

3.1 Introduction

This chapter sets out the BDCP Conservation Strategy, which consists of multiple components that are designed collectively to achieve the BDCP overall planning goals and objectives of ecosystem restoration and water supply and reliability. The chapter further describes the Plan's intended biological outcomes and details the means by which these outcomes will be achieved. The Conservation Strategy includes the BDCP's biological goals and objectives, and identifies a set of conservation measures necessary to provide for the conservation and management of covered species and natural communities upon which they depend, and to avoid, minimize, and compensate for the potential impacts of covered activities on these resources (*see* Chapter 4, *Covered Activities*). The Conservation Strategy also includes comprehensive programs for monitoring, research, and adaptive management. The BDCP Conservation Strategy has been developed to meet the regulatory standards of sections 7 and 10 of the federal Endangered Species Act (ESA), the state's Natural Community Conservation Planning Act (NCCPA), and, as appropriate, the California Endangered Species Act.

The Conservation Strategy responds to the challenge of restoring key ecosystem functions in the highly altered environment of the Delta. The Delta was once a vast marsh and floodplain intersected by meandering channels and sloughs that provided habitat for a rich diversity of fish, wildlife, and plants. The Delta of today is a system of artificially channeled and dredged waterways constructed into static geometries, initially designed to support farming and, later, urban development. These channels also serve to convey water supplies across the Delta for export to cities and farms in the San Francisco Bay Area, San Joaquin Valley and southern California. Physical disturbances within the Delta, the introduction of non-native species that have disrupted the foodweb, and multiple other environmental challenges to the ecosystem have contributed to declines in native fish, wildlife, and plant species and other organisms. In recent years, these factors have caused a significant drop in the population of key native fish species.

There is a growing urgency to address the challenges of the Delta from both an ecological and water supply perspective. At-risk species have become further imperiled, litigation contesting the adequacy of existing approaches to meet conservation and water supply objectives has intensified and regulatory requirements governing the water system have continuously shifted in response, resulting in increasing unpredictability. To further compound these challenges, fundamental changes to the Delta are certain to occur, as the Delta is not a static ecological system. The anticipated effects of climate change will result in elevated sea levels, altered annual and inter-annual hydrological cycles, changed salinity and water temperature regimes, and accelerated shifts in species composition and distribution in and around the Delta. In addition, the risk of significant flood events has greatly increased, in part because of the likelihood that significant seismic events will occur over the next several decades. These expected environmental changes add to the difficulty of resolving the increasingly intensifying conflict between the ecological needs of a range of at-risk Delta species and natural communities and the need to provide adequate and reliable water supplies for people, communities, agriculture, and industry. Anticipating, preparing for, and adapting to these changes are key underlying drivers for the BDCP.

The approach embodied in the BDCP and its Conservation Strategy reflects a significant departure from the manner in which at-risk Delta fish species and their habitats have been

1 managed in the past. The BDCP will contribute to the restoration of the health of the Delta's
2 ecological systems by focusing on ecological functions and processes at a broad landscape scale,
3 rather than by focusing on discrete parts. Unlike past regulatory approaches that have relied
4 almost exclusively on iterative adjustments to the operations of the State Water Project (SWP)
5 and the Central Valley Project (CVP), including those reflected in recent biological opinions
6 issued by the U.S. Fish and Wildlife Service (USFWS)¹ the National Marine Fisheries Service
7 (NMFS),² the BDCP proposes actions that will allow for fundamental, systemic, long-term
8 physical changes to the Delta, including substantial alterations to water conveyance
9 infrastructure and water management regimes and extensive restoration of habitat. These
10 ecosystem-wide changes are intended to enhance substantially the productivity of ecological
11 processes and advance the conservation of multiple species and communities that depend upon
12 them.

