water; NCCP = natural community conservation plan

6.1.1.1 Property Acquisition

In many cases, conservation measures will be implemented on existing public land and will not require the acquisition of property. Where this is not practicable, land will be acquired in fee or by conservation easement For example, property acquisition will be necessary to preserve natural communities (Table 6-2). The criteria used to select properties for acquisition varies by conservation measure (e.g., see *CM3 Natural Communities Protection and Restoration* for a description of acquisition criteria for this conservation measure).

Thorough field assessments will be needed to assess the suitability of a particular property for implementation of a conservation measure. The Implementation Office will also need to ensure that property encumbrances (e.g., existing easements, leases, rights-of-way, title restrictions, resource extraction rights, hazardous materials) do not conflict with Plan goals and objectives. For properties acquired using easements, easement terms should be negotiated before purchase. Property acquisitions for actions that involve modifications to levees (e.g., setting back levees to restore seasonally inundated floodplain habitat) include obtaining concurrence of the responsible agencies to initiate planning studies.

6.1.1.2 Planning and Design

In some cases, additional planning and design work is needed to allow conservation measure implementation. Design guidelines are provided within each applicable conservation measure (*Chapter 3, Conservation Strategy*). General planning and design will likely include the following steps.

- Funding and administrative support will be secured.
- Conceptual designs will be developed for natural community enhancement and restoration (CM3 through CM12), construction of new facilities (CM1, CM2, CM16, CM18, CM21), or removal of structures (CM4, CM5, CM15, CM21). Conceptual designs will need to be coordinated with affected stakeholders (e.g., local, state, and federal agencies, potentially affected landowners).
- Based on conceptual designs, detailed designs and cost estimates will be developed for each project.
- Based on the detailed design, bid specifications and drawings will be developed.
- Bids will be evaluated and contractors selected to implement the conservation measure at the selected location.
- Other efforts needed to execute “other stressors” conservation measures will be planned.

6.1.1.3 Regulatory Compliance

Depending on the implementation action, implementation may require preparation and submittal of documents and applications associated with acquisition of the permits under all applicable laws and regulations, such as the following.

- Additional project-level review under CEQA and NEPA.
- Sections 401 and 404 of the federal Clean Water Act (CWA).
- California Water Code Sections 1000 *et seq*. (water rights).

- Water Code Sections 13000 *et seq*. (water quality).
- Sections 10 (33 United States Code [USC] 403) and 14 (33 USC 408) of the Rivers and Harbors Act of 1899.
- Section 1602 of the California Fish and Game Code (Fish & Game Code) (Streambed and Lakebed Alteration Agreements).
- Section 106 of the National Historic Preservation Act.
- Encroachment permits for work on levees from the Central Valley Flood Protection Board and reclamation districts.

6.1.1.4 Implementation Activities

This implementation element includes all activities related to construction.

- Contractor mobilization.
- Site preparation, including grading, excavation, and placement of dredge or fill.
- Construction/installation of water management, utility, and other operations infrastructure.
- Demolition or refurbishment of existing infrastructure.
- Construction of dikes, levees, docks, or roads.
- Planting vegetation.
- Construction monitoring (Section 3.6, *Adaptive Management and Monitoring Program*, and *CM22 Avoidance and Minimization* Measures).
- Site remediation, if necessary.

6.1.1.5 Natural Community Restoration Schedule

The implementation schedule for natural community restoration conservation measures (CM4 through CM10 in Table 6-2) is described below for each natural community.

- ***CM4 Tidal Natural Communities Restoration.*** The implementation schedule for tidal natural community restoration actions is based on the assumption that property acquisition, planning, and any required environmental or regulatory compliance activities for the first 4,000 acres of tidal natural community restoration will be initiated immediately after BDCP permit authorization. Initial restoration actions will require less time to plan and permit than restoration actions for other natural communities because tidal natural community restoration is likely to be implemented first on public lands. The schedule for subsequent tidal wetland restoration assumes that it will take several years to acquire properties suitable for restoration, conduct analyses, develop conceptual plans, obtain any outstanding environmental and regulatory approvals and permits, develop bid specifications and drawings, construct new levees (if required) and natural community features, and breach existing levees.
- ***CM5 Seasonally Inundated Floodplain Restoration.*** Restoration of seasonally inundated floodplains will require extensive levee setbacks to reconnect historical floodplain with Delta channels. The implementation schedule (Table 6-2) assumes that at least 1,000 acres of floodplain will be restored by year 15 and that restoration of the remaining 9,000 acres of floodplain restoration will be completed in increments of 1,800 acres for each 5-year time

period until year 40. Each floodplain restoration project will, on average, require 5 years to identify potential floodplain restoration properties; coordinate planning with the U. S. Army Corps of Engineers (USACE), California Department of Water Resources (DWR) and other flood control agencies and reclamation districts; and conduct feasibility studies prior to implementation. Following approval of floodplain restoration plans, an additional 5 years will be required to acquire properties suitable for restoration, obtain any outstanding regulatory approvals and permits, develop bid specifications and drawings, construct the new levees and floodplain, and breach existing levees. Therefore, the first seasonally inundated floodplain restoration project is not expected to be completed until after the first 10 years of Plan implementation.

- ***CM6 Channel Margin Enhancement.*** The implementation schedule assumes that channel margin enhancements will be completed in increments of 5 miles of channel (achieved at multiple properties for a total of 5 miles of channel margin length) by years 10, 20, 25, and 30 and that channel margin enhancement will be a component of seasonally inundated floodplain and riparian natural community restoration. Each channel margin natural community enhancement increment will, on average, require 5 years to identify potential channel margin enhancement sites; coordinate planning with USACE, DWR, and other flood control agencies and reclamation districts; and conduct feasibility studies prior to implementation. Following approval of enhancement plans, an additional 5 years will be required to obtain any outstanding regulatory approvals and permits, develop bid specifications and drawings, and implement channel margin enhancements.

- ***CM7 Riparian Natural Community Restoration***. Restoration of the riparian natural community will be a component of tidal natural community restoration (CM4), seasonally inundated floodplain restoration (CM5), and channel margin natural community enhancement (CM6) projects; therefore, the schedule for planning, property acquisition, environmental compliance, and implementation of riparian restoration actions is linked to the implementation schedule for those restoration actions. Most of the 5,000 acres of riparian restoration is expected to occur with seasonally inundated floodplain restoration and tidal natural community restoration in the south Delta.

- ***CM8 Grassland Natural Community Restoration.*** The implementation schedule assumes that all grassland natural community restoration actions will be implemented between years 3 and 30 (Table 6-2). A total of 1,140 acres of grassland will be restored in the near-term implementation period, 340 acres in the early long-term implementation period, and the remaining amount in the late long-term implementation period. Over half of the grassland restoration needs to occur in the near-term period to offset the expected loss of this natural community from covered activities, mostly construction of the new water facility by year 10. The implementation schedule assumes that property acquisition, planning, and adaptive management activities for grassland restoration to be completed by year 5 are initiated in the first year or two following permit author**r**ization.

- ***CM9 Vernal Pool and Alkali Seasonal Wetland Complex Restoration.*** The vernal pool restoration objective (Objective VPNC1.2) requires that restoration occur to achieve no net loss of vernal pool complex. Based on the estimated maximum loss of vernal pools, up to 89 acres of restoration will be needed to achieve this objective. Most vernal pool complex restoration actions will likely need to be implemented in the first 15 years of implementation in order to stay ahead of the effects of vernal pool losses (Table 6-2). Property acquisition, planning, and

regulatory compliance activities for vernal pool complex restoration will likely require 2 to 3 years to complete.

- ***CM10 Nontidal Marsh Restoration.*** The implementation schedule assumes that all nontidal marsh restoration actions will be completed by year 10 to provide giant garter snake habitat as early as practical (Table 6-2). The implementation schedule assumes that property acquisition, planning, and regulatory compliance-related activities for each 100 acres of restoration will require approximately 2 years to complete, with the restoration actions being completed in the third year.

6.1.2 Maintaining Rough Proportionality

The conservation measures under a natural community conservation plan (NCCP) must be implemented in a manner roughly proportional in time and extent to the impact of covered activities on habitat and covered species authorized under the plan (California Fish and Game Code 2805(g)(3)(C) and (2820)(b)(3)(B)). Similarly, the ESA requires that habitat conservation plans (HCPs) minimize and mitigate the impacts of the taking to the maximum extent practicable (ESA Section 10(a)(2)(B)(ii)). The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) will consider whether the mitigation proposed in an HCP is sufficient to address the impact of the taking.

While the Plan provides net environmental benefits, many of the conservation measures entail habitat effects that must be proportionally mitigated during the course of Plan implementation. These effects and their timing are quantified in Chapter 5, *Effects Analysis*. Implementation of conservation measures in rough proportionality in time and extent to impacts will be assured under the BDCP through the following provisions. First, *CM2 Yolo Bypass Fisheries Enhancement, CM13 Invasive Aquatic Vegetation Control, CM14 Stockton Deep Water Ship Channel Dissolved Oxygen Levels, CM15 Localized Reduction of Predatory Fishes, CM16 Nonphysical Fish Barriers, CM17 Illegal Harvest Reduction, CM18 Conservation Hatcheries, CM19 Urban Stormwater Treatment, CM20 Recreational Users Invasive Species Program,* and *CM21 Nonproject Diversions* will be implemented according to the schedule in Table 6-1, as described in more detail in Chapter 3, *Conservation Strategy*, for each conservation measure. Although most of these conservation measures are intended to contribute to the conservation of the covered species (i.e., they have not been designed specifically to mitigate impacts), their implementation schedule provides for their implementation concurrent with or prior to the effects associated with the construction and operation of the water conveyance facility. In this respect, the implementation schedule is consistent with the rough proportionality standard and ESA requirements.

Second, conservation measures that involve the protection or restoration of natural communities and habitat for covered species (*CM3 Natural Communities Protection and Restoration, CM4 Tidal Natural Communities Restoration, CM5 Seasonally Inundated Floodplain Restoration, CM6 Channel Margin Enhancement, CM7 Riparian Natural Community Restoration, CM8 Grassland Natural Community, Restoration, CM9 Vernal Pool and Alkali Seasonal Wetland Complex Restoration,* and *CM10 Nontidal Marsh Restoration)* will be implemented according to the schedule in Table 6-2. This schedule was designed to ensure that the implementation of these conservation measures, including mitigation actions, occurs in rough proportion to impacts on natural communities and habitat for covered species (see Chapter 5, *Effects Analysis,* Figures 5.4-1 through 5.4-7 depicting the timelines for restoration and protection versus loss for most natural communities). Management and enhancement activities for the protected natural communities (*CM11 Natural Communities*

Enhancement and Management) will be undertaken at the same pace as the assembly of the reserve system, which will also occur in rough step with impacts. With respect to *CM12 Methylmercury Management*, methylmercury management activities will be carried out on a project-specific basis as applicable restoration projects are completed.

Rough proportionality for CM3[1] will be measured by comparing actual conservation achieved through the preservation of habitat, as measured from the date of recordation of fee title or conservation easement against the trajectories in Chapter 5, *Effects Analysis,* Figures 5.4-1 through 5.4-7. *CM4 Tidal Natural Communities Restoration, CM5 Seasonally Inundated Floodplain Restoration,* C *CM6 Channel Margin Enhancement*, *CM7 Riparian Natural Community Restoration*, *CM8 Grassland Natural Community Restoration*, *CM9 Vernal Pool and Alkali Seasonal Wetland Complex Restoration, and* CM10 *Nontidal Marsh Restoration* require restoration of natural communities that provide species habitat. For these conservation measures, rough proportionality will be determined through a comparison of the amount of habitat constructed (i.e., restoration is counted toward the requirement once construction is completed) with the same trajectories in Chapter 5, *Effects Analysis*, Figures 5.4-1 through 5.4-7. These trajectories are designed to ensure that conservation proceeds in roughly proportional steps to impacts and also makes steady progress towards each applicable 5-year implementation requirement and the overall target for each natural community by year 40. For the purposes of compliance with the rough proportionality standards, the pace of conservation measure implementation may not fall behind the pace of covered activity impacts by more than 10%.

Measurements necessary to monitor compliance with the rough proportionality standard for all conservation measures will be reported by the Implementation Office on an annual basis at the end of each calendar year as part of the Annual Report. This information will become available beginning at the end of the second full calendar year of Plan implementation to allow the Implementation Office to reach operational capacity and focus its efforts on acquiring and restoring land. Compliance with the rough proportionality standard will be measured based on the schedule in Table 6-3.

6.2 Interim Implementation Actions

Implementation actions that occur before permit issuance and after the execution of the Planning Agreement (Anonymous 2006) (October 6, 2006) count toward meeting BDCP requirements as long as those actions are consistent with the Plan, help to meet its biological goals and objectives, and do not provide mitigation for an interim project[2]. These actions, called interim implementation actions, will help the Implementation Office to meet the implementation schedules (Table 6-1 and Table 6-2) early in the permit term.

Interim implementation actions that have been completed, are in process, or are planned to be initiated prior to permit issuance are listed in Table 6-4 and mapped in Figure 6-2. These actions include natural community preservation and restoration. These actions will be credited toward the

[1] *CM3 Natural Communities Protection and Restoration* requires acquisition of land in order to protect and enhance areas of existing natural communities and covered species habitat; protect and maintain occurrences of selected plant species with limited distributions; and/or provide habitat connectivity among the BDCP conservation lands, and connectivity to other conservation lands inside and outside the Plan Area.

[2] See BDCP Planning Agreement Section 7.7.

fulfillment of the conservation measures set out in Chapter 3, *Conservation Strategy*, to the degree they are consistent with those conservation measures. The following sections summarize 13 of the interim implementation actions listed in Table 6-4 and describe their applicability to the BDCP.

