

# APRIL 22, 2011

## THIRD STAFF DRAFT DELTA PLAN

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This is the third of four (4) staff draft versions of the Delta Plan that will be presented to the Delta Stewardship Council prior to the release of the Draft Environmental Impact Report (EIR) by mid-June 2011. The staff draft versions will be released in the following order.

- ◆ **February 2011:** First Staff Draft Delta Plan was posted on February 14, 2011 and discussed at Delta Stewardship Council meetings on February 24 and 25, 2011 and March 10 and 11, 2011.
- ◆ **March 2011:** Second Staff Draft Delta Plan was posted on March 18, 2011 and discussed at Delta Stewardship Council meetings on March 24 and 25, 2011 and April 14 and 15, 2011.
- ◆ **April 2011:** Third Staff Draft Delta Plan was posted on April 22, 2011 and discussed at Delta Stewardship Council meetings on April 28 and 29, 2011 and May 12 and 13, 2011.
- ◆ **May 2011:** Fourth Staff Draft Delta Plan (for modification and approval by the Delta Stewardship Council to be circulated with the Draft EIR).
- ◆ **June 2011:** Draft Delta Plan and Draft EIR are circulated.

After circulation of the Draft EIR, comments obtained on the Draft Delta Plan and Draft EIR will be considered. Delta Stewardship Council staff will prepare written responses to comments received on the Draft EIR; those responses will become part of the Final EIR. The Delta Plan will be finalized in light of the comments and Final EIR. In November 2011, the Delta Stewardship Council will consider the Final EIR for certification under CEQA, then consider the final Delta Plan for adoption.

At each stage of the development of the Staff Draft Delta Plan there will be public meetings at the Delta Stewardship Council meetings for the purpose of receiving information and comments and for Delta Stewardship Council deliberation. All Delta Stewardship Council meetings are public and simulcast on the Delta Stewardship Council website at [www.deltacouncil.ca.gov](http://www.deltacouncil.ca.gov).

In addition, public comments are welcome during the entire process and will become a formal part of the record. The Delta Stewardship Council encourages written public comments to be submitted to [deltaplancomment@deltacouncil.ca.gov](mailto:deltaplancomment@deltacouncil.ca.gov). **All comments received by Friday, May 6, 2011**, will be considered for revisions made in developing the Fourth Staff Draft Delta Plan. All comments received are posted to the Delta Stewardship Council web site: <http://www.deltacouncil.ca.gov/>

### RELEVANT POINTS TO THE APRIL 22, 2011 THIRD STAFF DRAFT DELTA PLAN

- ◆ The Executive Summary is under development and not included in the Third Staff Draft Delta Plan.
- ◆ Graphics are under development and not included in the Third Staff Draft Delta Plan. The Department of Water Resources' *Draft Ecosystem Restoration Program's Conservation Strategy for Stage 2 Implementation for the Sacramento-San Joaquin Delta Ecological Management Zone* (2010) will be posted Monday, April 25, 2011.
- ◆ Technical editing for all information in the Staff Draft Delta Plan versions, including fact-checking, grammatical, and style changes, and inclusion of additional citations and references will be ongoing.
- ◆ A redline version comparing policies and recommendations in the Third Staff Draft with the Second Staff Draft will be posted on Monday, April 25, 2011.



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# Chapter 1

## The Delta Plan

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# Chapter 1

## The Delta Plan

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3 The Delta Stewardship Council was established as an independent State agency by the Sacramento-San  
4 Joaquin Delta Reform Act of 2009.

5 The primary responsibility of the Delta Stewardship Council is to develop, adopt, and implement by  
6 January 1, 2012, a legally enforceable, comprehensive, long-term management plan for the Sacramento-  
7 San Joaquin Delta and the Suisun Marsh—the Delta Plan—that achieves the coequal goals of “providing  
8 a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem”  
9 and does this “in a manner that protects and enhances the unique cultural, recreational, natural resource  
10 and agricultural values of the Delta as an evolving place” (Water Code section 85054).

11 The coequal goals are the guiding principles for the Delta Plan. Additionally, the Sacramento-San Joaquin  
12 Delta Reform Act of 2009 states that the policy of the State is “to achieve the following objectives that  
13 the Legislature declares are inherent in the coequal goals for the management of the Delta:

14 *(a) Manage the Delta’s water and environmental resources and the water resources of the state*  
15 *over the long term.*

16 *(b) Protect and enhance the unique cultural, recreational, and agricultural values of the*  
17 *California Delta as an evolving place.*

18 *(c) Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy*  
19 *estuary and wetland ecosystem.*

20 *(d) Promote statewide water conservation, water use efficiency, and sustainable water use.*

21 *(e) Improve water quality to protect human health and the environment consistent with achieving*  
22 *water quality objectives in the Delta.*

23 *(f) Improve the water conveyance system and expand statewide water storage.*

24 *(g) Reduce risks to people, property, and state interests in the Delta by effective emergency*  
25 *preparedness, appropriate land uses, and investments in flood protection.*

26 *(h) Establish a new governance structure with the authority, responsibility, accountability,*  
27 *scientific support, and adequate and secure funding to achieve these objectives” (Water Code*  
28 *section 85020 et. seq.) .*

29 It is also State policy “to reduce reliance on the Delta in meeting California’s future water supply needs  
30 through a statewide strategy of investing in improved regional supplies, conservation, and water use  
31 efficiency. Each region that depends on the water from the Delta watershed shall improve its regional  
32 self-reliance for water through investment in water use efficiency, water recycling, advanced water  
33 technologies, local and regional water supply projects, and improved regional coordination of local and  
34 regional water supply efforts” (Water Code section 85021).

1 The Delta Plan builds on previous State efforts, particularly the Integrated Regional Water Management  
2 planning effort and pending actions on flood management and emergency response. It is an attempt to  
3 combine and coordinate the diverse efforts of State and local agencies, and to respond to the mandate of  
4 the Sacramento-San Joaquin Delta Reform Act of 2009, which requires linked actions to achieve a more  
5 reliable water supply while retaining regional flexibility and reducing overall reliance on the Delta.

6 Thus, in addition to promoting statewide actions and investments, the 2012 Delta Plan recognizes that the  
7 actions of California’s local agencies in hydrologic regions are vital to achieving water supply reliability  
8 and a protected and improved Delta ecosystem, in a manner that respects the unique character of the  
9 Delta.

## 10 The 2012 Delta Plan

11 The Delta Plan is a legally enforceable, long-term management plan that must be updated at least every  
12 five years. Some elements of the Delta Plan have regulatory effects. Any plan, project, or program that  
13 meets certain criteria (“covered actions,” described later in this chapter and in Chapter 3) is subject to the  
14 regulations included in the Delta Plan, and the project proponent must certify consistency with the Delta  
15 Plan. Detailed information regarding the certification and appeals processes is included in Chapter 3.

16 The Delta Plan also includes a series of non-regulatory recommendations to be considered by other  
17 agencies or by the Legislature or the governor. Achieving the coequal goals depends on collaborative  
18 effort and an unprecedented level of coordination and cooperation among State, federal, and local  
19 governments as well as all residents of California and cannot be achieved singularly by the Delta  
20 Stewardship Council.

21 Simultaneously, the Delta Plan presents a view of how the diversity of our water supply system and all its  
22 components, including demands for water and how water is currently used, fit together with the need for  
23 an improved Delta ecosystem. The planning time frame is through the year 2100, which indicates both the  
24 complexity of the job and also the need for constant monitoring and adjusting of decisions—what is  
25 commonly called “adaptive management”—informed by the best available science.

26 Success in achieving the coequal goals depends on completion of several ongoing planning processes led  
27 by State and local agencies. These major planning efforts may significantly affect State and local policy  
28 in the Delta over the next decade and in ways that impact the Delta. Among the major ongoing efforts are:

29 ♦ **The State Water Resources Control Board’s revised flow criteria for the Delta and its major**  
30 **tributaries:** The Delta is currently managed according to flow criteria developed in 1999.  
31 Scientific understanding has evolved considerably since that date, and State policy establishing  
32 the Delta ecosystem and statewide water supply reliability as coequal is now law. The State  
33 Water Resources Control Board currently plans to have new flow criteria established for the Delta  
34 by 2014 and key tributaries in the Delta watershed by 2018.

35 ♦ **The Bay Delta Conservation Plan:** A multi-stakeholder Habitat Conservation Plan/Natural  
36 Communities Conservation Plan process for the Delta has been under way since 2006 and has the  
37 dual purpose of achieving greater reliability to the water supplies through an improved Delta  
38 export water conveyance system, and required recovery of threatened and endangered species in  
39 the Delta. The Bay Delta Conservation Plan is expected to be complete by 2012. The Delta  
40 Stewardship Council has a unique potential appellate role with respect to the Bay Delta  
41 Conservation Plan, as outlined in the Sacramento-San Joaquin Delta Reform Act of 2009 (Water  
42 Code section 85320).