13 The geographic scope of the BDCP Plan Area includes the statutory Sacramento-San Joaquin
14 Delta, as defined in California Water Code Section 12220; Suisun Marsh; and the Yolo Bypass
15 (see Section 1.4.1 *Geographic Scope of the BDCP*). The boundaries of the Plan Area may also
16 encompass over time additional areas within Delta counties that are protected through BDCP
17 actions to advance the Plan's goals and objectives for terrestrial species and habitats. Because
18 the state and federal water infrastructure operates as an integrated system, the effects of the
19 BDCP will extend beyond the Plan Area, both upstream and downstream, and will implicate both
20 water operational parameters and species and their habitats. Therefore, the BDCP will take into
21 account these upstream and downstream effects, both positive and negative, to ensure that the
22 overall effects of the BDCP are fully analyzed and understood.

23 While the initial focus of the BDCP was to address the conservation of Delta fish species that are
24 currently at very low population levels, such as Delta smelt, longfin smelt, winter-run Chinook
25 salmon, spring-run Chinook salmon, and green sturgeon, the Conservation Strategy has evolved
26 to include measures to address a broad range of species and habitats. The Conservation Strategy
27 will provide for the conservation and management of 63 species of fish, wildlife, and plants
28 (Section 1.4.3, *Covered Species*) and 14 natural communities (Section 1.4.2, *Natural*
29 *Communities*) in the Plan Area. The strategy sets forth actions to reduce the effects of
30 environmental stressors on these biological resources at various ecological scales, including
31 ecosystem-level actions to address physical and chemical processes and foodwebs; natural
32 community-level actions to address the habitats of many species, and species-level actions to
33 address individual populations and occurrences of species.

34 The Conservation Strategy is built upon and reflects the extensive body of scientific
35 investigation, study, and analysis of the Delta compiled over several decades (see *The State of*
36 *Bay-Delta Science*, 2008). The BDCP Steering Committee, for instance, took into account the
37 results and findings of numerous studies initiated under the CALFED Bay-Delta Science
38 program (now the Delta Science Program) and Ecosystem Restoration Program (ERP), the long-
39 term monitoring programs conducted by the Interagency Ecological Program (IEP), research and
40 monitoring conducted by state and federal resource agencies, and research contributions of

¹ Formal Endangered Species Act Consultation on the Proposed Coordinated Operations of the Central Valley Project (CVP) and State Water Project (SWP) (U.S. Fish and Wildlife Service 2008).

² Biological Opinion and Conference Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (National Marine Fisheries Service 2009).

1 academic investigators. In addition, the Steering Committee considered a number of other recent
2 reports on the Delta, including reports of the Governor’s Delta Vision Blue Ribbon Task Force
3 (January and October 2008) and several recent reports of the Public Policy Institute of
4 California.³ Many elements of the BDCP Conservation Strategy parallel the recommendations of
5 these other reports and reflect broad agreement that the Delta is dysfunctional from both an
6 ecological and water supply reliability perspective and that fundamental change is necessary.

7 To ensure that the BDCP would be based on the best scientific and commercial data available,
8 the BDCP Steering Committee also undertook a rigorous process to develop new and updated
9 information and to evaluate a wide variety of issues and approaches as it formulated a cohesive,
10 comprehensive Conservation Strategy. This effort included an evaluation, early in 2009,
11 conducted by multiple teams of experts of BDCP conservation options using the CALFED Bay-
12 Delta Ecosystem Restoration Program’s DRERIP⁴ evaluation process (results are provided in
13 Appendix F, *DRERIP Evaluation Results*). Reflecting the requirements of the NCCPA planning
14 process, the Steering Committee also sought and utilized independent scientific advice at several
15 key stages of the planning process, enlisting well-recognized experts in ecological and biological
16 sciences to produce recommendations on a range of relevant topics, including approaches to
17 conservation planning for both aquatic and terrestrial species, establishing adaptive management
18 and monitoring programs, and devising biological goals and objectives (see Appendix G,
19 *Independent Science Advisors Reports*).⁵