Table 6-3. Compliance Schedule for Rough Proportionality Measurements

Conservation Measure	Compliance Schedule for Rough Proportionality	Rationale
CM3 Natural Communities Protection and Restoration	Initial compliance at end of third full calendar year, every 2 years thereafter[1]	Land acquisition would likely rely mostly on large acquisitions that may take more than one year to close. The acquisition of cultivated land would likely require conservation easements on many relatively small parcels; more time is needed to develop and apply template easements acceptable to landowners and to acquire sufficient land to offset impacts.
CM4 Tidal Natural Communities Restoration	Initial compliance at end of third full calendar year, every 2 years thereafter	Because of the time required for land acquisition, planning and design, permitting, and construction, it is expected that projects to implement CM4 will take 3–5 years to complete.
CM6 Channel Margin Enhancement	Initial compliance at end of fifth full calendar year, every 2 years thereafter	Floodplain restoration schedule is outlined in Table 6-2, with requirements starting in year 15 to allow for extensive planning, design, land acquisition, and construction in the south Delta.
CM7 Riparian Natural Community Restoration	Initial compliance at end of second full calendar year, every 2 years thereafter1	Riparian restoration is expected to occur in large blocks, each of which is expected to take more than one year to acquire, plan, design, and implement.
CM8 Grassland Natural CommunityRestoration	Initial compliance at end of second full calendar year, every 2 years thereafter1	Grassland restoration is expected to occur in large blocks, each of which is expected to take more than one year to acquire, plan, design, and construct.
CM9 Vernal Pool and Alkali Seasonal Wetland Complex Restoration	Initial compliance at end of second full calendar year, every 2 years thereafter1	Vernal pool complex restoration is expected to occur in large blocks, each of which is expected to take more than one year to acquire, plan, design, and construct.
CM10 Nontidal Marsh Restoration	Initial compliance at end of second full calendar year, every 2 years thereafter1	Nontidal marsh restoration is expected to occur in large blocks, each of which is expected to take more than one year to acquire, plan, design, and construct.
CM2 Yolo Bypass Fisheries Enhancement, CM13–CM21	See Table 6-1 for compliance schedule	

Notes:

[1] Land acquisition and restoration milestones also occur at 5-year intervals (year 5, 10, 15; Table 6-2), so compliance with the rough proportionality standard will also be measured at these times.

Table 6-4. Interim Implementation Actions: Restoration Projects with Potential for BDCP Credit

Project	Property Owner/ Operator	Location	Size (acres)	Covered Species Benefitted	Status	Potential Overlap with BDCP (Associated Conservation Measure)
Calhoun Cut/ Lindsey Slough Tidal Habitat Restoration	CDFW	Cache Slough Complex	927	Delta smelt, longfin smelt, juvenile Chinook salmon, juvenile Central Valley steelhead, Sacramento splittail, juvenile green sturgeon, juvenile white sturgeon	In process	≤165 acres of tidal marsh restored (CM4, CM7)
Lower Yolo Restoration Project	Westlands Water District	Cache Slough Complex	3,408	Delta smelt, longfin smelt, juvenile Chinook salmon, juvenile Central Valley steelhead, Sacramento splittail, juvenile green sturgeon, juvenile white sturgeon	In process	1,305 acres of wetland creation, 700 acres of wetland enhancement, 50 acres of riparian enhancement (CM4, CM7)
Dutch Slough Tidal Marsh Restoration	DWR	West Delta	1,166	Sacramento splittail, juvenile salmon, steelhead, Delta smelt, longfin smelt, sturgeon, black rail	Planned	200–800 acres of restored tidal marsh, 20 acres of enhanced channel margin, 20 acres of restored riparian, total estimated area affected: 240–840 acres. Potential loss of 1,000 grazing acres (CM4, CM7, CM10)
McCormack-Williamson Tract	The Nature Conservancy	Cosumnes/ Mokelumne East Delta	1,660	Chinook salmon, steelhead, delta smelt, Valley elderberry longhorn beetle	Planned	1,200–1,300 acres of restored tidal marsh, 100–200 acres of restored riparian (CM4, CM7)
Grizzly Slough	DWR	Cosumnes/ Mokelumne East Delta	489	Chinook salmon, steelhead, delta smelt	Planned	470 acres of floodplain and riparian habitat (CM5, CM7)

Project	Property Owner/ Operator	Location	Size (acres)	Covered Species Benefitted	Status	Potential Overlap with BDCP (Associated Conservation Measure)
Experimental Fremont Weir Fish Passage Improvements	Sacramento San Joaquin Drainage District (Central Valley Flood Protection Board). DWR maintains Weir. CDFW operates existing fish ladder and leases Fremont Weir Wildlife Area.	Yolo Bypass	N/A	Chinook salmon, Central Valley steelhead, Sacramento splittail, green and white sturgeon	Planned	N/A
Fremont Weir Modifications/ Floodplain Enhancement	Owner: Sacramento San Joaquin Drainage District (Central Valley Flood Protection Board). DWR maintains Weir. CDFW operates existing fish ladder and leases Fremont Weir Wildlife Area.	Yolo Bypass	TBD	Chinook salmon, Central Valley steelhead, delta smelt, Sacramento splittail, lamprey	Planned	5,000–20,000 acres of inundated floodplain
Lisbon Weir Fish Passage Enhancement	CDFW and private obligations	Yolo Bypass	N/A	Chinook salmon, Central Valley steelhead, Sacramento splittail	Planned	N/A
Putah Creek Fish Passage Enhancement	CDFW	Yolo Bypass	N/A	Chinook salmon, Sacramento splittail	Planned	3–10 acres of restored tidal marsh, 50–500 acres of inundated tidal plain, 1–5 acres of restored channel margin, 1–5 acres of restored riparian

Project	Property Owner/ Operator	Location	Size (acres)	Covered Species Benefitted	Status	Potential Overlap with BDCP (Associated Conservation Measure)
Sacramento Weir Improvements	Sacramento San Joaquin Drainage District (Central Valley Flood Protection Board). DWR maintains Weir. CDFW operates existing fish ladder and leases Sacramento Bypass Wildlife Area.	Yolo Bypass (the Sacramento Bypass is a tributary of the Yolo Bypass).	N/A	Chinook salmon, Central Valley steelhead, delta smelt, Sacramento splittail, lamprey	Planned	N/A
Southport Project	City of West Sacramento, DWR	Sacramento River between RM 52.8 and 56.0	280		Planned	280 acres of floodplain restoration (CM5)
Agricultural Crossings	Private ownership	Yolo Bypass	N/A	Chinook salmon, Central Valley steelhead, Sacramento splittail	Planned	N/A
Meins Landing Tidal Habitat Restoration (Identified for Delta Ecosystem Enhancement Program)	DWR	Suisun Marsh	666	Chinook salmon, delta smelt, Sacramento splittail, salt marsh harvest mouse, Suisun shrew, California clapper rail, California black rail	Planned	633 acres of restored tidal marsh, 33 acres of restored riparian. total estimated affected: 666 acres (CM4)
Hill Slough Tidal Habitat Restoration	CDFW and Private obligations	Suisun Marsh	1,750	Chinook salmon, delta smelt, California clapper rail, California black rail, salt marsh harvest mouse, Suisun shrew, Suisun Marsh covered plant species	In process	846 acres of restored tidal marsh, 94 acres restored riparian. total estimated affected: 940 acres (CM4)
Tule Red Restoration	Westervelt Ecological Services, Inc.	Suisun Marsh	Est. 300	Chinook salmon, Delta smelt, California clapper rail, California black rail, salt marsh harvest mouse, Suisun shrew, Suisun Marsh covered plant species	Planned	300 acres tidal marsh creation and 1,300 acres of possible tidal marsh enhancement (CM4)

Project	Property Owner/ Operator	Location	Size (acres)	Covered Species Benefitted	Status	Potential Overlap with BDCP (Associated Conservation Measure)
Rush Ranch Tidal Habitat Restoration	Solano Land Trust	Suisun Marsh	2,070	delta smelt, longfin smelt, splittail, Chinook salmon, California black rail, California clapper rail, Suisun song sparrow, salt marsh common yellowthroat, burrowing owl, salt marsh harvest mouse, Suisun ornate shrew, Suisun thistle, soft bird's beak, Delta tule pea, Suisun Marsh aster	Planned	70 acres of restored tidal marsh, 3 acres of enhanced channel margin (CM4)
Prospect Island Tidal Habitat Restoration	DWR	Cache Slough Complex	1,316	Delta smelt, longfin smelt, juvenile Chinook salmon, juvenile steelhead, green sturgeon, white sturgeon	Planned	450–1,300 acres of restored tidal marsh and riparian habitat (CM4, CM7)
Chipps Island	Chipps Island	Suisun Marsh	750	Delta smelt, longfin smelt, juvenile Chinook salmon, juvenile steelhead, green sturgeon, white sturgeon	Planned	100–250 acres restored tidal marsh (CM4)
Decker Island		Eastern Decker Island	110	Salmon and steelhead	Planned	110 acres of tidal natural communities

6.2.1 Calhoun Cut and Lindsey Slough Restoration

The Calhoun Cut Ecological Reserve is located on the northwest edge of the Sacramento Delta, in Conservation Zone 1 (Figure 6-2), in the Cache Slough ROA. The 927-acre property, which is owned by CDFW, consists of 334 acres of wetlands and 593 acres of upland areas. The restoration project is designed to increase the area of functional intertidal freshwater marsh habitat, restore processes necessary to create riparian canopy adjacent to tidal channels, and create conditions that allow for the natural regeneration of a mosaic of different wetland habitats ranging from tidal marsh to riparian to upland transitional alkali panne habitat. The restoration of the tidal channel system to Lindsey Slough consists of removing several existing features that restrict flow though the slough and excavate starter channels to restore Lindsey Slough's tidal channel system.

The project is not associated with any mitigation requirement. Environmental documentation is almost complete; however, funding sources are still needed for permitting, design, and construction. If the Implementation Office or its partner agencies provides additional funding, it would be eligible for credit for tidal wetland restoration, riparian restoration, and potential other natural community restoration targets (e.g., grassland, vernal pool).

6.2.2 Lower Yolo Restoration Project

The Lower Yolo Restoration Project is located in Conservation Zone 1 (Figure 6-2) at the southern end of the Yolo Bypass in the Cache Slough ROA. The restoration project is intended to help fulfill the tidal wetland mitigation requirement for the Operational Criteria and Plan (OCAP) Biological Opinions (BiOps) (National Marine Fisheries Service 2004, 2009; U.S. Fish and Wildlife Service 2008). Based on the Memorandum of Agreement (MOA) between the Bureau of Reclamation (Reclamation), USFWS, DWR, NMFS, CDFW, and State and Federal Contractors Water Agency (SFCWA) (California Department of Water Resources 2011), this restoration project may also count toward BDCP tidal wetland restoration requirements. The project entails breaching levees along the Stairstep Channel and channel excavation to return tidal action to approximately 50% of the 3,408-acre property known as Yolo Ranch in order to restore tidal marsh-open-water habitat and upland and riparian habitats. Yolo Ranch was acquired by Westlands Water District in 2007 with the intention of creating tidal marsh and open water habitat to benefit delta smelt and the delta food web.

The restoration project is required mitigation as established in the OCAP BiOp and was part of an Originating Agreement with the OCAP and the California Bay-Delta Authority (CALFED) Ecosystem Restoration Program (ERP). Funding sources for the project include the ERP, Fish Restoration Program Agreement, and members of SFCWA. CEQA documentation is currently being prepared and construction is anticipated to begin in 2013.

6.2.3 Dutch Slough Tidal Restoration Project

The Dutch Slough Tidal Restoration Project takes place on a 1,178-acre property located in Conservation Zone 6 (Figure 6-2) and is part of the West Delta ROA. DWR purchased the property in 2003. Restoration and natural community enhancement will take place on the entire area. The Dutch Slough property offers an opportunity for large-scale tidal marsh restoration, natural community enhancement, and open space preservation. The project will restore a diversity of tidal wetland,

riparian, and other natural communities. The project has been designed with an adaptive management framework to test various restoration approaches.

The project is not required as mitigation and is not part of an originating agreement. Therefore, the project might count toward BDCP obligations for tidal wetland restoration (CM4), riparian restoration (CM7), or possibly nontidal marsh restoration (CM10). Partial funding for construction has been secured through the DWR Delta Levees Program, the CALFED ERP and the California Coastal Conservancy. Construction is expected to begin in 2013.

6.2.4 McCormack-Williamson Tract Restoration

The McCormack-Williamson Tract element of the North Delta Flood Control and Ecosystem Restoration Program was proposed to be funded by DWR and the CALFED Levee Stability Program. This project and the Grizzly Slough project described below will provide a nearly contiguous corridor along the downstream portion of the Cosumnes Preserve. The McCormack-Williamson Tract, a 1,660-acre property located in Conservation Zone 4 (Figure 6-2) in the Cosumnes-Mokelumne ROA, was purchased by The Nature Conservancy in 1999 using a CALFED grant (USFWS funds). The project will help regulate peak flood flows and prevent flood surges in the North Delta where the Mokelumne and Cosumnes Rivers converge. The project will entail breaching the McCormack-Williamson Tract levees to restore ecosystem function, create floodplain and tidal marsh natural communities, and benefit native species. Restoration is anticipated to take place on approximately 1,500 acres.

Additional project details can be found in the *North Delta Flood Control and Ecosystem Restoration Project Final EIR*, released in November 2010. This project could be eligible for BDCP credit for floodplain and tidal marsh restoration.

6.2.5 Grizzly Slough

The Grizzly Slough Property, part of the Cosumnes Preserve, is a 489-acre parcel that was purchased in 1992 as mitigation for the State Water Project (SWP). The property, owned by DWR, is in the Cosumnes River watershed and is located near the Cosumnes-Mokelumne ROA in Conservation Zone 4 (Figure 6-2) approximately 2 miles northeast of the town of Thornton. Nearly 70 acres has been utilized to mitigate for the Delta Levee Program, while the remaining approximately 450 acres is planned as riparian and floodplain restoration to provide additional attenuation of peak flows in the North Delta. Funding for the project has not been identified but is needed for environmental documentation and permitting, design, and construction. Additional project details can be found in the *North Delta Flood Control and Ecosystem Restoration Project Final EIR*, released in November 2010. If the Implementation Office or its partner agencies provided funding for the project, it would be eligible for credit for riparian restoration and floodplain restoration.

6.2.6 Southport Project

The Southport Early Implementation Project will implement flood risk-reduction measures along the Sacramento River South Levee that protects the Southport community and will provide 280 acres of floodplain restoration. The property, located in Conservation Zone 3 (Figure 6-2) along the Sacramento River between river miles 52.8 and 56.0, is owned by the City of West Sacramento and DWR. The ecosystem restoration portion of the project will satisfy an existing mitigation requirement. Partial funding for the project was secured through the DWR Early Implementation

Project; however, floodplain design and restoration funding has not been determined. A partner agency is needed to help fund the riparian floodplain restoration for the portion of the property that will not be used as mitigation for the flood control project. Depending on the funding source, this project could be eligible for BDCP credit for floodplain restoration.

6.2.7 Meins Landing Restoration Project

Meins Landing, a 666-acre waterfowl hunting club in Conservation Zone 11 (Figure 6-2) in the Suisun Marsh ROA, was purchased in December 2005, by DWR in partnership with the Suisun Marsh Preservation Agreement Agencies (DWR, CDFW, Reclamation, Suisun Resource Conservation District), and the California Coastal Conservancy. The project will restore up to 666 acres to a fully functioning, self-sustaining marsh ecosystem by restoring natural hydrologic and biological processes. It will increase the area and contiguity of intertidal, subtidal, and emergent wetlands in Suisun Marsh providing habitat for aquatic and tidal marsh species. The created tidal habitat will provide mitigation for wetlands and salt marsh harvest mouse habitat losses during levee improvements on 24 miles of levees in Suisun Marsh during the Delta Levees Program.