43 ♦ **The Central Valley Flood Protection Plan:** The California Department of Water Resources is  
44 developing an integrated flood management plan to protect areas of the Central Valley currently

1 receiving protection from flooding by existing facilities of the State Plan of Flood Control. The  
2 Central Valley Flood Protection Plan is scheduled to be submitted to the Central Valley Flood  
3 Protection Board for adoption in July 2012 and will be updated every five years thereafter.

4 Additional critical components of the Delta Plan include emergency response plans for each of the Delta  
5 counties and for the State and federal water projects, the Delta Protection Commission's *Economic*  
6 *Sustainability Plan* for the Delta, the Department of Parks and Recreation's *Delta Recreation Plan*, and  
7 decisions of federal and State policy makers on financing in support of the coequal goals. A proposed  
8 financing plan is included in this Delta Plan; however, legislative action is required.

9 Pending completion of these plans and a Delta Stewardship Council decision to incorporate them in  
10 whole or in part, the 2012 Delta Plan lays out an initial roadmap for achieving the coequal goals and  
11 inherent objectives over the next five years and beyond.

12 Accordingly, the Delta Stewardship Council has determined that the first step toward achieving the  
13 coequal goals is to avoid adverse impacts on the Delta ("covered actions") or the coequal goals from:

- 14 ♦ Actions that further erode water supply reliability or water quality;
- 15 ♦ Actions that further degrade the Delta ecosystem; or
- 16 ♦ Actions that increase risk to people, property, or statewide interests.

17 The Delta Plan also includes regulatory policies and recommendations for actions that will contribute to  
18 enhanced water supply reliability, reduce reliance on the Delta, help restore the Delta ecosystem, reduce  
19 flood risk, and improve the collection of water use data and other information that will guide the next  
20 Delta Plan update.

## 21 **Current Conditions: California's Delta and Its** 22 **Water Delivery Infrastructure Are in Crisis**

23 As recognized by the California Legislature, the Delta is "a distinct and valuable natural resource of vital  
24 and enduring interest to all the people" (Water Code section 85022(c)(1)). The Delta is the largest estuary  
25 on the west coast of North and South America and provides habitat for 55 species of fish and over  
26 750 species of plants, birds, and wildlife.

27 Over a century ago, Delta residents began to build an intricate, non-engineered levee system to channel  
28 water and reclaim land, which converted hundreds of thousands of acres of seasonally flooded wetlands  
29 into fertile agricultural land. By 1930, over 313,000 acres of former Delta wetlands were leveed and  
30 reclaimed for agriculture. Today, as a result of continued land reclamation and large-scale urbanization,  
31 95 percent of the historical tidal marsh in the Delta has been lost. Despite ongoing maintenance of this  
32 levee system, communities that have evolved behind these levees face the constant threat of flooding and,  
33 in some cases, catastrophic flooding. The Legislature declared the Delta "inherently floodprone" in 1992  
34 (Public Resources Code section 29704).

35 The Delta's miles of rivers and natural and man-made sloughs and channels are also the hub for moving  
36 water supplies from northern California to Central and Southern California. At the same time, the average  
37 volume of water flowing into the Delta has been reduced by approximately 30 percent in the last  
38 100 years. The Delta now has numerous pipes and canals that carry water from east to west in isolation.

39 In the 20<sup>th</sup> century, State and federal water projects built a system of reservoirs upstream of the Delta to  
40 divert and release water, some of which eventually flows to and through the Delta to the State Water  
41 Project and Central Valley Project pumping and conveyance facilities. Nearly two-thirds of the state's  
42 population depends on the Delta and these conveyance facilities for some portion of their water supply, as

1 do more than two million acres of farmland made more productive by water supplied for irrigation. These  
2 large systems of storage and conveyance have evolved in response to patterns of precipitation and  
3 population within the state.

4 California's residents and its economy rely heavily on captured water and large systems of storage and  
5 conveyance because precipitation in the state is concentrated in a few major rain storms in most years and  
6 varies tremendously year to year. Most of the state's annual precipitation occurs in five to 15 days  
7 combined and a recent scientific analysis concludes that "...larger variations in California necessitate  
8 heroic levels of management of the State's water resources to accommodate wider swings of wet and dry  
9 years than in any other state" (Dettinger et al. 2011).

10 Today, the valued elements of the Delta ecosystem are, by almost any measure, in serious decline.  
11 Reduced and variable fresh water flowing into the Delta, water pumping facilities exporting water from  
12 the Delta, invasive species, altered waterway geometry, urban growth, and urban and agricultural  
13 pollution are collectively degrading water quality and threatening the survival of multiple native fish  
14 species.

15 The dependence of the state's major regional economies on water supplies from the Delta has grown at  
16 the same time the reliability of water supplies from the Delta has begun to deteriorate. The State Water  
17 Project Delivery Reliability Report 2009 notes that water deliveries from the Delta average 60 percent of  
18 maximum contract amounts, down from 63 percent in 2007. Regulatory and court-imposed constraints on  
19 Delta water system operations are increasing as native fish populations decline, reducing the reliability of  
20 water deliveries, impacting urban and agricultural water users, and threatening the economic vitality of  
21 the state.

22 **Reliability of the State Water Project**

23 INFORMATION BOX UNDER DEVELOPMENT  
24  
25

26 Significant obstacles exist to achieving statewide water supply reliability. California's water managers do  
27 not know how much water is being used on an annual basis. Since 1914, the State Water Resources  
28 Control Board has issued permits to water diverters within the Delta, but actual annual diversion amounts  
29 are not currently known. Owners and operators of nearly one-third of irrigated lands in the Delta  
30 watershed do not participate in programs to meet water quality standards, and their compliance with the  
31 State Water Code is unclear. Although groundwater and surface water are part of an interconnected  
32 system, the State Water Resources Control Board has no clear authority to manage groundwater.  
33 Groundwater monitoring across California is improving, but is still not adequate to understand statewide  
34 groundwater use and regional water balances.

35 Compounding the complexity of these problems is the increasing volatility of the Delta's water supplies  
36 due to climate change, including shifting seasonal precipitation and runoff patterns. The potential for  
37 catastrophic failure in the Delta and the risk to its residents and water delivery infrastructure due to  
38 floods, sea level rise, and land subsidence is real, growing, and outpaces the State's ability to manage and  
39 fund risk reduction measures.

40 Agricultural practices on some Delta islands have led to subsidence of up to 25 feet below sea level,  
41 creating tremendous pressure on the levees to act as dikes—to hold back water constantly rather than only  
42 during peak flow periods. The cost of maintaining or improving these levees is sometimes more than the  
43 value of the use of the land. This creates an uncertain future for Delta agriculture and for the associated  
44 Delta economy.

# 1 What the Delta Plan Will Achieve by 2100

2 The Delta Plan must achieve the coequal goals and inherent objectives in the face of dramatically  
 3 changing conditions. The Delta of 2100 likely will be very different from the Delta of today. Some of the  
 4 changes will be intentional or predictable; others will be unintended and surprising. Changes will result  
 5 from population growth, climate change and sea level rise, land subsidence, and seismicity—most beyond  
 6 human ability or willingness to control.

7 The Delta Plan lays out a suite of regulatory policies and recommendations intended to address the  
 8 current and predicted ecological, flood control, water quality, and water supply reliability challenges. As  
 9 required by statute, the Delta Plan adopts a science-based adaptive management strategy to manage  
 10 decision-making in the face of uncertainty (Water Code section 85308(f)). All of these changes—some  
 11 foreseeable and some not—will create a dynamic context in which the Delta Plan will need to adapt.

12 Table 1.1 illustrates the range of changes that are anticipated by 2050 and, in some cases, by 2100. These  
 13 are the expected changes, allowing consideration of new policies and investments. The Delta Plan also  
 14 must prepare California for the possibility of large, unexpected changes.