20 In the fall of 2009, the Steering Committee conducted a “mini” effects analysis that focused on
21 the expected effects of draft water operations conservation measures on salmonids, smelt, and
22 sturgeon. The results of the mini effects analysis informed decisions to revise proposed water
23 operations criteria to further increase benefits to fish species consistent with water supply goals.
24 Early in 2010, the BDCP Steering Committee initiated a full analysis of the likely effects of the
25 draft Conservation Strategy and proposed covered activities on species and habitats covered by
26 the Plan (see Chapter 4, *Covered Activities*). The BDCP effects analysis was comprehensive in
27 scope, identifying the beneficial and adverse effects that would be expected to occur through the
28 implementation of covered activities and conservation measures (Chapter 5, *Effects Analysis*).
29 Through an iterative process, the results and conclusions from the effects analysis provided the
30 basis for multiple adjustments, modifications, and revisions to be made to the conservation
31 measures to enhance their likely effectiveness.

32 This chapter sets out the Conservation Strategy for the BDCP. The chapter begins with a
33 description of the overall approach to the development of a strategy sufficient to provide for the
34 conservation and management of key Delta species and their habitats (see section 3.2). In
35 section 3.3, the biological goals and objectives of the Plan are identified. Section 3.4 sets out the
36 specific conservation measures that will be implemented to achieve those biological goals and
37 objectives. Section 3.5 identifies “potential conservation measures” that may later be adopted
38 through the adaptive management program to further address the adverse effects of various
39 stressors on the aquatic system. The biological monitoring and research program is described in
40 section 3.6, and the adaptive management program is described in section 3.7.

³ Envisioning Futures for the Sacramento-San Joaquin Delta (Public Policy Institute of California, February 2007); . Comparing Futures for the Sacramento-San Joaquin Delta (Public Policy Institute of California, July 2008).

⁴ Delta Regional Ecosystem Restoration Implementation Plan

⁵ Insert citation to additional information identifying experts.

3.1.1 Biological Goals and Objectives

The BDCP biological goals and objectives reflect the expected ecological outcomes of the Plan. The biological goals set out the broad principles that were established to guide the development of the Conservation Strategy; the biological objectives express specific, measurable targets that the conservation measures are designed to meet. Progress toward achieving objectives will be generally measured on the basis of outcomes related to ecological processes, habitat conditions, and species distribution.

BDCP biological goals and objectives are expressed in an ecological-scale hierarchy with ecosystem-level, natural community-level, and species-specific goals and objectives. For example, the Plan includes an ecosystem goal to “improve hydrodynamic conditions to support the movement of adult life stages of native fish species to natal spawning habitats”; a natural community goal to “protect, enhance, and restore natural communities to provide habitat and ecosystem functions to increase the natural production (reproduction, growth, and survival), abundance, and distribution of native Delta species”; and a species goal to “create conditions that support a self-sustaining population of delta smelt in the Delta and Suisun Bay.” As such, the goals and objectives reflect the comprehensive scope of the BDCP, including its focus on both broad-scale ecological processes and species-specific needs.

3.1.2 Conservation Measures

The BDCP conservation measures comprise the specific actions that will be implemented to achieve the biological goals and objectives of the Plan. The conservation measures have been grouped into the same ecological hierarchy as the biological goals and objectives. Ecosystem-level conservation measures are designed to improve the method, timing, and amount of flow and quality of water into and through the Delta for the benefit of covered species and covered natural communities. They are also focused on the establishment of an interconnected system of conservation lands across the Plan Area. Natural community-level conservation measures include actions to restore physical habitat to expand the extent and quality of intertidal, floodplain, and other habitats. Species-level “other stressors” conservation measures are designed to reduce the adverse effects of various stressors on covered species, including toxic contaminants, non-native predators, illegal harvest, and genetic threats. This comprehensive suite of actions is expected to significantly contribute to the conservation of covered species and to the restoration of ecosystem processes in the Delta, while providing for a reliable water supply for human use.