The project is part of the Van Sickle Island Levee Improvement Program and the originating agreement is the CALFED, though funding for environmental documentation and permitting, design, and construction has not yet been determined. Three underground pipelines with easements transect the property and prevent open breaches and full tidal inundation. Control structures that would allow full tidal flow yet still be able to give dry access to pipelines in case of maintenance requirements are being investigated. The project is currently awaiting funding and further assessment of the lands suitability for tidal marsh restoration. Portions of the land not counted as mitigation for other DWR programs may be eligible to count toward BDCP tidal wetland restoration or salt marsh harvest mouse protection obligations.

6.2.8 Hill Slough Tidal Restoration Project

The Hill Slough Tidal Restoration Project will restore tidal habitat to approximately 640 acres of diked seasonal wetlands and enhance 200 acres of mixed perennial wetlands in Suisun Marsh. The project will reintroduce tidal action to the site, restoring a transition of perennial aquatic habitat in the deepest areas, low intertidal marsh, high intertidal marsh, and lowland alluvial habitat. The 1,723-acre property is located in Conservation Zone 11 (Figure 6-2) in the Suisun Marsh ROA and is owned by CDFW.

The project is not required mitigation but was part of an originating agreement with CALFED and the Suisun Marsh Plan. Partial funding for the project was secured through the CALFED ERP; however, funding for the final design and construction has not been secured. Grizzly Island Road would need to be elevated in order to restore the site. A draft environmental impact report is in preparation. The BDCP may be eligible to count all or a portion of this project towards its tidal wetland restoration obligations.

6.2.9 Tule Red Restoration Project

In 2011, Westervelt Ecological Services purchased the Tule Red property, located in Conservation Zone 11 (Figure 6-2) in the Suisun Marsh ROA. The restoration project will help fulfill the tidal wetland mitigation requirement for the OCAP BiOp. Based on the MOA between Reclamation, USFWS, DWR, NMFS, CDFW, and SFWCA (California Department of Water Resources 2011), this

restoration project may also count toward BDCP tidal wetland restoration requirements. The restoration project would create 350 acres of tidal marsh with the potential to enhance an additional 1,300 acres. Restoration on the Tule Red Property is highly economical because its location is adjacent to dynamic sediment sources and its surface elevations are conducive to tidal marsh restoration. The restoration may be expanded into adjacent land that is already owned by CDFW.

Restoration at Tule Red is intended to partially fulfill the tidal restoration requirements of the OCAP BiOp. Some or all of this restoration could also fulfill BDCP requirements for tidal wetland restoration. The first phase of construction is planned for 2014.

6.2.10 Rush Ranch Restoration Project

Rush Ranch, acquired by the Solano Land Trust in 1988, is a 2,070-acre ranch located along the northern edge of Suisun Marsh in Conservation Zone 11 (Figure 6-2) in the Suisun Marsh ROA. The restoration project is intended to help fulfill the tidal wetland mitigation requirement for the OCAP BiOp. Based on the MOA between Reclamation, USFWS, DWR, NMFS, CDFW, and SFWCA (California Department of Water Resources 2011), this restoration project may also count toward BDCP tidal wetland restoration requirements. The property consists of 940 acres of grassland, a 70-acre diked marsh, and 1,050 acres of tidal wetlands that form one of the largest extant tracts of undiked, brackish marsh in the San Francisco Estuary. The 70-acre diked marsh restoration project site is situated in the northwest corner of Rush Ranch, on the edge of Suisun Slough. The project will breach the levee and create a starter channel to allow daily tidal inundation and restore natural patterns of sedimentation and evolution of marsh plain and channels.

The project is part of an originating agreement with OCAP and the Suisun Marsh Plan. Partial funding for the project was secured through the CALFED ERP; however, funding for environmental documentation and permitting, design, and construction has not been secured. Additional funding is needed for a USACE permit, baseline data collection, and final restoration designs. The Implementation Office or its partner agencies could provide funding to complete the project and could count some of the restoration toward the tidal wetland restoration requirements of the Plan.

6.2.11 Prospect Island Restoration Project

Prospect Island, located in Conservation Zone 2 (Figure 6-2) in the Cache Slough ROA, is one of three Delta islands specified for early implementation in the Plan. The restoration project is intended to help fulfill the tidal wetland mitigation requirement for the OCAP BiOp. Per the Fish Restoration Program Agreement (2010) between CDFW and DWR and the MOA between Reclamation, USFWS, DWR, NMFS, CDFW, and SFWCA (California Department of Water 2011), this restoration project may also count toward BDCP tidal wetland restoration requirements. DWR acquired 1,306 acres on the northern part of Prospect Island from the federal General Services Administration in January 2010. The project will entail breaching the Prospect Island levees to restore from 460 up to 1,300 acres of tidal marsh, open water habitat, and some upland/riparian habitat. Prospect Island offers a unique opportunity for restoration on a site with comparatively little subsidence, resulting in elevations in the island interior that are assumed suitable for tidal wetlands. The project is fully SWP-funded through the Fish Restoration Program Agreement for the entire restoration project.

6.2.12 Chipps Island Restoration

Chipps Island is a 1,000-acre island located in Conservation Zone 11 (Figure 6-2) at the confluence of the Sacramento and San Joaquin Deltas, within the Suisun Marsh ROA. The property is composed of three different tracts of land. On one, some 250 acres have already been set aside for a previous mitigation project. The final two tracts account for roughly 750 acres of land owned by two groups and used primarily for duck hunting. Chipps Island is actively marketed by the landowners as a property for tidal wetland restoration, mitigation, dredge spoils dumping, carbon credits and/or conservation and may be sold as a whole or in two parcels.

6.2.13 Decker Island Restoration

Decker Island is an artificial 658-acre property located in Conservation Zone 10 along the Sacramento River in the Cache Slough ROA. The island was created in the early 1900s when USACE constructed the Deep Water Ship Channel through alluvial fan deposits from the Montezuma Hills. Approximately 473 acres on the western side of the island is privately owned, CDFW owns 34 acres on the north end of the island, and Port of Sacramento owns approximately 140 acres along the eastern portion of the Island. The Port of Sacramento is planning a 110-acre restoration project that would provide habitat to migrating salmon and steelhead.

6.3 Planning, Compliance, and Progress Reporting

The Implementation Office will prepare, on a regular basis, planning documents and implementation reports to demonstrate compliance with the BDCP and its associated authorizations. Under the ESA, HCPs are required to establish monitoring programs to assess the effects of plan implementation on covered species(50 Code of Federal Regulations [CFR] 17. 22(b)(3) and 50 CFR 222. 307(b)(5)). In addition, the USFWS/NMFS Five-Point Policy (65 *Federal Register* [FR] 106, June 1, 2000) recommends that such plans provide annual reporting on matters related to compliance with permit terms and conditions. Similarly, the NCCPA requires that implementation agreements include "provisions for periodic reporting to wildlife agencies and the public for purposes of information and evaluation of plan progress" (Fish & Game Code 2820(b)(7)). The Implementation Office will, over the term of the BDCP, submit various reports and plans to the fish and wildlife agencies that serve the following purposes.

- Provide the necessary data and information to demonstrate that the BDCP is being properly implemented.
- Identify the effect of BDCP implementation on covered species and on the effectiveness of the conservation strategy at advancing the biological goals and objectives.
- Document actions taken under the adaptive management and monitoring program (e.g., process, decisions, changes, results, corrective actions).
- Disclose issues and challenges concerning BDCP implementation, and identify potential modifications or amendments to the BDCP that would increase the likelihood of success.
- Set out schedule and budgets related to the implementation of actions over 1-year and 5-year timeframes.

Throughout the course of BDCP implementation, the Implementation Office will prepare and submit to the fish and wildlife agencies the following documents, as described in this chapter.

- Annual Workplan and Budget
- Annual Water Operations Plan
- Annual Progress Report
- Annual Water Operations Report
- Five-Year Comprehensive Review
- Five-Year Implementation Plan

The Implementation Office will confer with the Authorized Entity Group, Permit Oversight Group, the Adaptive Management Team, and the Stakeholder Council, during the development of these planning and reporting documents, as appropriate (the composition and roles of these groups are described in Chapter 7, *Implementation Structure*). The totality of these documents will enable the range of interested public and private stakeholders and the general public to assess, on an ongoing basis, the progress and performance of the BDCP toward meeting its biological goals and objectives and to make informed recommendations to the Implementation Office regarding plan implementation. These reports will be available to the public and posted on the BDCP website.

6.3.1 Annual Workplan and Budget

On an annual basis[3], the Implementation Office will prepare a workplan and budget for the upcoming implementation year. The workplan will identify planned actions regarding the implementation of conservation measures and the adaptive management and monitoring program. The budget will set out projected expenditures and identify the sources of funding for those expenditures. A final Annual Workplan and Budget will be completed no later than 1 month prior to the beginning of the implementation year.

The Program Manager will solicit input on the draft Annual Workplan and Budget from the Permit Oversight Group and the Stakeholder Council, and submit the Annual Workplan and Budget to the Authorized Entity Group for review and approval. The Permit Oversight Group will review the draft Annual Workplan and Budget and confirm that final decisions of the group or of the individual fish and wildlife agencies, or decisions in which they participated in making, are accurately reflected in the draft, particularly with respect to matters involving adaptive management and biological monitoring and research. A draft of the Annual Workplan and Budget will be submitted for review and comments to the Authorized Entity Group no later than 3 months, and the Permit Oversight Group and the Stakeholder Council no later than 2 months, prior to the release of the final Annual Workplan and Budget.

At a minimum, the Annual Workplan and Budget will contain the following information.

- A description of the planned actions (including matters under consideration in the adaptive management process) to implement conservation measures (for water operations conservation measures, see Section 6.3.4, *Annual Water Operations Report*) and the entities that will carry out the actions.

[3] The Implementation Office will decide how the planning year will be bounded (e.g., calendar year, federal fiscal year, state fiscal year, or water year).

- A description of the planned monitoring actions and the entities that will implement those actions.
- A description of the anticipated research studies to be undertaken and the entities that will conduct the studies.
- A budget reflecting the costs of implementing the planned actions, including a line item for each specific action.
- A description of the sources of funding to support the budget.

6.3.2 Annual Water Operations Plan

The Implementation Office will work closely with SWP and Central Valley Project (CVP) operation managers to ensure the proper implementation of water operations conservation measures, which take effect when the proposed north Delta diversion and conveyance facilities become operational. DWR and Reclamation will retain their authority and obligation to determine overall water project operations consistent with their existing authorities. DWR and Reclamation will conduct Delta operations in close coordination with CDFW, USFWS, and NMFS and in accordance with permitted operating criteria, and consistent with the planning processes described below.

Beginning in the year prior to the initiation of operations of the proposed north Delta diversion and conveyance facilities (assumed to be year 9), and no later than 3 months prior to each implementation year thereafter[4], DWR and Reclamation will jointly develop an Annual Water Operations Plan, including provisions for seasonal variations, that includes the following elements.

- Operational priorities for both fisheries and water supply for the upcoming year.
- Expected operations, including consideration of real time operational criteria, established in the water operations conservation measures.
- Monitoring, data collection, research, and potential adaptive management actions associated with water operations for the upcoming year.

DWR and Reclamation will use prior years' Annual Water Operations Reports to inform development of the Annual Water Operations Plan. DWR and Reclamation will seek input from the Implementation Office, Permit Oversight Group, Adaptive Management Team, and the Stakeholder Council regarding the draft Annual Water Operations Plan. DWR and Reclamation will retain final approval authority over the plan; however, the Permit Oversight Group will, in a timely manner, review the draft plan and confirm that the plan is consistent with the provisions of the BDCP, the Implementing Agreement[5], or the associated regulatory authorizations. The Implementation Office will incorporate, for informational purposes, the final Annual Water Operations Plan into the Annual Work Plan and Budget (Section 6.3, *Planning and Compliance and Progress Reporting*).

[4] Currently, DWR prepares water operations plans for the SWP by the end of June each year to allow for preparation prior to their implementation at the start of each water year on October 1.

[5] The Implementing Agreement, Appendix 7.A, is a separate legal document, the purpose of which is to assure that the terms and conditions of the BDCP and associated permits are implemented.

6.3.3 Annual Progress Report

At the end of each implementation year, the Implementation Office will prepare an Annual Progress Report. These reports will provide a summary of the activities carried out during the previous implementation year. The Annual Progress Report will include, among other things, a description and accounting of land acquisitions and natural community restoration activities that occurred during the prior year, an update on the status of the adaptive management and monitoring programs (including a discussion of the synthesis and use of data and information and the identification of important trends), and a summary of water operations reflected in the Annual Water Operations Report. The Annual Progress Report will also include an assessment of the progress made toward achieving the biological goals and objectives of the BDCP. Annual reports will be completed within 6 months of the close of the reporting year.

The annual reports will include the following types of information.

- A summary of the Annual Water Operations Report (Section 6.3.4, *Annual Water Operations Report*).
- Documentation of the implementation of natural community conservation measures (i.e., protection, enhancement, creation, restoration of habitat) in relation to the implementation schedule set out in Section 6.1, *Implementation Schedule*, including the following components.
    - A summary of the completed or in-progress conservation actions, including information related to type, extent, and location of protected, enhanced, and restored natural communities and modeled habitat for covered species[6]. This summary will identify the lands acquired and the restoration and enhancements actions undertaken over the year, and describe the covered species that are expected to benefit from each action. The report will document this on an annual and cumulative basis.
    - A general summary of all land management activities undertaken on conservation lands, including a description of the management issues facing the Implementation Office at each preserve unit.
    - The status of the conservation lands system assembly and an assessment of the progress toward all acquisition goals, including those related to natural communities, landscape linkages, covered plant populations, and wetland protection. This assessment will include evaluation of compliance with the reserve design and assembly principles as described in Chapter 3, *Conservation Strategy*.
    - Identification of natural community conservation actions that have not been implemented in accordance the implementation schedule (i.e., actions that are either behind or ahead of the implementation schedule) and an explanation for the deviation from the schedule.
- Documentation of the implementation of "other stressors" conservation measures (CM12 through CM21) in relation to the implementation schedule set out in Section 6.1, *Implementation Schedule*, including the following components.
    - A summary of the actions completed or in progress for each conservation measure, including information related to type, location, and method of implemented actions. This

[6] Species habitat distribution models may change over the course of the Plan as understanding of species' ecology improves. However, loss of modeled habitat for covered species will be reported based on models at the time of Plan approval to ensure consistent tracking throughout the permit term.

summary will identify the expected benefits to covered species resulting from each action. The report will document this on an annual and cumulative basis.