15 **Table 1-1**  
 16 **Anticipated Changes by 2050 and 2100**

	<b>Change predicted by 2050</b>	<b>Change predicted by 2100</b>
Population of California <sup>a</sup>	Increase from 34.1 in 2010 to 59.5 million, a 75% increase	
San Francisco Bay/East Bay area earthquake affecting Delta by 2032 <sup>b</sup>	62% probability of at least one magnitude 6.7 or greater earthquake	
Probability of island flooding from high water, relative to record to 2005 <sup>c</sup>	In range of 200% increase (assumes no additional levee improvements)	In range of 450% increase from 2005 <sup>c</sup> (assumes no additional levee improvements)
Increased weather variability, including longer term droughts <sup>d</sup>	Both models and analyses of tree rings and other evidence to 800 AD suggest greater variability and long periods of drought, especially for the Colorado River basin, a current source of some water to California	
Sea level rise, relative to 2000 <sup>e</sup>	14"	40-55"
Snow pack, relative to 1956-2000 average of 15 MAF <sup>f</sup>	Reduction of 25 % (4.5 MAF) to 40% (6 MAF)	

a. California Department of Finance 2007

b. U.S. Geological Survey 2011

c. CALFED Independent Science Board 2008

d. For examples, see Richard Seager, Columbia University. <http://www.ideo.columbia.edu/res/div/ocp/drought/> or California Global Climate Change Portal. <http://www.climatechange.ca.gov/background/index.html>

e. California Ocean Protection Council 2011

f. California Department of Water Resources 2008

17 Restoring the Delta ecosystem and providing a more reliable water supply for California will require a  
 18 broad range of linked actions, most of which will need to be developed and adapted over time as new  
 19 information is developed and as additional resources are made available. These actions will have to  
 20 anticipate likely changes (see Table 1-1) and adjust to unexpected changes. The guiding vision for the  
 21 Delta Plan—the achievement of the coequal goals and inherent objectives—is intended to result in the  
 22 following outcomes by 2100:

- 23 ♦ The coequal goals of restoring the Delta ecosystem and providing a more reliable water supply  
 24 for California are the foundation of all State water management policies. No water rights  
 25 decisions or water contracts that directly or indirectly impact the Delta are made without

- 1 consideration of the coequal goals. The Public Trust Doctrine and California’s Constitutional  
2 Article 10, Section 2, requirements for beneficial use, reasonable water use, and no waste are  
3 fully enforced. California has a fully integrated, real-time system for tracking and evaluating  
4 water use and water quality for both surface water and groundwater supplies.
- 5 ♦ California’s water conveyance and storage facilities in the Delta watershed are significantly  
6 improved and better integrated. State and regional storage in the watershed and elsewhere has  
7 expanded over the past century. Water is exported from the Delta in a manner that is less harmful  
8 to the ecosystem. Robust information about water use and availability allows surface supplies and  
9 groundwater to be managed in an integrated, adaptable, and sustainable manner statewide.
  - 10 ♦ California leads the nation in water efficiency and sustainable water use. Water use by all  
11 segments of the economy is reduced, and urban per capita water use is reduced by 50 percent or  
12 more statewide. Regions of California that previously had severe groundwater overdraft  
13 conditions now sustainably manage these water resources. Significant new local and regional  
14 water supplies—recycled water, storm water, desalinated water, and reclaimed impaired  
15 groundwater—have been developed. As a result of all these actions, California is less dependent  
16 on water supply from the Delta, and is able to withstand imported water interruptions and other  
17 expected and unexpected changes of the coming century, without severe disruptions to the state’s  
18 economy or environment.
  - 19 ♦ Large areas of the Delta have been restored in support of a healthy estuary. A diverse mosaic of  
20 interconnected habitats— areas of open water, tidal marshes, floodplains, riparian, and upland  
21 areas—is re-established within the Delta and its watershed. Migratory corridors for fish, birds,  
22 and terrestrial wildlife have been largely protected and restored. Actions have been taken to  
23 ensure that sufficient freshwater flows following a more natural hydrograph are now dedicated to  
24 support a healthy ecosystem. Actions have reduced the impacts caused by invasive species, poor  
25 water quality, loss of habitat, and urban development, improving conditions for native species of  
26 fish, birds, and wildlife that depend on the Delta and its watershed.
  - 27 ♦ Delta agriculture remains an important and dynamic part of the Delta, adapting and improving  
28 through new technologies that sustain Delta soils, enhance wildlife, and improve air and water  
29 quality. Visitors from around the world are drawn to the Delta for recreation and to experience its  
30 beauty, ecosystem, and agricultural bounty. The Delta is a place where agricultural, recreational,  
31 and environmental uses are uniquely integrated and continue to contribute to the regional  
32 economy.
  - 33 ♦ The Delta—while evolving in response to sea level rise, earthquakes, floods, and major  
34 urbanization around the outside—remains a socially and environmentally distinctive and  
35 culturally significant region that is overwhelmingly rural. Within that context, the Delta remains a  
36 vibrant, changing, and evolving place. Local, State, and federal agencies have worked together to  
37 adapt and prepare for future changes caused by sea level rise, earthquakes, floods, and other  
38 natural forces. Land use policies and levee improvements are consistent with the human,  
39 property, and statewide interests in the Delta. Although continued changes are expected, progress  
40 toward achieving the coequal goals will protect the uniqueness of the Delta and provide a strong  
41 foundation for enhancing the resources and cultural and agricultural values of the Delta as an  
42 evolving place for the next century.

# 1 Phasing of the Delta Plan and the First Five Years

2 Over the next 90 years, the Delta Plan will be developed in phases, consistent with the principles of  
3 adaptive management and availability of new and improved information. Again, the Delta Stewardship  
4 Council must review the Delta Plan at least every five years, but may adopt revisions more frequently  
5 (Water Code section 85300(c)).

6 The Delta Plan identifies key milestones date for the Delta Stewardship Council to evaluate the  
7 performance toward achievement of the coequal goals. These milestones are:

- 8 ♦ **2025 (Near Term):** The timeframe in which the Bay Delta Conservation Plan is scheduled for  
9 implementation, many of the Delta levees and associated structures will be approaching 150 years  
10 of age (although many structures will have undergone substantial repairs), and additional sea  
11 level rise is projected to occur;
- 12 ♦ **2050 (Mid Century):** The timeframe by which the water supply contracts for the State Water  
13 Project and Central Valley Project will be renewed, many of the Central Valley Project reservoirs  
14 will be approaching 100 years of age, and additional sea level rise is projected to occur; and
- 15 ♦ **2100 (Long Term):** The timeframe by which much of the infrastructure within the Delta will be  
16 150 years to over 200 years old (although many structures will have undergone substantial  
17 repairs) and sea level rise of more than 55 inches is projected to occur.

18 The **initial five years** after adoption of the Delta Plan will be critical to its success. Additional, vital  
19 sources of information, including the Bay Delta Conservation Plan, Delta water flow standards, and  
20 improved water use data are scheduled to become available during this five-year period.

## 21 Geographic Scope and Use of the Delta Plan

22 Because California's water supply reliability and Delta ecosystem concerns are united in the Delta, the  
23 geographic scope of the Delta Plan must include areas that divert water upstream of the Delta and those  
24 areas that export water from the Delta. This is virtually the same planning area used for the CALFED  
25 Bay-Delta Program.

26 The scope of the Delta Plan encompasses the Delta and Suisun Marsh, the Delta watershed, and areas of  
27 the state that use water from the Delta watershed, as shown in Figure 1-1. The Primary Planning Area  
28 includes the statutory Delta (as defined by the Delta Protection Act of 1992) and the Suisun Marsh. For  
29 the purposes of the Delta Plan, the Delta and the Suisun Marsh are collectively referred to as the "Delta,"  
30 unless otherwise specified.

31 The Secondary Planning Area includes the Delta watershed, the Upper Trinity River Watershed, and areas  
32 outside the Delta in which exported water is used. In setting these boundaries, the Delta Stewardship  
33 Council recognized that the Sacramento-San Joaquin Delta Reform Act of 2009 requires that the Delta  
34 Plan address certain statewide water issues that are vital to sustainable management of the Delta (see, for  
35 example, Water Code sections 85020(a),(d),(f), and (h) 85302(b), 85303, 85304, and 85307 (a)).

1 **Figure 1-1**  
2 **Delta Plan Study Area**



3

1 The Delta Plan contains both regulatory policies, which are mandatory, and recommendations that are  
2 discretionary. Covered actions must be consistent with the plan's regulatory policies. Covered actions are  
3 defined as:

4 *“...a plan, program, or project as defined pursuant to Section 20165 of the Public Resources*  
5 *Code that meets all of the following conditions:*

- 6 1. *Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh;*
- 7 2. *Will be carried out, approved, or funded by the state or a local public agency;*
- 8 3. *Is covered by one or more provisions of the Delta Plan;*
- 9 4. *Will have a significant impact on the achievement of one or both of the coequal goals or*  
10 *the implementation of government-sponsored flood control programs to reduce risks to*  
11 *people, property, and state interests in the Delta.” (Water Code section 85057.5)*

12 Certain actions are exempted from the definition of “covered action,” including a regulatory action of a  
13 State agency, routine maintenance and operation of the State Water Project or the federal Central Valley  
14 Project, or local public agency routine maintenance or operation of any facility in the Delta (Water Code  
15 section 85057(b)).

## 16 Use of Adaptive Management in the Delta Plan

17 The Delta Stewardship Council is required by law to use the best available science and adaptive  
18 management as the basis for the Delta Plan. The Delta Plan must include “a science-based, transparent,  
19 and formal adaptive management strategy for ongoing ecosystem restoration and water management  
20 decisions” (Water Code section 85308(f)).

21 The scientific body of knowledge of the Delta and California’s water conditions is constantly growing  
22 and changing, but Delta-related resource management decisions are often made with incomplete  
23 information.