The conservation measures were developed in the context of the time frame governing the implementation of the BDCP, which has been designed as a fifty year conservation plan. Under the scope of the BDCP, the type of water conveyance infrastructure for SWP and CVP operations serves to demarcate near-term and long-term components of the Plan. Specifically, the near-term component of the BDCP encompasses those actions related to the operations of the projects under existing water conveyance infrastructure, including conservation measures associated with this operational framework. The long-term component of the BDCP comprises those actions related to project operations under new isolated conveyance infrastructure, including the construction of and operation of the infrastructure and the implementation of an array of conservation measures. A number of conservation measures cannot be implemented until the north Delta diversion is operational and therefore are considered to be long-term actions. Those measures that are not dependent on operations of the new facilities will largely be

1 initiated in the near-term phase. These actions include habitat restoration to accelerate new
2 productivity in the Delta, the installation of non-physical barriers to divert young salmonids from
3 high risk areas, removal of habitat features that promote non-native predators, and enhancement
4 of the Yolo Bypass floodplain habitat. Prompt and decisive implementation of these measures
5 pending the completion of systemic changes in the water conveyance system is likely to be
6 central to the success of the BDCP Conservation Strategy.

7 The conservation measures address biological needs on a broad spatial scale, an important
8 feature of the overall Conservation Strategy. The Delta-wide focus of the Plan requires that
9 restoration actions be implemented in proper sequence and timing across the northern, western,
10 eastern and southern regions of the Delta. These restoration actions must also be closely
11 integrated with the measures affecting water facilities and operations to ensure that the flow and
12 physical habitat parameters are all met.

13 Under the BDCP, certain conservation measures are also covered activities. In some cases,
14 actions that are intended to advance the biological objectives of the Plan may also result in the
15 incidental take of covered species. Certain activities may provide benefits for some covered
16 species, and have either no effect or some limited negative effect on other species. For instance,
17 the restoration of tidal habitats to provide new physical habitat and enhanced food production for
18 covered fish species and certain covered wildlife and plants, will necessarily remove terrestrial
19 habitat that supports other covered wildlife and plant species. Another example is the proposed
20 construction and operation of a new isolated conveyance system, which may provide substantial
21 benefits to certain aquatic species over the existing system, but will also entail adverse impacts
22 on terrestrial wildlife and plants. Consequently, these conservation measures are characterized as
23 covered activities to ensure their coverage under the regulatory authorizations issued under the
24 BDCP and enable their implementation.

25 This chapter also identifies “potential conservation measures,” which do not qualify as
26 conservation measures at present, but may during the implementation of the BDCP be adopted as
27 conservation measures through the adaptive management program. The efficacy of these
28 potential conservation measures will be evaluated over time by the Implementation Office to
29 determine whether they should be incorporated into the Conservation Strategy as conservation
30 measures (see section 3.5, *Potential Conservation Measures to address Other Stressors*).

31 **3.1.3 Monitoring, Research, and Adaptive Management**

32 The monitoring, research and adaptive management components of the Conservation Strategy
33 are intended to inform decision-making during plan implementation, provide indicators of
34 progress, enable modifications to be made to improve the efficiency and effectiveness of the
35 conservation measures in achieving the BDCP biological goals and objectives, and to allow for
36 adjustments to be made to conservation measures as more is learned about the Delta. The
37 monitoring and research program, described in section 3.6, *Monitoring and Research Program*,
38 includes a combination of system-wide and conservation measure-specific monitoring and
39 research to provide information on the effectiveness of conservation actions.

40 Adaptive management is central to the success of the Plan. The adaptive management program
41 described in section 3.7, *Adaptive Management Program*, will integrate new data, knowledge,
42 and scientific information to enhance the efficacy of the BDCP conservation measures. The
43 adaptive management program will provide the mechanism by which conservation measures can

- 1 be modified or discontinued in response to results from BDCP monitoring and research programs
- 2 and other new scientific information.
- 3

DRAFT