- An assessment of progress toward meeting all goals and objectives relevant to "other stressors" conservation measures.
- Identification of conservation actions proposed under the "other stressors" conservation measures that have not been implemented in accordance the implementation schedule (i.e., actions that are either behind or ahead of the implementation schedule) and an explanation for the deviation from the schedule.

- A description of the implementation of covered activities and their effects on natural communities and covered species, including the following items.
  - An assessment of nature and extent of the effects of covered activities on covered natural communities and covered species. The report also will contain the following elements.
    - A brief description of the covered activity and the entity that carried out the covered activity.
    - The location of a natural community or covered species modeled habitat permanently or temporarily affected.
    - The identity and location of any known occurrences of covered species affected by the covered activities (e.g., take of covered species).
  - A brief description of the type, extent, and location of measures implemented to avoid and minimize the potential effects of covered activities on covered species during the reporting period.
  - A summary of the overall level of effects, both beneficial and adverse, over the course of the reporting year and a summation of effects of all prior years of covered activities on covered natural communities and for covered species.
- An evaluation of the results of monitoring and research activities, including descriptions of the following activities.
  - Ecosystem/landscape-scale, natural community, and species monitoring activities (as described in Section 3.6, *Adaptive Management and Monitoring Program,* or in monitoring plans subsequently developed during implementation) undertaken during the reporting period and a summary of monitoring results with appropriate assessment of population trends and status of covered species.
  - All directed research conducted by the BDCP during the reporting period and a summary of research results to date.
- Descriptions of the following adaptive management activities.
  - Adaptive management decisions made during the reporting period, including how existing information was used to guide these decisions and the rationale for the action.
  - Use of independent scientists or other experts in the adaptive management decision-making processes.
  - Adopted and recommended changes to the implementation of conservation measures based on interpretation of monitoring results and research findings.

- A financial report describing funds made available to the Implementation Office by source; annual and cumulative expenditures by cost category; deviations in expenditures from the annual budget; and other relevant information as appropriate (a detailed budget will be included in the Annual Workplan and Budget [Section 6.3.1, *Annual Workplan and Budget*]).
- Descriptions of actions implemented or pending to respond to changed circumstances.
    - Identification of the changed circumstance and its effects on covered species and natural communities.
    - Actions taken to address the changed circumstance and the effectiveness of those actions, including the outcomes of actions to address changed circumstances from earlier years.
- A summary of any administrative changes, minor modifications, or major amendments to the plan proposed or approved during the reporting period.

6.3.4 Annual Water Operations Report

Beginning in the first year that the proposed north Delta diversions and conveyance become operational, and no later than November 15 of each year, DWR and Reclamation, with input from the SWP and CVP contractors, the state and federal fish and wildlife agencies, the Implementation Office, and the Stakeholder Council, will prepare an Annual Water Operations Report on the prior water year's operational effects on covered species. The report will include the following components.

- A summary of the prior year's operations, including a comparison of the actual operations with planned operations.
- Evaluation of the effectiveness of actions for covered fish species and ecological processes, including the responses to real-time operational changes.
- Description of the extent to which water supply projections in the prior year's Annual Water Operations Plan were met, and if not met, identification of factors affecting the ability to meet projections.
- Consideration of whether any protective actions should be altered in light of new information or their effect on meeting fishery protection goals and objectives or water supply reliability targets.
- Documentation of compliance with the water operation criteria in effect during the reporting period.
- Documentation and rationale for any deviations from the water operation criteria in effect during the reporting period.

6.3.5 Five-Year Comprehensive Review

The implementation of the BDCP will be subject to a comprehensive review every 5 years throughout the term of the Plan. As part of this review, the Implementation Office will prepare a report, the Five-Year Comprehensive Review, to document the findings of this review.

The objectives of the Five-Year Comprehensive Review are as follows.

- To provide an overview of the status of BDCP implementation, including implementation of conservation measures and the progress made toward meeting biological goals and objectives.

- To assess covered species trends and natural community conditions associated with BDCP implementation relative to overall trends and conditions for covered species and natural communities based on all relevant information (i.e., not limited to BDCP data and reports).
- To evaluate the relevance of the various monitoring actions and research projects to the implementation of conservation measures.
- To evaluate changes that have been made in the implementation of the BDCP and set out potential modifications that may be advisable in the future based on new information and lessons learned.

The primary purpose of the Five-Year Comprehensive Review is to provide a periodic, program-level assessment of the progress made under the BDCP toward achieving the biological goals and objectives and water supply reliability targets. As such, the review will be focused on identifying and evaluating broad ecological trends in the Delta, including covered species abundance, variability, distribution, and population growth rate; ecological processes and stressors such as hydrodynamics, foodwebs, and contaminants; natural community distribution, function, and diversity; natural community restoration extent and functionality; and other relevant measures.

In contrast to the annual report, the Five-Year Comprehensive Review will require significant analysis and synthesis of data collected over time, using data and information compiled from various sources. Five-Year Comprehensive Reviews will include critical evaluations of the assumptions and model outputs on which the BDCP has been based and of the efficacy of the conservation measures in light of monitoring data and the analysis and synthesis of information through the adaptive management process.

The Five-Year Comprehensive Review also will include an evaluation of the BDCP monitoring program, assessing such issues as the program's capacity to adequately measure the BDCP's progress toward achieving biological goals and objectives. The review will discuss the lessons that have been learned during the course of implementation and reach conclusions regarding how best to approach monitoring into the future. The review also will afford an opportunity to evaluate the biological goals and objectives and assess their continued relevance in light of new information that has become available.

The Five-Year Comprehensive Review will be developed in close coordination with the Interagency Ecological Program, Delta Science Program, and Independent Science Board. The Implementation Office will work with the Interagency Ecological Program lead scientist and the Delta Science Program science manager to consolidate data and information from a range of sources. The review may be scheduled to coincide with the Delta Science Conference to capitalize on the gathering of the community of scientists engaged in Delta issues.

6.3.6 Five-Year Implementation Plan

Based on the Five-Year Comprehensive Review, the Implementation Office will prepare a Five-Year Implementation Plan that covers the upcoming 5 years. In contrast to the Annual Workplan and Budget, the Five-Year Implementation Plan will focus more broadly on potential future implementation actions and adaptive management changes, other potential modifications to the BDCP, and the significance of ecological trends. At a minimum, the Five-Year Implementation Plan will contain the following information.

- Description of potential adaptive management changes to BDCP implementation of conservation measures, monitoring, research, and program administration.
- Modifications to biological goals and objectives that should be considered.
- Summary of the planned actions and schedule, including potential revisions, to implement conservation measures.
- Description of expected long-term and system-wide monitoring actions and anticipated research studies.
- Summary budget projections reflecting the costs of implementing the planned actions.

In years when Five-Year Implementation Plans are prepared, the Annual Workplan and Budget may be included with or prepared separately from the Five-Year Implementation Plan.

6.4 Regulatory Assurances, Changed Circumstances, and Unforeseen Circumstances

6.4.1 Regulatory Assurances

ESA regulations and provisions of the NCCPA provide for regulatory and economic assurances to parties covered by approved HCPs or NCCPs concerning their financial obligations under a plan. Specifically, these assurances are intended to provide a degree of certainty regarding the overall costs associated with species mitigation and other conservation measures, and add durability and reliability to agreements reached between Authorized Entities and the fish and wildlife agencies. That is, if unforeseen circumstances occur that adversely affect species covered by an HCP or NCCP, the fish and wildlife agencies will not require additional land, water, or financial compensation or impose additional restrictions on the use of land, water, or other natural resources.

The assurances provided under the ESA and the NCCPA do not prohibit or restrain USFWS, NMFS, CDFW, or any other public agency from taking additional actions to protect or conserve species covered by an NCCP or HCP. The state and federal agencies may use the variety of tools at their disposal and take actions to reduce the effects of other stressors to ensure that the needs of species affected by unforeseen events are adequately addressed.

6.4.1.1 Regulatory Assurances under the Endangered Species Act—The No Surprises Rule

Under the No Surprises rule (63 FR 8859, Feb. 23, 1998), once an incidental take permit has been issued pursuant to an HCP, and its terms and conditions are being fully implemented, the federal government will not require additional conservation or mitigation measures, including land, water (including quantity and timing of delivery), money, or restrictions on the use of those resources (63 FR 8868)[7]. If the status of a species addressed under an HCP unexpectedly declines, the primary obligation for undertaking additional conservation measures rests with the federal government,

[7] The No Surprises rule was promulgated jointly by the Department of the Interior (U. S. Fish and Wildlife Service) and the Department of Commerce (National Marine Fisheries Service).

other government agencies, or other nonfederal landowners who have not yet developed HCPs. The federal fish and wildlife agencies provide the following explanation.

> Once an HCP permit has been issued and its terms and conditions are being fully complied with, the permittee may remain secure regarding the agreed upon cost of conservation and mitigation. If the status of a species addressed under an HCP unexpectedly worsens because of unforeseen circumstances, the primary obligation for implementing additional conservation measures would be the responsibility of the Federal government, other government agencies, and other non-Federal landowners who have not yet developed an HCP (63 FR 8867).

However, the federal fish and wildlife agencies may, in the event of unforeseen circumstances, require additional measures provided they are limited to modifications in conserved natural community areas or to the conservation plan's operating conservation program (i.e., the conservation strategy) for the affected species, and that these measures do not involve additional financial commitments or resource restrictions without the consent of the permittee (the permittees will be those Authorized Entities that receive permits from USFWS and NMFS pursuant to Section 10. Those Authorized Entities that are covered under permits issued under Section 10 are expected to include DWR and certain SWP and CVP water contractors. These assurances are provided to all HCP permittees that properly implement their plans. The No Surprises rule, however, does not apply to Reclamation, which will use the BDCP as the basis for a biological assessment to support the issuance of take authorizations from USFWS and NMFS pursuant to Section 7 of the ESA for its actions in the Delta.

The assurances provided by the No Surprises rule are not absolute and are tempered by other regulatory provisions of the ESA. The Permit Revocation rule moderates the scope of the No Surprises rule, providing that in instances where a species covered by an HCP is threatened with extinction, assurances may be nullified and USFWS may revoke the HCP permit (50 CFR 17. 22(b)(8)). The federal fish and wildlife agencies may exercise this authority even if a permittee is in compliance with the terms and conditions of the permit, provided the permitted activity would appreciably reduce the likelihood of the survival and recovery of the species in the wild (69 FR 71723, 71727; December 10, 2004).

6.4.1.2 Regulatory Assurances under the Natural Community Conservation Planning Act

Under the NCCPA, CDFW provides assurances to permittees (those Authorized Entities that receive permits from CDFW pursuant to Section 2835 of the NCCPA) commensurate with the long-term conservation assurances and associated implementation measures that will be implemented under the BDCP.[8] In its determination of the level and term of the assurances to be afforded a permittee, CDFW takes into account the conditions specific to the plan, including such factors as the level and quality of information regarding covered species and natural communities, the sufficiency and use of the best available scientific information in the analysis of impacts on these resources, reliability of mitigation strategies, and appropriateness of monitoring techniques, including the use of centralized information to evaluate the effectiveness of the plan; the adequacy of funding assurances; the range of foreseeable circumstances that are addressed by the plan; and the size and duration of the plan.[9]

[8] Fish & Game Code 2820 (f)states, "The department may provide assurances for plan participants commensurate with long-term conservation assurances and associated implementation measures pursuant to the approved plan."

[9] DFG bases its determination of the level of assurances on multiple factors. See Fish & Game Code 2820(f).

Based on an evaluation of these factors, CDFW will provide the Authorized Entities with regulatory assurances for the 50-year duration of the Plan.

The assurances provided to the entities receiving permits under the NCCPA will, at a minimum, ensure that if there are unforeseen circumstances, no additional financial obligations or restrictions on the use of resources will be required of the permittees without their consent. Specifically, the NCCPA directs that,

> [i]f there are unforeseen circumstances, additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources shall not be required without the consent of plan participants for a period of time specified in the implementation agreement, unless [CDFW] determines that the plan is not being implemented consistent with the substantive terms of the implementation agreement (Fish & Game Code 2829(f)(2)).

However, like the provision in the ESA regulations, the NCCPA requires that CDFW suspend or revoke a permit, in whole or in part, if the continued take of a covered species would jeopardize its continued existence.

6.4.2 Changed Circumstances

Ecological conditions in the Delta are likely to change as a result of future events and circumstances that may occur during the course of the implementation of the BDCP. This section identifies changes in circumstances that are reasonably foreseeable and that could adversely affect reserve system lands or waters in the Plan Area, consistent with the "changed circumstances" provisions of ESA regulations and in the NCCPA. To ensure successful implementation of the conservation strategy, the Plan further sets out measures designed to respond to these anticipated future changes.

In the context of the ESA, changed circumstances are defined as "changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the [USFWS and NMFS] and that can be planned for." The NCCPA similarly defines changed circumstances as "reasonably foreseeable circumstances that could affect a covered species or geographic area covered by the plan" (50 CFR 17. 3, 50 CFR 222. 102, and Fish & Game Code 2805(c).

This section identifies the specific changed circumstances that can reasonably be expected to occur in the Plan Area during the course of plan implementation and that may compromise the effectiveness of the implementation actions set out in the BDCP. The section further describes the responses that will be implemented through the BDCP to adequately address such events and their potential to prevent or impede the BDCP from achieving anticipated biological outcomes. The specific approaches and steps related to many of the planned responses largely will be developed and implemented through the adaptive management and monitoring program (Section 3.6, *Adaptive Management and Monitoring Program*). However, for certain changed circumstances, responsive actions will fall outside the scope of the adaptive management and monitoring program; these actions are specifically described in this section. The planned responses to changed circumstances have been designed to be practical and roughly proportional to the impacts of covered activities on covered species and natural communities, yet sufficient to effectively address such events.

For each changed circumstance, the cost of implementing the planned responses was accounted for in the budget established for the BDCP (Chapter 8, *Implementation Costs and Funding Sources*).

6.4.2.1 Process to Identify Changed Circumstances

The Implementation Office will be responsible for identifying the onset of a changed circumstance, using information obtained from system-wide or effectiveness monitoring, scientific study, or information provided by other sources. Once the Implementation Office has become aware that a changed circumstance has occurred or is likely to occur, it will take immediate steps to investigate and confirm the event. If a changed circumstance appears to have occurred, the Implementation Office will contact the fish and wildlife agencies to inform them of the changed circumstance. The Implementation Office will also notify the Authorized Entities, Permit Oversight Group, and the Stakeholder Council of the change in circumstances.