24 Adaptive management provides the necessary flexibility to manage complex natural resources in the face  
25 of considerable uncertainty. Adaptive management starts with information. The Delta Plan requires the  
26 development and submission of water use data and other data that are currently unavailable or  
27 inaccessible. This information is foundational to scientific judgments and adaptive management, and will  
28 inform the Delta Stewardship Council as it updates future versions of the Delta Plan. The Delta  
29 Stewardship Council is required to review the Delta Plan at least once every five years, but may do so  
30 more frequently—but only if relevant information is available. The next chapter, Science and Adaptive  
31 Management for a Changing Delta, provides detail of an adaptive management framework that will be  
32 used to guide the development and subsequent revisions of the Delta Plan. The framework includes an  
33 assessment of progress toward meeting the objectives of the Act and Delta Plan, and identification and  
34 assessment of possible adaptive management actions.

35 In addition, ongoing water management and ecosystem restoration covered actions will be required to  
36 adhere to the adaptive management framework described in Chapter 2. Proponents of proposed covered  
37 actions must describe how they intend to apply the adaptive management framework, including a  
38 commitment for communicating to the public the information learned during the monitoring and  
39 assessment of implemented actions. The Delta Stewardship Council will use the improved understanding  
40 gathered through the implementation of covered actions and associated research to revise the Delta Plan.

## Inclusion of Other Plans in the Delta Plan

By statute, the Delta Stewardship Council may incorporate part or all of other plans related to the Delta if the Delta Stewardship Council determines that these plans will assist with the achievement of the coequal goals (Water Code section 85350).

The Delta Stewardship Council recognizes that several important planning efforts relating to the Delta are not, or may not, be completed prior to the January 1, 2012 deadline for Delta Stewardship Council adoption and implementation of the Delta Plan. The Delta Stewardship Council has reviewed the available information to determine whether these plans, in part or in whole, may be included in the Delta Plan. Further, the Delta Stewardship Council can elect at a future time to include a final plan or to incorporate new information into the Delta Plan (Water Code section 85300(c)).

Future plans for consideration of incorporation by the Delta Stewardship Council could include but are not limited to, county Habitat Conservation Plans/Natural Community Conservation Plans (HCP/NCCPs), county emergency response plans, the State Water Resources Control Board's Bay-Delta Water Quality Control Plan, the Delta Protection Commission's Economic Sustainability Plan, and the Department of Parks and Recreation's proposal to expand the network of State recreation areas in the Delta.

The Sacramento-San Joaquin Delta Reform Act of 2009 explicitly enumerated a specific process for the incorporation of the Bay Delta Conservation Plan in the Delta Plan if the Bay Delta Conservation Plan meets the requirements of Water Code section 85320, including the approval by the Department of Fish and Game of the Bay Delta Conservation Plan as a natural community conservation plan and its approval as a habitat conservation plan pursuant to the federal Endangered Species Act.

By statute, the determination by the Department of Fish and Game that the Bay Delta Conservation Plan has met the requirements of Water Code section 85320 may be appealed to the Delta Stewardship Council. If the Delta Stewardship Council finds that the Bay Delta Conservation Plan fails to meet the statutory criteria, then "...the BDCP shall not be incorporated into the Delta Plan and the public benefits associated with the BDCP shall not be eligible for state funding" (Water Code section 85320(b)).

The Delta Stewardship Council has determined that any consideration or use of Bay Delta Conservation Plan-related studies or concepts in the Delta Plan will not have a pre-decisional effect on any possible future appeal of a Department of Fish and Game determination related to the Bay Delta Conservation Plan. As required by statute, the Delta Stewardship Council will base its review of any appeal on the complete record before it, consistent with Water Code section 85320(e) and the Delta Stewardship Council's adopted appellate procedures.

## Organization of the Delta Plan

The Delta Plan is organized around the specific subgoals, strategies, actions, and measures set forth in the Sacramento-San Joaquin Delta Reform Act of 2009. Water Code section 85020 provides the general framework for the organization of the chapters. Each chapter of the Delta Plan addresses a major subject matter issue, as required by the Sacramento-San Joaquin Delta Reform Act of 2009.

Chapter 2 explores the topic of adaptive management, a core principle necessary to achieve the coequal goals. In the Delta Plan, adaptive management is a tool that will be used to evaluate success of the Plan in meeting the coequal goals, but will also be a required element for certain covered actions as described in Chapter 3.

Chapter 3 describes some of the processes and procedures of the Delta Stewardship Council with respect to their appellate role. Importantly, this chapter includes regulations required of all covered actions.

1 Chapters 4 through 8 are policy chapters and are organized as follows:

- 2 ♦ Chapter 4, water supply reliability for California.
- 3 ♦ Chapter 5, ecosystem restoration.
- 4 ♦ Chapter 6, water quality.
- 5 ♦ Chapter 7, risk reduction in the Delta.
- 6 ♦ Chapter 8, protection and enhancement of the Delta as an evolving place.

7 Chapter 9 discusses a framework for funding for water supply and water supply-related ecosystem  
8 investments, current and potential future funding sources, and recommendations to the California  
9 Legislature from the Delta Stewardship Council for future funding amounts and sources.

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# Chapter 2

## Science and Adaptive Management for a Changing Delta

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The Sacramento-San Joaquin Delta Reform Act of 2009 seeks to provide a strong science foundation for decisions of the Council, seen in both provisions for a science program and an independent science board (Water Code sections 85480):

*85280. (a) The Delta Independent Science Board is hereby established in state government*

*85280 (4)(b)(4) The mission of the Delta Science Program shall be to provide the best possible unbiased scientific information to inform water and environmental decisionmaking in the Delta. That mission shall be carried out through funding research, synthesizing and communicating scientific information to policymakers and decisionmakers, promoting independent scientific peer review, and coordinating with Delta agencies to promote science-based adaptive management. The Delta Science Program shall assist with development and periodic updates of the Delta Plan's adaptive management program.*

The Act requires the inclusion of science-based adaptive management in the Delta Plan as defined and stated in Water Code sections 85308(f) and 85052:

*85308(f) Include a science-based, transparent, and formal adaptive management strategy for ongoing ecosystem restoration and water management decisions*

*85052 "Adaptive management" means a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives.*

The Act also requires that the Delta Plan is based upon and implemented using the best available science:

*85308 The Delta Plan shall meet all of the following requirements:*

*(a) Be based on the best available scientific information and the independent science advice provided by the Delta Independent Science Board.*

*(b) Where appropriate, recommend integration of scientific and monitoring results into ongoing Delta water management.*

*85302(g) In carrying out this section, the council shall make use of the best available science.*

# Chapter 2

## Science and Adaptive Management for a Changing Delta

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4 The Sacramento-San Joaquin Reform Act seeks to provide a strong science foundation for Council  
5 decisions. The Act provides for ongoing scientific expertise to support the Council through the Delta  
6 Science Program and Delta Independent Science Board (Water Code section 85280); requires that the  
7 Delta Plan is based on and implemented using the best available science (Water Code sections 85308 (a)  
8 and (e) and 85302(g)); and requires the use of science-based, transparent, and formal adaptive  
9 management strategies for ongoing ecosystem restoration and water management decisions (Water Code  
10 section 85308(f)).

11 Adaptive management is defined in Water Code section 85052, “‘Adaptive management’ means a  
12 framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and  
13 evaluation leading to continuous improvements in management planning and implementation of a project  
14 to achieve specified objectives.” Adaptive management is not currently being used to its fullest extent in  
15 the Delta. The intent of the Delta Plan is to more effectively use adaptive management for planning,  
16 doing, and evaluating and responding to actions that affect Delta ecology, water operations, and other  
17 human uses of Delta resources.

18 The adaptive management approach provides a structured process that allows for making decisions on the  
19 basis of best available science, closely monitoring and evaluating outcomes, and reevaluating and  
20 adjusting decisions once more information is learned. Adaptive management is smart management—it  
21 provides the necessary flexibility and feedback to manage natural resources in the face of often  
22 considerable uncertainty about management effects. Adaptive management closely integrates policy,  
23 management, and science in an ongoing, clearly structured, transparent, timely, and inclusive cycle.

24 The Council will use the following adaptive management framework to review and revise the Delta Plan.  
25 In addition, all ongoing ecosystem restoration and water management proposed covered actions will be  
26 required to develop a formal strategy consistent with this adaptive management framework. Proponents of  
27 ongoing ecosystem restoration and water management proposed covered actions must describe how the  
28 adaptive management framework will be applied, including a commitment to communicating to the  
29 public information learned from the monitoring and assessment of implemented actions.

### 30 Adaptive Management and the Delta

31 The Delta and our understanding of the Delta are constantly undergoing change (e.g., Healey et al. 2008,  
32 Lund et al. 2010). Delta-related resource management decisions are often made without perfect  
33 information. Adaptive management is one approach that is appropriate for managing the Delta because  
34 adaptive management embraces uncertainty, monitors actions, evaluates outputs and outcomes, and  
35 revises policy decisions based on improved understanding (Christensen et al. 1996, Abal et al. 2005).

1 Ideally, effective adaptive management for the Delta will derive from excellent science linked to  
2 governance that allows adjustments and changes to management decisions in a timely and transparent  
3 manner.

4 Proposed ongoing ecosystem restoration and water management covered actions in the Delta should allow  
5 and plan for adaptive management of the Delta as a changing place. Adaptive management is an approach  
6 to resource management that is applied to systems that constantly undergo change. It is based on the  
7 science of learning by doing, embracing uncertainty, monitoring actions, evaluating outputs and  
8 outcomes, and revising policy decisions based on improved understanding (Christensen et al. 1996, Abal  
9 et al. 2005, Healey et al. 2008). This chapter presents a framework for the application of adaptive  
10 management to ongoing ecosystem restoration and water management proposed covered actions. The  
11 review process and governance structure to support adaptive management are described in Chapter 3.

## 12 An Adaptive Management Framework

13 Several suggested frameworks for adaptive management have been developed elsewhere and provide the  
14 basis for the adaptive management approach for the Delta Plan (Christensen et al. 1996, Stanford and  
15 Poole 1996, CALFED Bay-Delta Program 2000, Habron 2003, Abal et al. 2005, Healey 2008, Kaplan and  
16 Norton 2008, Bay Delta Conservation Plan Independent Science Advisors on Adaptive Management  
17 2009, Williams et al. 2009). Although there are some differences among various frameworks, they  
18 generally contain three broad phases: plan, do, and evaluate and respond.

19 1. “Plan” is the first phase of the adaptive management framework and includes the following:

- 20 a) define/redefine the problem;
- 21 b) establish goals and objectives;
- 22 c) model linkages between objectives and proposed action(s); and
- 23 d) select action(s): research, pilot, or full-scale.

24 2. “Do” is the next phase of adaptive management, and includes the following:

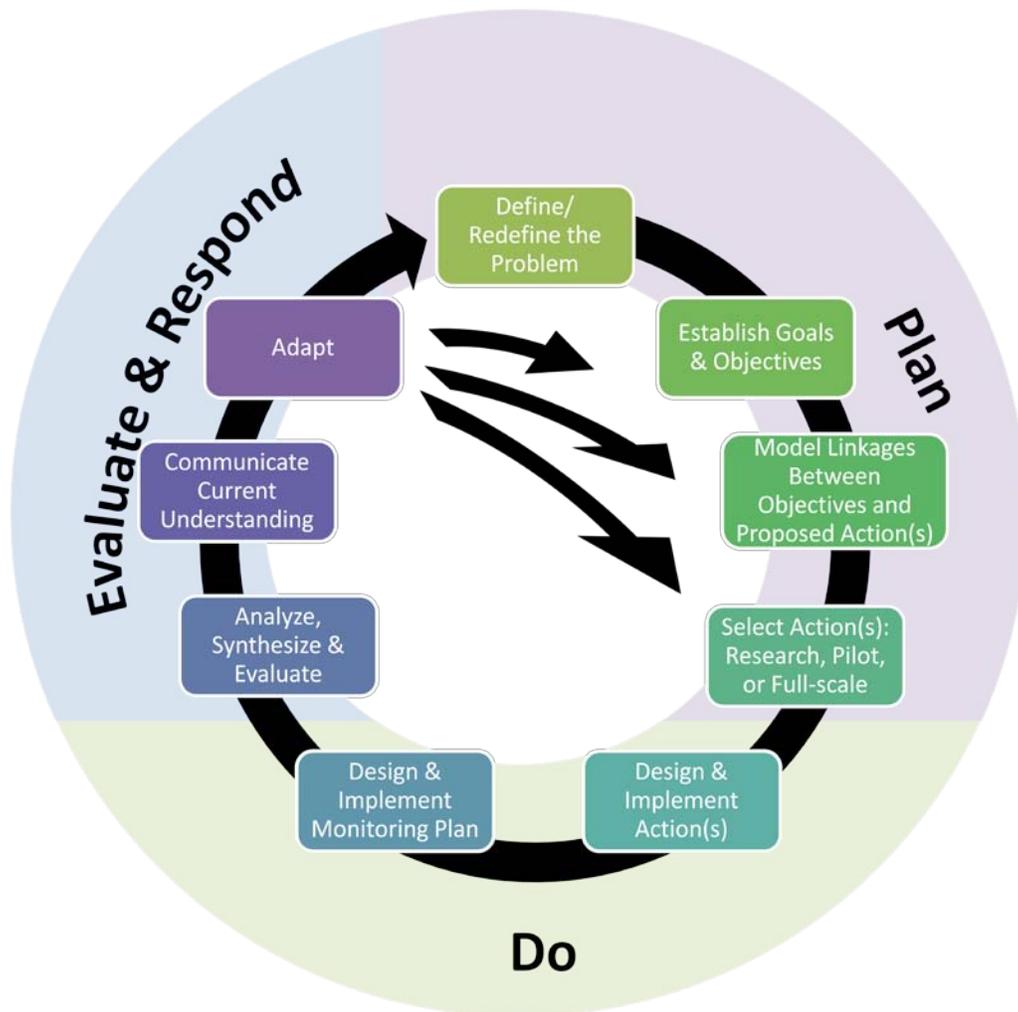
- 25 a) design and implement action(s); and
- 26 b) design and implement monitoring plan.

27 3. “Evaluate and Respond” is the final phase and includes the following:

- 28 a) analyze, synthesize, and evaluate;
- 29 b) communicate current understanding; and
- 30 c) adapt.

31 The Council will use the adaptive management framework in Figure 2-1 as a guideline for revising the  
32 Delta Plan and evaluating the use of adaptive management in proposed ongoing ecosystem restoration and  
33 water management covered actions. This framework and the description of each step are largely derived  
34 from Stanford and Poole (1996), Abal et al. (2005), CALFED Bay-Delta Program (2000), and the Bay  
35 Delta Conservation Plan Independent Science Advisors on Adaptive Management (2009).

1 **Figure 2-1**  
2 **An Adaptive Management Framework for the Delta Plan**  
3 *The shading represents the three broad areas of adaptive management (Plan, Do, and Evaluate and Respond), and the*  
4 *boxes represent the steps within an adaptive management framework. The circular arrow represents the general*  
5 *sequence of steps. The additional arrows indicate other possible next steps from the adapt step.*  
6



7  
8 **1. Plan**

9 The “plan” area of the adaptive management framework is presented as four steps. The Act provides the  
10 core elements for the first step, defining the overall problem and providing broad findings. The Act also  
11 establishes components of the second step, including the coequal goals and objectives.

12 ***Define/Redefine the Problem***

13 The first step of effective adaptive management is to clearly define the problems that will be addressed.  
14 This should take the form of a problem statement. The problem statement should clearly link to program  
15 goals and to specific objectives, which are to be developed by proponents in an open and transparent  
16 manner. All problem statements must be based on the best available science and clearly documented  
17 information. Defining a problem commonly requires defining the boundaries of the problem (e.g., the  
18 geographic scale, temporal scale, and ecological processes).

## 1 ***Establish Goals and Objectives***

2 Clear goals and objectives must be established by proponents, and be based on the best available science.  
3 Goals are broad statements that propose general solutions. Objectives are more specific than goals, and  
4 are often quantitative, specific statements of desired outcomes allowing evaluation of the proximity to  
5 meeting the goal.

## 6 ***Model Linkages between Objectives and Proposed Action(s)***

7 Models formalize and apply current scientific understanding, develop expectations, assess the likelihood  
8 of success, and identify tradeoffs associated with different management actions. Models can be  
9 conceptual, statistical, physical, decision support, or simulative. Models link the objectives to the  
10 proposed actions and clarify why an intended action is expected to result in meeting its objectives.  
11 Models provide a road map for testing hypotheses, which are statements that describe the expected  
12 outcome of an action.

13 Both qualitative (conceptual) and quantitative models can effectively link objectives and proposed actions  
14 by illuminating if and how different actions meet specific objectives. Conceptual models are particularly  
15 useful for both decision makers, scientists, and the public because they provide a visual illustration of the  
16 most critical cause and effect pathways. Conceptual models provide an articulation of the hypotheses  
17 being tested and how various actions might achieve particular objectives. Conceptual models also help to  
18 develop performance measures, qualitative or quantitative information that tracks status, and trends  
19 toward meeting objectives. Conceptual models should be used within adaptive management planning  
20 because they help explain how other types of models, research, and actions will be used to explore  
21 hypotheses and address specific existing and anticipated uncertainties.

## 22 ***Select and Evaluate Action(s): Research, Pilot, and Full-scale***

23 The process for selecting and evaluating an action or suite of actions to meet objectives includes an  
24 evaluation of the best available science, represented in the conceptual model. This evaluation should  
25 inform the level of the action(s) to be taken (e.g., further research, pilot-scale project, or full-scale  
26 project), the physical and temporal scale of the action(s), the degree of confidence in its benefits, and the  
27 consequences of being wrong. The scale of the action selected should be informed by the certainty of the  
28 relevant scientific information. For example, when low scientific certainty for predicting the outcome of  
29 an action and irreversible consequences exist for wrongly predicting the outcomes of the action, further  
30 research or a pilot-scale action should be selected over a full-scale action. Where possible, the selected  
31 action(s) should test cause and effect relationships so that the conceptual model can be adapted by using  
32 the information learned from implementing the action.