After documenting the occurrence of a changed circumstance, the Implementation Office will determine specific responsive actions that are consistent with the requirements set out in this section and develop a schedule for their implementation. The Implementation Office will confer with the fish and wildlife agencies regarding the details of the response and a timeframe for implementation. For actions implemented through the adaptive management and monitoring program, the decision-making process described in Section 3.6, *Adaptive Management and Monitoring Program*, will be used. After implementing these actions, the Implementation Office will monitor their effectiveness and report the associated results and findings through the annual reporting process.

6.4.2.2 Changed Circumstances Related to the BDCP

The following changed circumstances are described and will be addressed in implementation if they occur.

- Levee failures
- Flooding
- New species listing
- Wildfire
- Toxic or hazardous spills
- Nonnative invasive species
- Climate change

The Implementation Office will respond to all changed circumstance events that meet the changed circumstances criteria as defined in the following sections.

6.4.2.2.1 Levee Failures

Nature of Changed Circumstance

During the course of BDCP implementation, levee failures may occur in the Plan Area, and such failures may compromise or eliminate the benefits provided by some reserve system lands or by some conservation measures. Levees in the Delta sometime fail as a result of events or conditions such as earthquakes, flooding, and structural inadequacy (also known as “sunny day events”) (California Department of Water Resources 2009, 2011). All levee failures are considered a changed circumstance under the BDCP if the failure meets any of the following criteria and is within the limits described in the following paragraphs.

- Diminishes significantly the function of reserve system lands, as jointly determined by the Implementation Office and the fish and wildlife agencies.
- Precludes implementation of conservation measures.
- Impedes the implementation of water operations conservation measures.

Given the current and anticipated future state of the Delta, all reserve system lands and other resources conserved by the plan that are currently or will be protected by a levee are susceptible to the consequences of levee failures due to the influence of external events on levees. It is foreseeable that several natural community types in the reserve system could be affected by this changed circumstance. These include managed wetlands and cultivated lands in Conservation Zones 1 and 11 (up to 9,000 acres) and other natural seasonal wetlands, nontidal permanent freshwater emergent wetlands, and nontidal perennial aquatic in Conservation Zones 2 and 4 (up to 400 acres total). In addition, all natural community enhancement or restoration in levee-protected floodplains will be vulnerable to flooding caused by a levee failure. Natural community enhancement or restoration in floodplains could be damaged if levee failure occurs before riparian plantings become established. Finally, a single levee failure event could temporarily impede implementation of water operation conservation measures either in the north or south Delta, but not both simultaneously. The Implementation Office will implement corrective actions for all changed circumstance events that meet this definition.

Rationale

Different types of events are likely to cause different kinds of levee failures, which result in different types of effects. A single external event may cause the failure of one or more levees, causing the flooding of one or more islands or tracts in tidally influenced areas. An earthquake or large peak flow event may result in multi-levee failure and multi-island or multi-tract flooding (California Department of Water Resources 2009). A sunny day event is more likely to cause the failure of a single levee and to affect nearby areas (California Department of Water Resources 2009). As such, levee failures hold the potential to cause widespread or localized flooding, which could extend to multiple islands or be confined to a levee subsection.

Available historical data suggest that external events will likely occur during the permit term that cause levee failures. Since 1900, an average of 1.31 failures per year have occurred, excluding earthquakes and Suisun Marsh (historical records in Suisun Marsh are incomplete). Looking at trends in more recent years (1950 through 2006) that are more likely to represent future risks, 74 storm-related levee failures (1.36 per year) and 8 sunny-day failures (0.10 failures per year in the Delta and 0.04 per year in Suisun Marsh) have occurred in the Plan Area (California Department of Water Resources 2008).

In most of the Delta, a levee failure causes the flooded area to become tidally influenced. The depth and extent of the flooded area will change with the tides. One or more levee failures could affect the volume of water that moves in and out of the area during the tidal cycle (i.e., the tidal prism). Multiple levee failures could expand the tidal prism enough to cause the high tide to be lower and/or the low tide to be higher than normal. Such changes, if not reversed by levee repair, could alter the distribution of tidally influenced natural communities, all of which are sensitive to small variations in depth, frequency, and duration of tidal inundation. Over a period of years, the affected natural communities will reach equilibrium with the new tidal range, but the end result will be changes in the distribution and acreage of each tidally influenced natural community.

There are a number of compounding effects that make it difficult to use historical data to accurately predict future events. Both the likelihood of failure and locations within the reserve system or water system operations vulnerable to levee failure need to be considered. Likelihood of failure is influenced by external events, levee condition (e.g., age, location, height, construction), current site characteristics (e.g., geology, groundwater conditions, tidal conditions), and changing conditions (e.g., amount of water, sea level rise, earthquakes). Locations vulnerable to failure include current and future locations below sea level (e.g., subsided islands/tracts). To that end, the changed circumstances analysis looks at which areas of the reserve system or water system could be affected by a levee failure.

Many conservation measures protecting or restoring natural communities will be implemented in areas that are not within tidal elevation ranges, but some of these measures will occur in areas protected by and behind levees. Failure of those levees may compromise the function of these protection and restoration actions. Identifying the natural communities vulnerable to this impact depends on the final configuration of levee removal or relocation projects, but these communities may include managed wetlands and cultivated lands in Conservation Zones 1 and 11, as well as other natural seasonal wetlands, nontidal permanent freshwater emergent wetlands, and nontidal perennial aquatic communities in Conservation Zones 2 and 4. If an adjacent levee is breached, the function of these protected or restored communities could be diminished. If levee repair does not occur, these areas may change to natural communities associated with floodplains, such as valley/foothill riparian, grassland, alkali seasonal wetland, nontidal freshwater perennial emergent wetland, or seasonally flooded cultivated lands.

Levees protect infrastructure required for implementation of water operations conservation measures. The dual conveyance system will allow operational flexibility if levee failure impedes water withdrawals from the north Delta or south Delta intakes; however, increased withdrawals may be required from the undamaged intakes. Levee failure could also restrict water delivery to the Yolo Bypass and the level of flooding required for conservation measure implementation will be difficult to maintain. Because of the distance separating the north Delta and south Delta facilities, it is foreseeable that levee failure will impede water operations in the north Delta or south Delta, not both simultaneously. Levee repair may be required to ensure implementation of water operations conservation measures.

Levees also protect floodplains adjacent to waterways (e.g., along the San Joaquin River). Breaching of these levees is possible during flood events in the rainy season. The effects of such flooding will likely be temporary because water will ultimately recede. Seasonally inundated floodplain restoration, channel margin enhancement, or riparian natural community restoration may occur in levee-protected floodplains; however, the natural communities created by these efforts are adapted to and therefore resilient to flooding. They are shaped by their proximity to streams and are maintained by seasonal flooding in winter and spring and by drought in summer. Diminished function of these natural communities from levee failures is not anticipated; however, new riparian plantings may need to be replaced if levee failure results in their destruction.

Planned Responses

The two foreseeable scenarios described below involve the failure of levees that result in either the loss or degradation of natural community or create an impediment to the proper implementation of the conservation strategy, including the operations of the SWP and CVP. The remedial actions that will be undertaken to address such circumstances are described for each scenario. The scenarios

cover those events that occur as a result of failures of BDCP levees and those that occur as a result of failure of non-BDCP levees.

Failure of levees constructed as part of the BDCP (BDCP-related levees). BDCP-related levees will be designed and constructed to standards required by USACE and the jurisdictional flood management authority, to minimize the risk of failure. In the event of the failure of a BDCP-related levee, the Implementation Office will either repair the breached levee or undertake other measures that produce at least equivalent benefits for covered species and natural communities affected by the event. These measures will be consistent with the process and schedule identified in this section.

The Implementation Office will be responsible for undertaking, in a timely manner, an assessment of the levee failure, which will include the following actions.

- An evaluation of the effects of the failure on the covered species and natural communities addressed by the BDCP.
- A description of the proposed remedial actions.
- A process and schedule for their implementation.

The Implementation Office will evaluate the affected site to determine whether biological conditions for any of the covered species have been degraded and what, if any, feasible and reasonably achievable corrective actions are necessary.

Corrective actions could occur at the affected site or at another location. Actions taken on site will likely include the repair of the levee, restoration of the affected site, or equivalent measures.

In most cases, levees will need to be repaired or replaced to maintain permit compliance. However, in cases where the levee does not need to be fixed, alternative sites may be protected or restored at lower cost and effort than required for levee replacement. Offsite corrective actions will require a different process and timeline than onsite actions. Offsite natural community restoration replacement will require the identification of a site suitable for a replacement project. The Implementation Office will identify and oversee the acquisition of an appropriate property and manage the planning, design, and permitting, if any, necessary to effectuate the project.

Failure of levees not constructed as part of a covered activity (non-BDCP levees). The Implementation Office will also be responsible for implementing remedial measures associated with the failure of non-BDCP levees when those failures adversely affect natural communities protected through covered activities, including by interfering with the operations of the projects, and will seek funding or reimbursement costs from the appropriate responsible entity. A similar process to that identified above for failure of BDCP-constructed levees will be followed. However, the schedule for remedial action implementation will likely be longer because of the necessary involvement of third parties with responsibility for the affected levee.

Several responsible flood management entities in the Plan Area manage non-BDCP levees. These entities include USACE and local water districts. State and federal levees in the Delta that are at risk of failure or that otherwise require repair or replacement are covered by the levee repairs program under Section 821 of the Disaster Preparedness and Flood Prevention Bond Act of 2006 (Proposition 1E). Local agencies that maintain levees may seek funding assistance through the local levee grant program, which provides for cost-sharing between the state and local agencies for work done on lands deemed critical by DWR.

In the event of a non-BDCP levee breach, the Implementation Office will evaluate the affected site to determine whether covered species or their habitat have been adversely affected, or whether the breach had the potential to adversely affect aquatic habitats used by covered species. Adverse effects could include reduced benefits to covered species from diminished conservation measures. The site of the levee failure will be evaluated to allow adequate time for the Implementation Office to contact and coordinate with the responsible flood management entity. For example, the Implementation Office may need to obtain permission from the local entity to access the property.

The Implementation Office will follow the same procedure for site assessment as it will for a BDCP-related levee failure. The Implementation Office will also coordinate with the responsible flood management entity to ensure that the responsible entity repairs the levee. The responsible flood management entity will therefore assume financial responsibility for the costs of the remedial action, including for the levee repair work and the restoration of the affected reserve system lands. However, to ensure that the repair work occurs quickly and permit compliance is not compromised, the Implementation Office may need to assist the responsible local flood management entity (e.g., provide funding to be reimbursed or complete repairs and be reimbursed).

6.4.2.2.2 Flooding

Nature of Changed Circumstance

Any flood events in the reserve system caused by excessive precipitation, or floods of a magnitude up to a 100-year level, will be considered a changed circumstance if the flooding is determined to cause permanent loss of the ecological benefits provided by conservation measures. The Implementation Office will implement corrective actions for all changed circumstance events that meet this definition.

Rationale

Flooding is a natural event in stream systems, having both beneficial and detrimental effects on natural communities. Seasonally inundated floodplain restoration, channel margin enhancement, or riparian natural community restoration are resilient to flooding because they may occur in floodplains. These communities are shaped by their proximity to streams and are maintained by seasonal flooding in winter and spring and by drought in summer. Any adverse effects of flooding will likely be temporary because flood waters will ultimately recede. However, severe flooding along stream channels with new riparian plantings could destroy restoration lands.

Damage or destruction of facilities and infrastructure constructed to implement the conservation strategy due to flooding is not expected. Facilities and infrastructure will be constructed outside of floodplains or to withstand a severe peak flow event.

Planned Response

The conservation strategy includes measures to reduce the risk of natural flooding of certain reserve system lands. Still, remedial measures may be necessary if flooding causes permanent loss of natural community values created through covered activities. The remedial measure implemented in response to a flood event less than the 100-year event will be to repair or replace the restoration site once flood water recedes, consistent with the conservation strategy described in Chapter 3, *Conservation Strategy,* and any permits acquired for the original project (e.g., USACE permit).

6.4.2.2.3 New Species Listings

Nature of the Changed Circumstance

USFWS, NMFS, or CDFW may list additional species that occur in the Plan Area as threatened or endangered under the ESA or the California Endangered Species Act (CESA)[10]. In the event that a fish and wildlife agency lists a species not covered by the BDCP, the provisions of this changed circumstance will be triggered. The Implementation Office will implement corrective actions for all changed circumstance events that meet this definition. A new species listing of a covered species will not trigger this changed circumstance because the Plan already anticipates such actions by providing for the conservation of each covered species. Thus, take coverage for the newly listed covered species will be automatic.

Planned Response

Upon a new listing of a species (not covered by the BDCP) under state or federal endangered species laws, the Implementation Office will undertake the following measures.

- Evaluate the potential effects of covered activities on the newly listed species and conduct an assessment of the presence of suitable habitat in areas of potential effect.
- Implement measures to avoid effects on the newly listed species until such time as take authorization for the newly listed species has been secured, either by amending the Plan to include the newly listed species as a covered species, or by securing a new and separate take authorization.

In the event that a species not covered by the BDCP becomes listed as threatened or endangered, is designated as a candidate species, or is proposed or petitioned for listing, the Implementation Office, on behalf of the Authorized Entities, may request that the appropriate fish and wildlife agency add the species to the relevant take authorizations issued pursuant to the BDCP. In determining whether to seek take coverage for the species, the Implementation Office will consider, among other things, whether the species is present in the Plan Area, whether the covered activities could result in incidental take of the species, and whether the existing conservation measures benefit the species and avoid and minimize effects of covered activities on the species. If incidental take coverage is sought, the BDCP and its authorizations will be amended. Alternatively, the Implementation Office, on behalf of the Authorized Entities, could seek new and separate take authorizations. The procedures for plan modifications and amendments are described in Section 6.5, *Changes to the Plan or Permits.*

6.4.2.2.4 Wildfire

Nature of Changed Circumstance

Wildfire will be considered a changed circumstance in the event that any number of fires not prescribed by the Implementation Office (i.e., as part of conservation strategy implementation in conservation lands) damages or destroys sufficient amounts of vegetation to substantially degrade the intended natural community functions of conservation lands for covered species. The scope of

[10] A species designated by the State of California as a candidate for listing also receives regulatory protection during the review of the candidacy. As such, the provisions set out in this changed circumstance will apply to state-designated candidate species.

the remedial actions required for a single event will be limited to an area of no greater than 1,300 acres of reserve system lands in Conservation Zones 1, 8, or 11 because of the expected configuration and land cover type composition of these lands. This limit corresponds to the expected limit in size of a wildfire in any of these three zones. The remedial actions will be limited to no more than 1,300 acres. The Implementation Office and the fish and wildlife agencies will jointly determine the nature and extent of habitat loss resulting from the fire. The Implementation Office will implement corrective actions for all changed circumstance events that meet this definition.