## 33 **2. Do**

34 The “do” area of adaptive management includes two steps that occur in parallel.

## 35 ***Design and Implement Action(s)***

36 The design and implementation of action(s) with associated monitoring includes clearly describing  
37 specific activities that will occur under the selected action(s). Designing includes creating a plan for  
38 implementing the action(s) and monitoring responses from the action(s). The design of the action(s)  
39 should be informed by both existing and anticipated uncertainties, and directly link to meeting the goals  
40 and objectives. The design step includes identifying adequate funding to carry out both the action(s) and  
41 the associated monitoring for the appropriate implementation period.

## 1 ***Design and Implement Monitoring Plan***

2 A well-designed monitoring plan includes a data management plan. A data management plan describes  
3 the process for organizing and clearly documenting observations, including how data are collected, the  
4 methods and calculations used, the time and space scales of the variables, and accurate site locations and  
5 characteristics. Data management is critical for analyses, syntheses, and evaluations.

6 A well-designed monitoring plan goes beyond data collection and data management. A monitoring plan  
7 includes targeted research to answer why certain results are observed and others are not. A monitoring  
8 plan also includes clear communication of the information gathered and current understanding drawn  
9 from this information. A complete monitoring plan includes the following types of monitoring:  
10 compliance monitoring (e.g., required by permits), performance monitoring (e.g., measuring achievement  
11 of targets), mechanistic monitoring (e.g., testing the understanding of linkages in the conceptual model),  
12 and system-level monitoring (e.g., holistic and long-term). These types of monitoring can measure and  
13 communicate various types of information. For example, administrative/inputs (e.g., dollars awarded and  
14 spent, projects funded, etc.), compliance/outputs (e.g., tons of gravel added, acres exposed to tidal action,  
15 etc.), and effectiveness/outcomes (e.g., actual outcome expected from implementing an action at the local  
16 scale, suites of actions at the systemwide scales, and status and trends assessments) measure and  
17 communicate different types of information. Within the monitoring plan design, an integrated suite of  
18 monitoring metrics must be developed that can be integrated and summarized to inform decision makers  
19 and the public as described in the Communicate Current Understanding step.

20 Implementation of actions and monitoring plans should occur in parallel. Before an action is  
21 implemented, initial conditions, to the extent practicable, should be clearly documented so that a baseline  
22 is established. Baseline data includes recognition of space and time scales that encompass the range of  
23 natural variation observed in the examined system. For many parameters, an extensive set of baseline data  
24 is available because of the efforts of the Interagency Ecological Program. The implementation of action(s)  
25 and monitoring should be executed in a transparent manner and clearly communicated to the public.  
26 Status and trends metrics after implementation compared to these same measures in areas where  
27 implemented actions have not occurred are often good assessment and communication tools.

## 28 **3. Evaluate and Respond**

29 The “evaluate and respond” area of adaptive management includes three key steps: analyze, synthesize,  
30 and evaluate; communicate current understanding; and adapt. Under the Act, formal decision making is  
31 the responsibility of the Council, and all other processes should be structured to provide strong support  
32 for Council decisions.

### 33 ***Analyze, Synthesize, and Evaluate***

34 Analysis, synthesis, and evaluation of the action(s) and monitoring are critical for improving current  
35 understanding. Analysis and synthesis should be informative of how conditions have changed, both  
36 expected and unexpected, as a result of the implementation of the action(s). The evaluation should  
37 examine whether or not performance measures indicate that one or more of the objectives have been met  
38 as a result of the implemented action(s), and if so, why. If an objective is not met, an explanation of the  
39 potential reasons why the objective has not been met should be clearly identified and communicated. The  
40 results of the analysis, synthesis, and evaluation step could be published in technical peer-reviewed  
41 reports for the purpose of external review, transparency, and accessibility where results warrant this level  
42 of communication.

### 43 ***Communicate Current Understanding***

44 Communication of current understanding gained through analysis, synthesis, and evaluation of  
45 implemented action(s) and monitoring is a key step for educating and equipping policy makers, managers,

1 stakeholders, and the public to appropriately respond and adapt. This step spans both the “do” and the  
2 “evaluate and respond” areas of adaptive management because the communication of current  
3 understanding and related recommendations for change requires both policy and technical expertise. The  
4 information communicated should be technically sound, well synthesized, and translated into formats  
5 conducive to informing a non-technical audience (e.g., a report card), and should be disseminated to those  
6 directly involved in the adaptive management process for the plan, program, or project and to those  
7 interested in the outcome of the action.

8 Technical staff and decision makers should be regularly involved in the exchange of information as data  
9 are analyzed and synthesized. Communication should be ongoing and occur at appropriate time scales for  
10 which an improved understanding could lead to refining other steps of the adaptive management  
11 framework. Key to successful communication is a skilled and dedicated interdisciplinary person or team  
12 that understands the technical information learned and the functional needs of the decision makers.

### 13 *Adapt*

14 Proponents of ongoing ecosystem restoration and water management covered actions need to be engaged  
15 and prepared to adapt to a change in current understanding. Educated and equipped with new results and  
16 understanding, decision makers should reexamine the other steps of the adaptive management framework  
17 and adapt where current understanding suggests doing so. Possible next steps could include redefining the  
18 problem statement, amending goals and objectives, altering the conceptual model, or selecting an  
19 alternative action for design and implementation.

## 20 **Summary**

21 The Council will use the adaptive management framework in this chapter and other provisions of the  
22 Delta Plan and Council rules and procedures as appropriate to make decisions on ongoing ecosystem  
23 restoration and water management covered actions and revising the Delta Plan. Flexible and responsive  
24 governance to support adaptive management is essential to achieve the coequal goals and is further  
25 discussed in Chapter 3.

### Box 1 - Adaptive Management Examples

- [This box will highlight a few of the best examples worldwide where adaptive management is actively being practiced.]

# 1 Knowledge Base for Adaptive Management

2 The knowledge base is the foundational scientific understanding of a system, both environmental and  
3 social, that creates the context for planning stages of science-based adaptive management. A strong  
4 knowledge base informs policy makers and the public. It has wide benefit, as seen in the work of the  
5 Council's Delta Science Program (formerly the CALFED Science Program). The following elements of  
6 the knowledge base also provide information necessary to effectively plan, do, and evaluate and respond  
7 within an adaptive management framework: (1) best available science, (2) scientific research to  
8 understand change, and (3) monitoring to detect change. These elements create the capacity for informed  
9 planning, meaningful actions and associated monitoring, and knowledgeable evaluating and responding.

## 10 Best Available Science

11 Best available science is specific to the decision being made and the timeframe available for making that  
12 decision. There is no expectation of delaying decisions to wait for improved scientific understanding.  
13 Action may be taken on the basis of incomplete science if the information used is the best available at the  
14 time.

15 Best available science shall be developed and presented in a transparent manner, including clear  
16 statements of assumptions, the use of conceptual models, description of methods used, and presentation of  
17 summary conclusions. Sources of data used shall be cited, and analytical tools used in analyses and  
18 syntheses shall be identified. Best available science changes over time, and decisions may need to be  
19 revisited as new scientific information becomes available. Targeted investment in science reduces  
20 scientific uncertainty and improves best available science.

21 Best available science must be consistent with the scientific process (Sullivan et al. 2006) that is  
22 described below, and includes the steps for achieving best science, guidelines and criteria, effective  
23 communication and documentation, and a process for reviewing the scientific rationale upon which Delta  
24 Plan strategies and performance measures are built. Ultimately, best available science requires the best  
25 scientists using the best information and data to assist management and policy decisions. The processes  
26 and information used should be clearly documented and effectively communicated.

### 27 *Steps for Achieving Best Science*

28 Science consistent with the scientific process includes the following elements: well-stated objectives; a  
29 clear conceptual model; a good experimental design with standardized methods for data collection;  
30 statistical rigor and sound logic for analysis and interpretation; and clear documentation of methods,  
31 results, and conclusions. The best science is transparent; it clearly outlines assumptions and limitations.  
32 The best science is also reputable; it has undergone peer review conducted by active experts in the  
33 applicable field(s) of study. Scientific peer review addresses the validity of the methods used, the  
34 adequacy of the methods and study design in addressing study objectives, the adequacy of the  
35 interpretation of results, whether the conclusions are supported by the results, and whether the findings  
36 advance scientific knowledge (Sullivan et al. 2006).