Rationale

Fire-adapted natural communities in conservation lands include grassland and inland dune scrub, totaling at least 8,000 acres in the conservation lands. Other natural communities in the conservation lands are not fire-adapted or fire-prone because of their low fuel loads and high moisture context (e.g., cultivated lands, wetlands, riparian areas). Wildfire in grassland or inland dune scrub is unlikely to substantially degrade these communities because they are both fire-adapted, early-successional natural communities. Because of the layout of conservation lands, the distribution of the fire-prone communities, and the presence of many waterways that serve as barriers to fire, it is likely that a single wildfire event will affect a contiguous area no greater than 1,300 acres in Conservation Zones 1, 8, or 11 (i.e., a single fire of no more than 1,300 acres in any of these three zones).

Planned Response

In the event of a fire in conservation lands, the Implementation Office will notify the fish and wildlife agencies of the fire event and conduct a preliminary assessment of the likely effects of the fire on covered species and reserve system lands of a size that is defined above as foreseeable. This information will be used to make an initial determination of whether a changed circumstance has occurred. In most cases, a wildfire will be deemed a natural event that has neutral or beneficial effects on a fire-adapted community. If a changed circumstance is determined to exist, the Implementation Office will implement a series of remedial measures. First, the Implementation Office will conduct a more detailed assessment within 3 months of the event to identify appropriate post-fire restoration and rehabilitation actions, if any. Such actions, which may include natural community restoration, nonnative invasive species control, or erosion management, will be undertaken to ensure reestablishment of covered plants and other native vegetation through active or passive means, as appropriate. In addition, appropriate erosion control structures and applications (e.g., seeding) will be put in place before the upcoming rainy season.

The Implementation Office will also implement a post-fire monitoring plan for a 2-year period following the fire. If over the course of the monitoring period it is determined that vegetation was not recovering sufficiently in the burned area to reestablish the original functions of the affected natural community, the Implementation Office will develop and implement a natural community restoration plan to restore natural community functions of the affected areas.

6.4.2.2.5 Toxic or Hazardous Spills

Nature of Changed Circumstance

Toxic or hazardous spills will be considered a changed circumstance if the spill of chemicals into Delta waters or into a protected or restored aquatic natural community could substantially and adversely affect habitat functions for a covered species, as jointly determined by the Implementation

Office and the fish and wildlife agencies. The scope of the remedial actions required will be limited to an area of no greater than 4,000 acres of reserve system lands, inclusive of restoration sites. The Implementation Office will implement corrective actions for any event that meets this definition.

Rationale

A single spill of toxic or hazardous materials could not affect the entire reserve system (i.e., protected and restored lands and waters) because the system is noncontiguous and dispersed. The parameters defining this changed circumstance reflect the amount of land that will ultimately be protected in the reserve system that may be vulnerable to a spill event. The largest contiguous area of potential restoration occurs in Conservation Zone 11. Conservation targets in Zone 11 include Suisun Marsh ROA tidal restoration (7,000 acres), and additional restoration and protection that is assumed to be 9,000 acres, for a total estimated size in Suisun Marsh of 16,000 acres. A toxic or hazardous spill is not expected to affect the entire reserve in this area, so the changed circumstance threshold represents 25% of the reserve system land base in Conservation Zone 11. Only spills that meet this criteria will be considered a changed circumstance under the BDCP.

Planned Responses

There are existing local, state, and federal statutory frameworks that dictate the process and approach to the cleanup of toxic and hazardous waste. The U. S. Environmental Protection Agency (EPA) is the lead federal agency responsible for the enforcement of federal regulations associated with hazardous materials. The primary legislation governing hazardous materials are the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC Section 9601 *et seq.* 1980); the Resource Conservation and Recovery Act (RCRA) (42 USC Section 6901 *et seq.* 1976); and the Superfund Amendments and Reauthorization Act (SARA) of 1986.

The cleanup of toxic or hazardous spills is governed by CERCLA. CERCLA provides for federal funding to support the cleanup of uncontrolled or abandoned hazardous waste sites, accidents, spills, discharges, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA has the authority to seek out those parties responsible for any hazardous release and assure their cooperation in the cleanup. The California equivalent to CERCLA is the California Hazardous Substance Account Act (Division 20 of the Health and Safety Code, Chapter 6.8). This act requires past and present owners and operators to assume liability for the remediation of hazardous waste sites within the State of California. At the local level, the Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs. The California Environmental Protection Agency (CalEPA) and other state agencies set the standards for their programs, and local governments implement the standards. These local implementing agencies are called Certified Unified Program Agencies. All remedial actions implemented by the Implementation Office or other responsible parties will be carried out in a manner consistent with the existing statutory framework.

The conservation strategy includes implementation of best management practices to avoid or minimize adverse effects from contaminant spills on covered species and natural communities that could result from covered activities (*CM22 Avoidance and Minimization Measures*). This includes the development and implementation of a hazardous materials management plan. The plan will include appropriate practices to reduce the likelihood of a spill of toxic chemicals and other hazardous materials during construction. A specific protocol for the proper handling and disposal of materials will be established before construction activities begin and will be enforced by DWR. All work will

be performed in accordance with the rules and regulations pertaining to safety established by the California Division of Industrial Safety. The avoidance and minimization measures that will be implemented through this framework are detailed in Appendix 3.C, *Avoidance and Minimization Measures*. For any spill event caused by a covered activity, the Implementation Office will immediately coordinate its response with CDFW's Office for Oil Spill Prevention, the Regional Water Quality Control Board, and other state and federal regulatory entities as appropriate to the nature of the spill event to curtail the immediate spread of the spill and minimize its effects.

As soon as practicable, or as otherwise directed by the aforementioned regulatory entities, the Implementation Office will identify and undertake management measures sufficient to remediate the effects of the toxic substance on covered species and affected habitats (e.g., removal or isolation of the material) and restore the ecological functions of the affected habitat. Onsite habitat restoration or enhancement will be initiated, to the extent practicable, within 1 year of the spill.

If the affected habitat areas cannot be practicably and effectively restored, the Implementation Office will identify and implement measures to contain the ecological effects of the spill and either compensate for the loss of habitat functions at other locations or implement alternative conservation measures (e.g., expanded or additional contaminant reduction measures) that provide equivalent or greater ecological benefits to the affected covered species. Offsite habitat restoration or enhancement will be initiated, to the extent practicable, within 2 years of the spill to allow for an appropriate site to be identified and protected, if necessary.

If a spill event has not been caused by a covered activity, the Implementation Office will coordinate with responsible regulatory agencies and the parties responsible for the spill event (responsible regulatory agencies and parties). The responsible regulatory agencies and parties will assume financial responsibility for the costs of remedial action, including spill cleanup and restoration of affected reserve system lands. However, to ensure that the spill cleanup occurs quickly, the Implementation Office may need to assist the responsible local flood management entity. The Implementation Office will ensure that responsible regulatory agencies and parties take immediate steps to contain the spill and minimize its impact on affected species and habitats. Within 3 months of spill event, the Implementation Office will work with the responsible regulatory agencies and parties to complete an assessment of the spill site and provide that assessment to the fish and wildlife agencies for review and concurrence (as per the process identified in Section 6.4.2.2.1, *Levee Failures*). On the basis of this assessment, the Implementation Office will coordinate with responsible regulatory agencies and parties to identity the measures that will need to be funded and/or undertaken by the responsible parties to adequately remediate the effects of the spill and restore the ecological functions of the affected habitat for covered species.

6.4.2.2.6 Nonnative Invasive Species

Nature of Changed Circumstance

A changed circumstance that involves the introduction and spread of a new nonnative invasive species will be considered to have occurred if the Implementation Office and the fish and wildlife agencies determine jointly that such a species is present in the Plan Area, and proliferation of the new nonnative invasive species affects an area equal to or less than the area occupied by the most prolific nonnative invasive species currently in the Plan Area. The Implementation Office's responsibility will be limited to taking actions on nonnative invasive species for which control

measures are available and effective. The Implementation Office will implement corrective actions for any event that meets this definition.

Rationale

Nonnative invasive species are a global in nature and adversely affect covered species and natural communities both inside and outside of the Plan Area. All of the natural communities represented in the Plan Area currently support a large number of nonnative invasive species, including plants, amphibians, fish, and invertebrates. The conservation strategy includes many measures to identify, treat, and, if possible, eradicate nonnative invasive species in the Plan Area in aquatic and terrestrial natural communities. These measures were designed to treat nonnative invasive species currently known in the Plan Area and that have widespread adverse effects on the covered species and natural communities. However, it is foreseeable that new nonnative invasive species will appear in the Plan Area during Plan implementation. Examples include quagga mussel and zebra mussel, which represent one of the principal invasive species risks in the Delta. If these or other invasive species were to become widespread, they could cause harmful effects on covered species or natural communities not considered by the effects analysis or the conservation strategy. It is the responsibility of the Implementation Office to address harmful species that are introduced or spread as a result of conservation measures (e.g., restoration actions that create conditions for colonization of new nonnative invasive species).

Nonnative invasive species that are introduced and spread in the Plan Area independent of conservation measures will be identified and treated as part of the conservation strategy within the limits of the Plan. However, such events are not defined as a changed circumstance and it is not the sole responsibility of Implementation Office to remediate or eradicate those species from the Plan Area. The Implementation Office will support efforts to detect, treat, control, and if feasible, eradicate these new nonnative invasive species as part of its conservation strategy and adaptive management and monitoring program.

Planned Response

The Implementation Office will take steps to detect, through the monitoring and adaptive management program and through collaboration with other responsible entities, the establishment and spread of new invasive species in the Plan Area. If a new invasive species is discovered, the Implementation Office will conduct an assessment to determine the possible threats of the invasive species to covered species and protected and/or restored natural communities. Remedial responses will be informed by the results of the assessment and will be implemented through the adaptive management and monitoring program.

Based on results of the assessment, the Implementation Office will, through the adaptive management and monitoring program, identify and implement, to the extent reasonable and practicable, measures to reduce and/or control the adverse effects of new nonnative species on the functions provided by the conservation measures under the Plan. If methods to adequately reduce and/or control adverse effects of the nonnative species on the functions of restored physical natural communities are not available or practicable, the Implementation Office will identify practicable alternative design, implementation, and management approaches to future natural community restoration actions within the parameters of the adaptive management and monitoring program to avoid or minimize potential adverse effects of the invasive species on covered species. If methods are not available to reduce and/or control adverse effects of invasive species on water operations, physical natural community, and other conservation measures, the Implementation Office, within

defined adaptive ranges, will identify and implement alternative conservation measures that provide equivalent or greater benefits to covered species and their habitats to the extent reasonable and practicable. The effectiveness of remedial measures will be monitored over time and, based on their efficacy, such measures may be adjusted within the framework of the adaptive management and monitoring program.

6.4.2.2.7 Climate Change

Nature of Changed Circumstance

Long-term changes in sea level, watershed hydrology, precipitation, temperature (air or water), or ocean conditions that are of the magnitude or effect assumed for the effects analysis and that adversely affect conservation strategy implementation or covered species are considered a changed circumstance. The occurrence of this changed circumstance will be determined jointly by the Implementation Office and fish and wildlife agencies. Because the BDCP already anticipates the effects of climate change, no additional actions will be required to remediate climate change effects on covered species and natural communities in the reserve system.

Rationale

The BDCP incorporates the results of a coordinated effort to analyze the effects of future climate change. Appendix 2.C, *Climate Change Implications and Assumptions* summarizes the methodology for selection and application of climate scenarios specific to this process, discussion and selection of sea level rise scenarios, and the use of these climate change projections in the primary analytical tools to be used in the BDCP planning. A technical subgroup consisting of key staff at DWR, Reclamation, USFWS, and NMFS met over the course of 2009 and early 2010 to discuss the merits of various approaches and methods. The recommended approach consists of the selection of five "ensemble-informed" climate scenarios for each future analysis period. These regional climate scenarios use subsets of the 112 available downscaled climate projections to characterize the range of future climate possibilities indicated by the current state of global climate models. Importantly, the scenarios are derived from multiple projections, rather than a single global climate model projection, thus reducing the "noise" primarily associated with multi-decadal variability and sampling of global climate model period changes.

Climate change is evaluated as a cumulative effect. Regional climate change scenarios and sea level rise estimates are provided for the two long-term periods. The proposed method for incorporating climate changes preserves both the projected changes in mean climate and the projected changes in climate variability. Midrange sea level rise estimates selected for use at the two long-term timelines are 15 centimeters (6 inches) by 2025 and 45 centimeters (18 inches) by 2060. These estimates are derived from review of various sources used by DWR, recommendations by the CALFED Independent Science Board, and recent guidance from USACE.

The expected effects of climate change presented in Appendix 2. C, *Climate Change Implications and Assumptions* are discussed in detail in Chapter 2, *Existing Ecological Conditions*, Section 2.3.2.1.5, *Effects of Anthropogenic Influence and Future Climate Change*. The assumptions for climate change used in the effects analysis are described in Chapter 5, *Effects Analysis* and Appendix 5. A, *Climate Change Implications*. These assumptions are considered a reasonable worst-case scenario.

Planned Response

The conservation strategy, monitoring and research program, and adaptive management and monitoring program already include responses to anticipate climate change effects at the landscape, natural community, and species scales. For example, biological goals and objectives have been established at the landscape level to take climate change into account during conservation strategy implementation by providing upland areas where tidal natural communities can expand in response to sea level change. Natural community restoration and protection will take into account natural community and species ecological responses to climate change, such as changes in range, abundance, distribution, and habitat suitability (*CM3 Natural Communities Protection and Restoration* and *CM4 Tidal Natural Communities Restoration*). Construction and preferential operation of a new water diversion facility in the north Delta is proposed in part because of climate change considerations. System-wide monitoring actions have been established to detect and allow for adaptive management responses.

The adaptive management and monitoring program (Section 3.6, *Adaptive Management and Monitoring Program*) will monitor climate change effects and assumes that conservation measures will need to be adjusted in response to these effects. This will allow the Implementation Office to continually adjust conservation measures to the changing conditions in the Plan Area as part of the adaptive management program. Such adaptive management responses may include identifying alternative locations for implementing natural community restoration or protection actions in the Plan Area to increase habitat availability and suitability and to allow movement across environmental gradients. Examples include creation of cool water refugia, expansion of the range of environmental gradients included in restoration design, or selection of protected sites to provide for shifting species distributions and habitats. All of these potential responses will be made as part of the adaptive management and monitoring program. Measures beyond those contemplated by the adaptive management and monitoring program are not likely to be necessary because the conservation strategy was designed to anticipate a reasonable worst-case scenario of climate change. A change in conservation measures in response to climate change beyond that considered in Chapter 3, *Conservation Strategy*, and through the adaptive management and monitoring program is considered an unforeseen circumstance. Therefore, no remedial actions are required for this changed circumstance.