37 Several sources of scientific information and trade-offs are associated with each (Sullivan et al. 2006,  
38 Ryder et al. 2010). The primary sources of scientific information, in order of most to least scientific  
39 credibility for informing management decisions, include the following: independently peer-reviewed  
40 publications including journal publications and books (most desirable); other scientific reports and  
41 publications; science expert opinion; and traditional knowledge, as summarized in Table 2-1. Each of  
42 these sources of scientific information may be the best available at a given time, containing varying levels  
43 of understanding and uncertainty. These limitations shall be clearly documented when used to inform  
44 decisions.

**Table 2-1**  
**Prioritized List of Scientific Sources from Most to Least Scientific Credibility**

<b>Source</b>	<b>Content</b>	<b>Review Level</b>	<b>Timeliness</b>	<b>Availability</b>
Peer-reviewed publications	New findings and synthesis documents	Formal, independent external	Slow to medium; variable	Broadly available
Other scientific reports and publications	Reports, analyses, and synthesis documents	Informal, internal/external	Medium	Available from source
Science expert opinion	Opinion and broadly held understanding	Through reputation only	Fast	Available from individuals and groups
Traditional knowledge	Personal observations and opinions	Limited to none	Variable	Available from individuals and groups

Sources with more “scientific credibility” are at the top of the list. Adapted from Sullivan et al. 2006.

## 1 **Guidelines and Criteria**

2 Several efforts have been conducted in order to develop criteria for defining and assessing “best available  
3 science.” In 2004, the National Research Council Committee on Defining the Best Scientific Information  
4 Available for Fisheries Management prepared a report (National Research Council Report) that concluded  
5 that guidelines and criteria need to be defined in order to apply best available science in natural resource  
6 management (National Research Council 2004). Major findings and recommendations included  
7 establishing procedural and implementation guidelines to govern the production and use of scientific  
8 information. The guidelines were based on six broad criteria: (1) relevance, (2) inclusiveness,  
9 (3) objectivity, (4) transparency and openness, (5) timeliness, and (6) peer review.

10 The Legislature of the State of Washington also developed criteria for assessing best available science  
11 that are used by counties and cities in developing policies and regulations pursuant to the Washington  
12 State Growth Management Act. The State of Washington criteria include six characteristics for a valid  
13 scientific process: (1) peer review, (2) methods, (3) logical conclusions and reasonable inferences,  
14 (4) quantitative analyses, (5) context, and (6) references (Washington Administrative Code 2010).

15 Best available science for all proposed covered actions and implementing the Delta Plan should be  
16 consistent with the guidelines and criteria developed by the National Research Council and the State of  
17 Washington. Proposed covered actions should document that the science used follows the criteria adapted  
18 from the NRC report as they apply to the Delta environment, summarized in Table 2-2.

19 It is recognized that there are differences in the accepted standards of peer review for various fields of  
20 study and professional communities. When applying the above criteria for best available science, the  
21 Council will recognize that the level of peer review for supporting materials and technical information  
22 (i.e., scientific studies, model results, and documents) included in the scientific justification for a  
23 proposed covered action is variable and relative to the scale, scope, and nature of the proposed covered  
24 action. The Council understands that varying levels of peer review may be commonly accepted in various  
25 fields of study and professional communities, and will take this into consideration when reviewing the  
26 scientific justification for proposed covered actions.

1 **Table 2-2**  
 2 **Criteria for Best Available Science**

<b>Criteria</b>	<b>Description</b>
Relevance	Scientific information used should be germane to the Delta ecosystem and/or biologic organism (and/or process) affected by the proposed covered actions. Analogous information from a different region, but applicable to the Delta ecosystem and/or biota may be the most relevant when Delta-specific scientific information is nonexistent or insufficient. The quality and relevance of the data and information used shall be clearly addressed.
Inclusiveness	Scientific information used shall incorporate a thorough review of relevant information and analyses across relevant disciplines. Many analysis tools are available to the scientific community (e.g., search engines). <sup>a</sup>
Objectivity	Data collection and analyses considered shall meet the standards of the scientific method and be void of non-scientific influences and considerations. <sup>b</sup>
Transparency and Openness	The sources and methods used for analyzing the science (including scientific and engineering models) used shall be clearly identified. The opportunity for public comment on the use of science in proposed covered actions is recommended. Limitations of research used shall be clearly identified and explained. If a range of certainty is associated with the data and information used, a mechanism for communicating uncertainty shall be employed.
Timeliness	There are two main elements of timeliness: (1) data collection shall occur in a manner sufficient for adequate analyses before a management decision is needed, and (2) scientific information used shall be applicable to current situations. Timeliness also means that results from scientific studies and monitoring may be brought forward before the study is complete to address management needs. <sup>c</sup> In these instances, it is necessary that the uncertainties, limitations, and risks associated with preliminary results are clearly documented.
Peer Review	<p>The quality of the science used will be measured by the extent and quality of the review process. Independent external scientific review of the science is most important because it ensures scientific objectivity and validity.<sup>d</sup> The following criteria represent a desirable peer review process.<sup>e</sup></p> <p><u>Independent External Reviewers.</u> A qualified independent external reviewer embodies the following qualities: (1) has no conflict of interest with the outcome of the decision being made, (2) can perform the review free of persuasion by others, (3) has demonstrable competence in the subject as evidenced by formal training or experience, (4) is willing to utilize his or her scientific expertise to reach objective conclusions that may be incongruent with his or her personal biases, and (5) is willing to identify the costs and benefits of ecological and social alternative decisions.</p> <p><u>When to Conduct Peer Review.</u> Independent scientific peer review shall be applied informally or formally to proposed projects and initial draft plans, formally after official written draft plans or policies are released to the public, and formally to final released plans.</p> <p><u>Coordination of Peer Review.</u> Independent peer review shall be coordinated by entities and/or individuals that (1) are not a member of the independent scientific review team, (2) have a particular and special expertise in the subject under review, and (3) have had no direct involvement in the particular actions under review.</p>

- a. McGarvey 2007.
- b. National Research Council 2004, Sullivan et al. 2006.
- c. National Research Council 2004.
- d. Meffe et al. 1998.
- e. Adapted from Meffe et al. 1998.

3

## 1 Scientific Research to Understand Change

2 Scientific understanding about the  
3 Delta is not static and has changed  
4 considerably over time (Healey et al.  
5 2008, Lund et al. 2010). For  
6 example, our understanding of key  
7 drivers in ecological and social  
8 components of the Delta has changed  
9 over time (see Box 2).

10 In order to build the knowledge base  
11 for informing adaptive management  
12 within the Delta over the next few  
13 decades, ongoing investment in  
14 research is essential for  
15 understanding how the system  
16 changes over time. A comprehensive  
17 science plan for the Delta is needed.  
18 The science plan should outline the  
19 institutional structure, financial  
20 requirements, funding sources,  
21 research plan, comprehensive  
22 monitoring plan, data management,  
23 synthesis and integration plan, and  
24 communication plan for building the  
25 scientific knowledge base and  
26 sources of best available science over  
27 time. Delta-related research should  
28 (1) focus upon key uncertainties,  
29 (2) support the best and brightest  
30 through competitive grant programs, (3) invest in young scientists and researchers, (4) use peer review in  
31 the selection of research projects, (5) look to local and outside experts to focus and define research topics,  
32 and (6) welcome and support alternative ways of learning about the system (e.g., through involvement of  
33 local communities in scientific projects and discussions). The Delta Science Program will be the central  
34 entity in supporting this research to understand the Delta as a changing place and build upon the  
35 knowledge base used to support adaptive management.

## 36 Monitoring to Detect Change

37 A comprehensive monitoring plan that emphasizes both routine monitoring and targeted research are  
38 essential to the success of adaptive management and should be well described in the science plan for the  
39 Delta. Monitoring to detect change in the Delta will require that objectives of the monitoring are clearly  
40 linked to actions emanating from well-stated goals and objectives. Monitoring activities in the Delta  
41 should build upon the strengths and long-term data sets of the Interagency Ecological Program and other  
42 regional monitoring programs. The Interagency Ecological Program is a collaborative effort among nine  
43 State and federal agencies to monitor ecological changes in the Delta (<http://www.water.ca.gov/iep/>). This  
44 cooperative program produces publicly accessible data sets that include fish and wildlife status and  
45 trends, water quality, estuarine hydrodynamics, and food web monitoring. A comprehensive monitoring  
46 plan for the Delta should expand on the work of the Interagency Ecological Program and plan for  
47 coordinated synthesis, integration, and communication that transcends monitoring associated with  
48 covered actions.