6.4.3 Unforeseen Circumstances

USFWS and NMFS define *unforeseen circumstances* as those changes in circumstances that affect a species or geographic area covered by an HCP that could not reasonably have been anticipated by the plan participants during the development of the conservation plan, and that result in a substantial and adverse change in the status of a covered species (50 CFR 17.3, 50 CFR 222.102). Under ESA regulations, if unforeseen circumstances arise during the life of the BDCP, USFWS and/or NMFS may not require the commitment of additional land or financial compensation, or additional restrictions on the use of land, water, or other natural resources other than those agreed to in the plan, unless the Authorized Entities consent.

Within these constraints, USFWS and/or NMFS may require additional measures, but only if the following conditions apply.

- The agencies prove an unforeseen circumstance exists.

- Such measures are limited to modifications of the conservation measures to benefit the affected species.
- The original terms of the Plan are maintained to the maximum extent practicable.
- The overall cost of implementing the BDCP is not increased by the modification (see Chapter 8, *Implementation Costs and Funding Sources*, for a description of costs).

USFWS and/or NMFS bear the burden of demonstrating that unforeseen circumstances exist. A finding of unforeseen circumstances must be clearly documented, based on the best available scientific and commercial information, and made considering certain specific factors.[11] If such a finding is made and additional measures are required, the Authorized Entities will work with USFWS and/or NMFS to appropriately redirect resources to address the unforeseen circumstances, consistent with the intent of the Plan.

Similarly, *unforeseen circumstances* are defined in the NCCPA as changes affecting one or more species, habitat, natural community, or the geographic area covered by a conservation plan that could not reasonably have been anticipated at the time of plan development, and that result in a substantial adverse change in the status of one or more covered species (Fish &Game Code 2805(k)). The NCCPA further provides that, in the event of unforeseen circumstances, CDFW will not require additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources without the consent of the plan participants for a period of time specified in the Implementation Agreement. However, such assurances are not applicable in those circumstances in which CDFW determines that the plan is not being implemented in a manner consistent with the substantive terms of the Implementation Agreement (Fish &Game Code 2820(f)(2)).

6.4.4 Applicability of Other Federal Endangered Species Act Issues to the BDCP

6.4.4.1 Future Recovery Plans

Recovery plans under the ESA delineate actions necessary to protect and recover federally listed species. These plans provide useful information and recommendations that can assist in the development of conservation measures in HCPs designed to minimize or mitigate for the take of species. Recovery plans are not, however, intended to establish the obligations of permit applicants under Section 10 of the ESA.

As such, ESA recovery plans will not affect the implementation of the BDCP, except to the extent that they may contribute information that helps advance efforts to achieve the goals and objectives of the plan. Any recovery plan applicable to any covered species in the Plan Area that is developed after the approval of the BDCP will meet the following conditions.

[11] These factors include the following: (1) size of the current range of the affected species; (2) percentage of range adversely affected by the conservation plan; (3) percentage of range conserved by the conservation plan;(4) ecological significance of that portion of the range affected by the conservation plan; (5) level of knowledge about the affected species and the degree of specificity of the species' conservation program under the conservation plan; and (6) whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild. 50 CFR 17. 22(b)(5)(iii)(C); 50 CFR 222. 307(g)(3)(iii).

- Not require any additional land or financial compensation be provided by Authorized Entities.
- Be finalized only after USFWS and/or NMFS have consulted with and requested input from the Authorized Entity Group on the preparation of the recovery plan.
- Not in any way diminish the take authorizations for covered species granted to the Authorized Entities pursuant to the Section 10(a) permits or the integrated BiOp for the BDCP.

6.4.4.2 Future Section 7 Consultations

The BDCP is intended to meet the requirements of the ESA and provide the basis for regulatory coverage for a range of activities identified in the Plan. Some of the covered activities may require funding or regulatory authorizations from other federal agencies. In such instances, these federal agencies may need to consult with USFWS and/or NMFS under Section 7 of the ESA with respect to the effect of the activity on listed species and critical habitat. Similarly, associated federal actions undertaken by Reclamation may also trigger the consultation process.

Unless otherwise required by law or regulation, in any Section 7 consultation related to a covered activity or associated federal action and covered species, USFWS and NMFS will each ensure that the resulting BiOps are consistent with the integrated BiOp for the BDCP. Furthermore, USFWS and NMFS will not require additional land, water, or other natural resources, or financial compensation or additional restrictions on the use of land, water, or other natural resources regarding the implementation of covered activities beyond the measures provided for under the BDCP, the Implementing Agreement, the incidental take permits, and the integrated BiOp. USFWS and NMFS will also not require additional land, water, other natural resources, financial compensation, or additional restrictions on the use of land, water, or other natural resources regarding the implementation of associated federal actions without first allowing Reclamation to participate in responses developed through the BDCP's provisions regarding adaptive management, changed circumstances, and dispute resolution.

In any Section 7 consultation subsequent to approval of the BDCP involving actions, other than covered activities or associated federal actions, undertaken by any person, firm, or entity that may have an effect on covered species and their habitats in the Plan Area, USFWS and NMFS will give notice thereof to the Authorized Entity Group and the Implementation Office. USFWS and NMFS will further ensure that the terms of any BiOp issued in connection with projects that are independent of the covered activities and associated federal actions do not create or result in any additional obligation, cost, or expense to the Authorized Entities.

6.4.4.2.1 Critical Habitat

The BDCP provides a comprehensive, habitat-based approach to the protection of covered species by focusing on the areas essential for the long-term conservation of the covered species. This approach is consistent with the overall purposes of the ESA to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved. To the maximum extent allowable after public review and comment, in the event that a critical habitat determination is made for any covered species, areas within the boundaries of the BDCP will not be designated as critical habitat provided that the BDCP is being properly implemented. If, notwithstanding this provision, critical habitat is designated within the BDCP boundaries, no subsequent evaluation of the covered species, nor any mitigation, compensation, or other protective measures beyond those measures set forth in the BDCP will be required of permittees.

6.5 Changes to the Plan or Permits

This section describes the processes that will be used to change the plan or the permits. The Plan can be modified during implementation in accordance with CDFW, USFWS, and NMFS regulations and the terms of the permits and Implementing Agreement. Plan modifications may be needed periodically to clarify provisions or correct unanticipated inconsistencies in the documents. Plan changes fall into three broad categories: administrative changes, minor modifications, and formal amendments. Only some plan changes also require a permit amendment. The process for a permit extension and permit suspension or revocation are also discussed below.

6.5.1 Administrative Changes

The administration and implementation of the BDCP will require frequent and ongoing interpretation of the provisions of the Plan. Actions taken on the basis of these interpretations that do not substantively change the purpose or intent of the Plan provisions will not require modification or amendment of the BDCP or its associated authorizations. Such actions related to the ordinary administration and implementation of the BDCP may include, but are not limited to, the following.

- Clerical corrections to typographical, grammatical, and similar editing errors that do not change the intended meaning; or to maps or other exhibits to address insignificant errors.
- Adaptive management changes to conservation measures or biological objectives, including actions to avoid, minimize, and mitigate impacts, or modifications to habitat management strategies developed through and consistent with the adaptive management and monitoring program described in Chapter 3, *Conservation Strategy.*
- Variations in the day-to-day management of reserve system lands, such as adjusting irrigation schedules for created or restored natural community on the basis of observed water needs of planted vegetation.
- Adaptations to the design of directed studies.
- Adjustments to monitoring protocols to incorporate new protocols approved by the fish and wildlife agencies.
- Administration of the Implementation Office.
- Changes in the membership of BDCP advisory committees.
- Minor corrections to land ownership descriptions.
- Changes to survey, monitoring, reporting and/or management protocols that do not adversely affect covered species or habitat functions and values.
- Updates or corrections to the land cover or other resource maps or species occurrence data.

6.5.2 Minor Modifications or Revisions

As part of the process of Plan implementation, the Implementation Office may need to make minor modifications or revisions to the BDCP from time to time to respond appropriately to new information, scientific understanding, technological advances, and other such circumstances. Minor

modifications or revisions are likely to be technical in nature and not involve changes that will adversely affect covered species, the level of take, or the obligations of Authorized Entities.

Minor modifications or revisions may include, but are not limited to, the following circumstances.

- Transfers of targeted acreages between ROAs consistent with criteria set out in Chapter 3, *Conservation Strategy*.
- Transfers of targeted natural community acreages among conservation zones, provided such change does not preclude meeting preserve assembly requirements, significantly increase the cost of BDCP management, or preclude achieving covered species and natural community goals and objectives.
- Adjustments of conservation measures or biological objectives described in Chapter 3, *Conservation Strategy*, consistent with the monitoring and adaptive management program and intended to enhance benefits to covered species.
- Extensions of earth-moving or ground disturbance outside the right-of-way limits analyzed in the BDCP for covered activities involving infrastructure development or natural community restoration.
- Other proposed changes to the Plan that the permitting agencies have determined to be unsubstantial and appropriate for implementation as a minor modification.

6.5.2.1 Procedures for Minor Modifications or Revisions

The Implementation Office, the Authorized Entities, or the fish and wildlife agencies may propose minor modifications or revisions by providing written notice to the Implementation Office, Authorized Entities, and fish and wildlife agencies. Such notice will include a description of the proposed minor modifications or revisions, an explanation of the reason for the proposed minor modifications or revisions, an analysis of their environmental effects including any impacts on covered species, and an explanation of why the effects of the proposed minor modifications or revisions will have the following characteristics.

- They will not significantly differ from, and will be biologically equivalent or superior to, the effects described in the BDCP, as originally adopted.
- They will not conflict with the terms and conditions of the BDCP, as originally adopted.
- They will not significantly impair implementation of the conservation strategy.

The fish and wildlife agencies and/or the Authorized Entities may submit comments on the proposed minor modification or revision in writing within 60 days of receipt of notice. If any Authorized Entity disagrees with the proposed minor modification or revision for any reason, the minor modification or revision will not be incorporated into the BDCP. If the fish and wildlife agencies do not concur that the proposed minor modification or revision meets the requirements for a minor modification or revision, the proposal must be approved according to the amendment process. Any Authorized Entity or fish and wildlife agency may institute the informal meet and confer process set forth in the Implementing Agreement to resolve disagreements concerning a proposed minor modification or revision.

If the Authorized Entities are in agreement regarding the proposed minor modification or revision, and the fish and wildlife agencies concur that the requirements for a minor modification or revision have been met and the modification or revision should be incorporated into the plan, the BDCP will

be modified accordingly. If any fish and wildlife agency fails to respond to the written notice within the 60-day period, the agency will be deemed to have approved the proposed minor modification or revision.

6.5.3 Formal Amendment

Under some circumstances, it may be necessary to substantially amend the BDCP. Any proposed changes to the BDCP that do not qualify for treatment as described in Sections 6.5.1, *Administrative Changes*, or 6.5.2, *Minor Modifications or Revisions*, will require a formal amendment. Formal amendment to the BDCP also will require corresponding amendment to the authorizations/permits, in accordance with applicable laws and regulations regarding permit amendments. The Implementation Office will be responsible for submitting any proposed amendments to the fish and wildlife agencies.

Amendments to the BDCP likely will occur infrequently and will follow the process set forth in Section 6.5.3.1, *Process for Formal Amendment*. Formal amendments include, but are not limited to, these following changes.

- Substantive changes to the boundary of the Plan Area, other than those associated with the acquisition of terrestrial natural community in the surrounding Delta counties, as described in Section 1.4.1, *Geographic Scope of the Plan Area*.
- Additions of species to the covered species list.
- Increase in the allowable take limits of covered activities or adding new covered activities to the plan.
- Substantial changes in implementation schedules that will have significant adverse effects on the covered species.
- Changes in water operations beyond those described under *CM1 Water Facilities and Operations*.

6.5.3.1 Process for Formal Amendment

Formal amendments will involve the same process that was required for the original approval of the BDCP. In most cases, an amendment will require public review and comment, CEQA and NEPA compliance, and intra-Service Section 7 consultation. Amendments will be subject to review and approval by the Implementation Office and the Authorized Entities. The fish and wildlife agencies will use reasonable efforts to process proposed amendments within 180 days.

6.5.4 Extension of Permit Duration

The Authorized Entities are seeking take authorizations from the state and federal fish and wildlife agencies with terms of 50 years. The terms of the take authorizations issued under the BDCP will begin from the date of their issuance. Prior to expiration of the take permits, the Authorized Entities may apply to the fish and wildlife agencies to renew them. The Authorized Entities will initiate the permit renewal process prior to the expiration of the initial 50-year period and with ample time to allow for the review and processing of the permit renewal.

6.5.5 Suspension of the Federal Permits

Under certain circumstances defined by federal regulation, USFWS or NMFS may suspend, in whole or in part, the regulatory authorizations they issue under the BDCP. However, except where USFWS or NMFS determines that emergency action is necessary to avoid irreparable harm to a covered species, it will not suspend an authorization without first attempting to resolve the issue through the dispute resolution process set forth in the Implementing Agreement, and identifying the facts or action/inaction that may warrant the suspension and providing the Implementation Office a reasonable opportunity to implement appropriate responsive actions. Any decision to suspend one or both federal permits must be in writing and must be signed by the Secretary of the Interior or the Secretary of Commerce, as the case may be.

6.5.5.1 Reinstatement of Suspended Federal Permit

If USFWS and/or NMFS suspend a federal permit, as soon as possible but no later than 10 days after the suspension, the agency(ies) will meet and confer with the Implementation Office and Authorized Entities to discuss how the permits can be reinstated. At the conclusion of the meeting, USFWS and/or NMFS will identify reasonable, specific actions needed to address the suspension. Upon performance or completion of the actions, the applicable agency(ies) will immediately reinstate the federal permit.

6.5.6 Revocation of the Federal Permits

The No Surprises rule, as promulgated in 1998, did not address circumstances in which a species covered by a permitted HCP experienced significant decline and the continuation of an activity covered by the HCP would contribute to the likelihood of jeopardy to the species. To address such circumstances, USFWS issued a regulation in 2004, known as the Permit Revocation Rule, that allows USFWS to nullify regulatory assurances granted under the No Surprises rule and revoke the Section 10 permit only in specified instances, including where continuation of a permitted activity would jeopardize the continued existence of a species covered by an HCP and the impact of the permitted activity on the species has not been remedied in a timely manner (69 FR 7172, December 10, 2004).

In the event that such unforeseen circumstances were to arise under the BDCP, USFWS and/or NMFS would work with the Implementation Office and the Authorized Entities to avoid a permit revocation. The federal fish and wildlife agencies will engage in the following process prior to taking any steps to revoke the BDCP permits.

- The Implementation Office and the USFWS or NMFS will determine, through the adaptive management process, whether changes can be made to the conservation strategy to remedy the situation.
- The USFWS or NMFS will determine whether the fish and wildlife agencies or other state and federal agencies can undertake actions that will remedy the situation. The determination must be based on a thorough review of best available practices considering species population status and the effects of multiple federal and nonfederal actions. It is recognized that the fish and wildlife agencies have available a wide array of authorities and resources that can be used to provide additional protection for the species, as do other state and federal agencies.

- The Implementation Office and the USFWS or NMFS will determine whether there are additional voluntary implementation actions that the Authorized Entities could undertake to remedy the situation.

The USFWS or NMFS will begin the revocation process only if it is determined that the continuation of a covered activity will appreciably reduce the likelihood of survival and recovery of one or more covered species and that no remedy can be found and implemented. The USFWS or NMFS also could begin the revocation process if the Authorized Entities fail to fulfill their obligations under the BDCP, but only after completing the dispute resolution process described in the Implementing Agreement, and identifying the actions or inactions that may warrant the revocation and giving the Implementation Office a reasonable opportunity to implement appropriate responsive actions. The USFWS or NMFS will participate in the dispute resolution process and follow the administrative procedures set out in the Implementing Agreement in addition to the regulations implementing the Permit Revocation rule (50 CFR 13. 28 and 13. 29). Any decision to revoke one or both federal permits must be in writing and must be signed by the Secretary of the Interior or the Secretary of Commerce, as the case may warrant.

6.5.7 Suspension or Revocation of the State Permit

The NCCPA requires that the implementation agreement include specific provisions that, if violated, would result in suspension or revocation of the Section 2835 take permit. Such provisionsmust include a requirement for the plan participants to provide adequate funding to implement the plan; a requirement to maintain proportionality between impacts on habitats or covered species and conservation measures; a requirement to not adopt or approve changes to the plan that are inconsistent with the objectives and requirements of the plan without concurrence of CDFW; and a requirement to stay below the level of take set forth in the permit (Fish &Game Code 2820(b)(3)). CDFW also must suspend or revoke a Section 2835 take permit if continued take would result in jeopardy to a species (Fish &Game Code 2820(c)).

If the Authorized Entities violate the terms and conditions of the state permit, or if necessary to avoid jeopardizing the continued existence of a listed species, CDFW may suspend or revoke the permit in whole or in part. However, unless immediate revocation is necessary to avoid the likelihood of jeopardy to a listed species or to address rough proportionality (see below), CDFW will not suspend or revoke the state permit without first attempting to resolve any disagreements regarding the implementation or interpretation of the BDCP in accordance with the dispute resolution process provided in the Implementing Agreement, notifying the Implementation Office and Authorized Entities of the action or inaction that may warrant the suspension or revocation, and providing the Implementation Office and Authorized Entities with a reasonable opportunity to take appropriate responsive action. Any decision to suspend or revoke the state permit must be in writing and must be signed by the Director of CDFW.

6.5.7.1 Failure to Maintain Rough Proportionality

The NCCPA requires that permittees maintain rough proportionality between impacts on habitats or covered species and conservation measures to address those impacts. Rough proportionality will be maintained through the implementation of the conservation measures substantially in accordance with the plan implementation schedule set out in this chapter and consistent with Section 6.1.2, *Maintaining Rough Proportionality*. If CDFW determines, after conferring with the Authorized Entity Group, the Permit Oversight Group, and the Implementation Office, that rough proportionality is not

being maintained, the Authorized Entities, Permit Oversight Group, and the Implementation Office will meet and confer and, within 45 days of CDFW's determination, agree on adjustments to the implementation schedule or other actions to expeditiously restore rough proportionality.

Adjustments to the implementation schedule may involve advancing or accelerating efforts to acquire, restore, or enhance habitat for covered species. Once such adjustments have been agreed upon, the Implementation Office will take the necessary steps to comply with the revised schedule. Alternatively, the Implementation Office may remedy the situation by demonstrating that implementation actions are occurring in a manner consistent with the implementation schedule.

6.5.7.2 State Permit Suspension and Revocation Steps

In the event that such circumstances for permit revocation or suspension were to arise under the BDCP, CDFW will work with the Implementation Office and the Authorized Entities to avoid the need for permit revocation or suspension. CDFW will participate in the dispute resolution process set forth in the Implementing Agreement and engage in the following process prior to taking any steps to suspend or revoke the BDCP permit.

- In the event of a failure to maintain rough proportionality, the Implementation Office will work with CDFW to remedy the situation through schedule adjustments.
- For other situations that could result in permit revocation or suspension or if rough proportionality cannot be regained through schedule adjustments, the Implementation Office, Authorized Entities, and CDFW will determine, through the adaptive management process, whether other changes can be made to the conservation strategy to remedy the situation.
- CDFW will determine whether CDFW or the federal fish and wildlife agencies or other state and federal agencies can undertake actions that will remedy the situation. It is recognized that the fish and wildlife agencies have available a wide array of authorities and resources that can be used to provide additional protection for the species, as do other state and federal agencies.
- The Implementation Office and CDFW will determine whether there are additional voluntary implementation actions that the Authorized Entities could undertake to remedy the situation.

CDFW will begin the revocation or suspension process only if no solutions are found and it is determined that the continuation of a covered activity will result in jeopardy to a species or violate any of the terms and conditions subject to permit revocation or suspension as identified in the Implementing Agreement. Any decision to suspend or revoke the state permit must be in writing and must be signed by the Director of CDFW.

6.6 References Cited

Anonymous. 2006. *Planning Agreement Regarding the Bay Delta Conservation Plan.* Available: <http://www.dfg.ca.gov/water/docs/BDCP_Planning_Agreement_revised_9-13-2007.pdf>. Accessed: September 11, 2012.

California Department of Water Resources. 2008. *Technical Memorandum: Delta Risk Management Strategy (DRMS) Phase 1.* Topical Area: Levee Vulnerability Final. May 15.

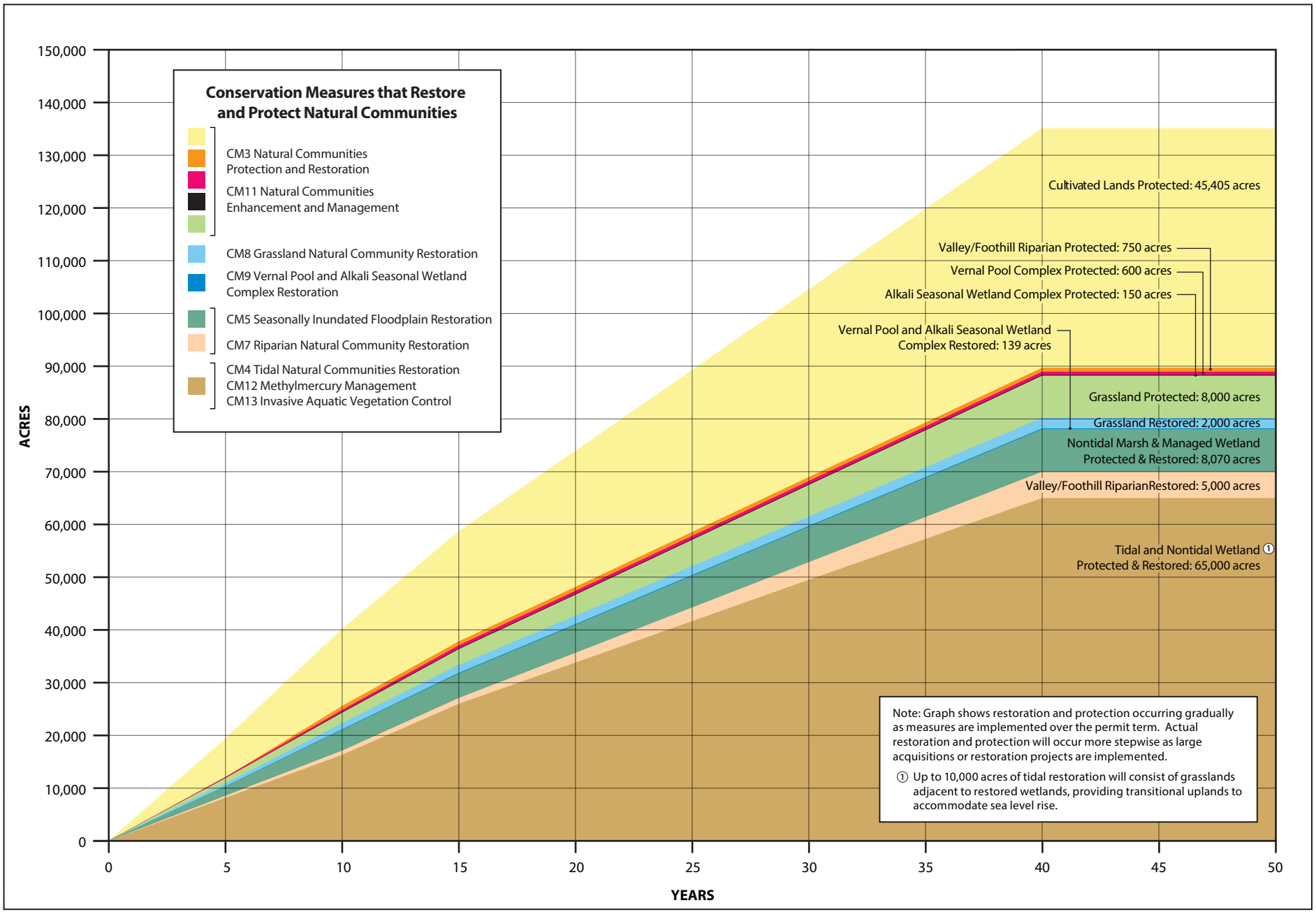
California Department of Water Resources. 2009. *Delta Risk Management Strategy Phase 1.* February. Prepared by URS Corporation/Jack. R. Benjamin & Associates, Inc.

California Department of Water Resources. 2011. *Delta Risk Management Strategy Phase 2.* June. Prepared by URS Corporation/Jack R. Benjamin & Associates, Inc.

National Marine Fisheries Service. 2004. *Biological Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan*. October 2004. Long Beach, CA: Southwest Region.

National Marine Fisheries Service. 2009. *Biological Opinion and Conference Opinion on the Long-term Operations of the Central Valley Project and State Water Project.* June. Southwest region.

U.S. Fish and Wildlife Service. 2008. *Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP)*. Biological Opinion. December 15. Sacramento, CA.

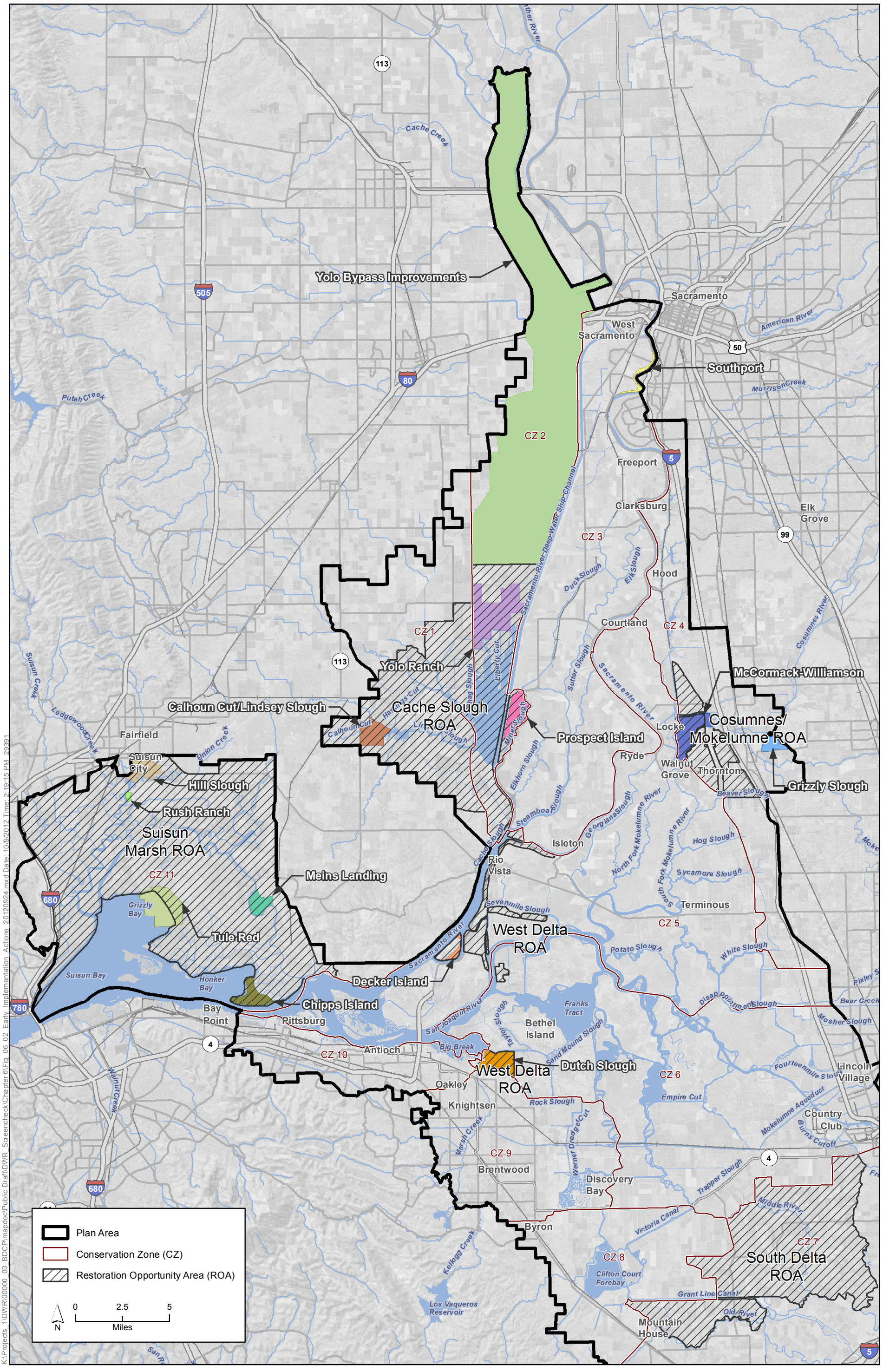


Graphics... BDCP Other Chapters (9-18-12) TM

DRAFT

Figure 6-1

Acres of Natural Communities Protected and Restored Over Permit Term



K:\Projects_1\DWR\00000_00_BDCP\mapdoc\Public Draft\DWR_Screencheck\Chapter 6\Fig_06_02_Early_Implementation_Actions_20120924.mxd Date: 10/9/2012 Time: 2:19:15 PM_29391

GIS Data Source: Early Implementation Actions, DHCCP 2012; Restoration Opportunity Areas, ICF 2012; Conservation Zones, SAIC 2012; Plan Area, ICF 2012

Figure 6-2
Early Implementation Actions