### Box 2 – Examples of Changes in the Knowledge Base for the Delta

- *The State of Bay-Delta Science, 2008* was published to summarize and synthesize the current scientific understanding of the Bay-Delta at that time. The Delta Science Program, along with the Department of Fish and Game's [Ecosystem] Restoration Program, fund research to improve scientific understanding of the Bay-Delta ecosystem on topics relevant to decision makers' needs for making informed management and policy decisions.  
[http://www.science.calwater.ca.gov/pdf/publications/sbds/sbds\\_final\\_update\\_122408.pdf](http://www.science.calwater.ca.gov/pdf/publications/sbds/sbds_final_update_122408.pdf)
- *Interagency Ecological Program 2010 Pelagic Organism Decline Synthesis of Results Through August 2010*: The 2010 IEP POD Synthesis report explains the evolution of the IEP's understanding of pelagic organism decline and the Delta ecosystem over time. The 2010 report highlights the evolution of the pelagic organism decline conceptual model from 2005 to the present. The evolution of the conceptual model highlights the change in thinking from a classical food web and fisheries ecology approach, to species-specific models, to an ecological regime shift model. This evolution in thinking has come from monitoring and analysis of the Delta ecosystem over time.  
<http://www.water.ca.gov/iep/docs/FinalPOD2010Workplan12610.pdf>

## 1 Effective Governance

2 To be effective, governance to support and implement adaptive management for a changing Delta must  
3 have the capacity to change policies and practices in response to what is learned over time. Governance  
4 for adaptive management should provide a decision-making structure that fosters communication between  
5 scientists and decision makers, and has clear lines of authority where timely decisions are made and  
6 implemented. Governance for implementing adaptive management must provide for the institutional  
7 capacity to interact, learn, and adapt. Governance, oversight, and review for the use of the adaptive  
8 management framework and supporting knowledge base presented in this chapter are explained in further  
9 detail in Chapter 3.

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# Chapter 3

## Governance: Implementation of the Delta Plan

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The Sacramento-San Joaquin Delta Reform Act established the Delta Stewardship Council to achieve more effective governance as reflected in these findings in Water Code section 85300 (a) – (e).

*85300. (a) On or before January 1, 2012, the council shall develop, adopt, and commence implementation of the Delta Plan pursuant to this part that furthers the coequal goals. The Delta Plan shall include subgoals and strategies to assist in guiding state and local agency actions related to the Delta. In developing the Delta Plan, the council shall consider each of the strategies and actions set forth in the Strategic Plan and may include any of those strategies or actions in the Delta Plan. The Delta Plan may also identify specific actions that state or local agencies may take to implement the subgoals and strategies.*

*(b) In developing the Delta Plan, the council shall consult with federal, state, and local agencies with responsibilities in the Delta. All state agencies with responsibilities in the Delta shall cooperate with the council in developing the Delta Plan, upon request of the council.*

*(c) The council shall review the Delta Plan at least once every five years and may revise it as the council deems appropriate. The council may request any state agency with responsibilities in the Delta to make recommendations with respect to revision of the Delta Plan.*

*(d) (1) The council shall develop the Delta Plan consistent with all of the following:*

*(A) The federal Coastal Zone Management Act of 1972 (16 U.S.C. Sec.1451 et seq.), or an equivalent compliance mechanism.*

*(B) Section 8 of the federal Reclamation Act of 1902.*

*(C) The federal Clean Water Act (33 U.S.C. Sec. 1251 et seq.).*

*(2) If the council adopts a Delta Plan pursuant to the federal Coastal Zone Management Act of 1972 (16 U.S.C. Sec. 1451 et seq.), the council shall submit the Delta Plan for approval to the United States Secretary of Commerce pursuant to that act, or to any other federal official assigned responsibility for the Delta pursuant to a federal statute enacted after January 1, 2010.*

*(e) The council shall report to the Legislature no later than March 31, 2012, as to its adoption of the Delta Plan.*

# Chapter 3

## Governance: Implementation of the Delta Plan

### Covered Actions Are a Core Responsibility

Central to the work of the Council is this Delta Plan. In contrast to plan implementation in most governmental contexts, the Council does not exercise direct review and approval authority over proposed actions for consistency with the Delta Plan. In most cases, the Delta Plan functions as a strategic plan in that it is a guidance and recommendation document. However, in some cases, actions taken by local or State agencies are “covered actions” as defined in Water Code section 85057.5. The State or local agency proposing to carry out, approve, or fund a “covered action” certifies the consistency of the covered action with the Delta Plan and files a certificate of consistency with the Council. A certificate of consistency may be appealed to the Council within 30 days, alleging that the proposed covered action is not consistent with the Delta Plan. Upon receiving such an appeal, the Council has 60 days to hear the appeal and an additional 60 days to make its decision and issue specific written findings. These indirect processes and tight time lines are unique among California state agencies. They will work most effectively if based on clear regulations, transparency, and energetic Council management of its agenda.

Only certain activities qualify as covered actions, and the Act establishes both criteria and exclusions. This Delta Plan further clarifies what is and is not a covered action. As an example, routine levee maintenance by a reclamation district in the Delta would not be a covered action because it is statutorily excluded. Also, an addition to a house in an incorporated city would likely not be a covered action because it would not appear to have a significant impact on the Delta. However, a new intake for water supply from the Delta, development of a subdivision in a Delta floodplain that does not meet exclusion criteria in the Act, or establishing a new tidal marsh area are likely to be covered actions.<sup>1</sup>

This Delta Plan incorporates and builds upon existing state policies where possible, with the intention of meeting the Act’s requirements without establishing an entirely new set of policies. For example, Delta Plan regulatory policies on reducing flood risk incorporate recent California legislation that requires upgrades to levees protecting urban areas.

In other cases, Delta Plan regulatory policies seek to prevent actions that may preclude the future implementation of projects that meet the requirements of that Act, such as the acquisition of floodplain area for construction of a new bypass or restoration of certain lands uniquely suited to habitat. Similarly, the Delta Plan includes regulatory policies to protect floodplains and floodways until studies are completed by the Department of Water Resources.

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<sup>1</sup> There are specific exemptions for land in the Secondary Zone that are consistent with a sustainable communities strategy or where a notice of determination was filed by September 30, 2009. For a more detailed list see Water Code section 85057.5.

1 The Act requires the Council to establish and oversee a committee of agencies responsible for  
2 implementing the Delta Plan. The statute directs each agency to coordinate its actions pursuant to the  
3 Delta Plan with the Council and other relevant agencies. The Council will commence regularly scheduled  
4 coordination meetings of the appropriate and interested agencies upon adoption of the Delta Plan. Council  
5 staff has met with federal agencies and is developing the Delta Plan in consultation with these agencies in  
6 order to pursue future consistency and compliance with the Coastal Zone Management Act, as required by  
7 Water Code section 85300(d)(1)(A).

## 8 How Will the Regulatory Policies of the Delta Plan 9 Work in Practice?

10 This section includes a discussion of the general requirements for certifying consistency with the Act and  
11 additional examples of covered actions. Delta Plan policies are not intended and shall not be construed as  
12 authorizing the Council or any entity acting pursuant to this section, to exercise their power in a manner  
13 which will take or damage private property for public use, without the payment of just compensation.  
14 This policy is not intended to affect the rights of any owner of property under the Constitution of the State  
15 of California or the United States. None of the Delta policies increase the State's flood liability.

## 16 What Is the Definition of a "Covered Action"? Who Determines 17 Whether a Proposed Plan, Program, or Project Is a "Covered 18 Action?"

19 A "covered action" is defined in the Act as:

20 *"...a plan, program, or project as defined pursuant to Section 21065 of the Public  
21 Resources Code that meets all of the following conditions:*

- 22 1. *Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh;*
- 23 2. *Will be carried out, approved, or funded by the state or a local public agency;*
- 24 3. *Is covered by one or more provisions of the Delta Plan;*
- 25 4. *Will have a significant impact on the achievement of one or both of the coequal goals  
26 or the implementation of government-sponsored flood control programs to reduce  
27 risks to people, property, and state interests in the Delta." (Water Code section  
28 85057.5(a))*

29 The first step in determining a "covered action" is to identify whether the proposed plan, program, or  
30 project meets the definition in Public Resources Code section 21065. That particular provision is the  
31 section of the California Environmental Quality Act that defines the term "project" for purposes of  
32 potential review under the California Environmental Quality Act (CEQA). It is important to note,  
33 however, that CEQA's various statutory and categorical exemptions—which are considered for possible  
34 application in a CEQA analysis only after the threshold determination of a CEQA "project" is made—are  
35 not similarly incorporated by cross-reference in the definition of "covered action." Thus, for example,  
36 while one section of CEQA provides that its terms do not apply to "ministerial projects" (see Public  
37 Resources Code sec. 21080(b)(1)), those types of projects do fall under the Act's definition of "covered  
38 action."

1 The next step in determining a covered action is to review the four additional conditions in the definition  
2 of “covered action,” all of which must be met by a proposed plan, program, or project, even if it meets the  
3 CEQA definition of a “project.”

4 In order to qualify as a covered action, the action must occur, in whole or in part, within the boundaries of  
5 the Delta or Suisun Marsh. It must be carried out, approved, or funded by the state or a local public  
6 agency.

7 A proposed plan, program, or project must be covered by one or more provisions of the Delta Plan,  
8 meaning that a regulatory policy is applicable to the proposed action. The Delta Plan may exclude  
9 specified actions; therefore, those actions would not be covered by one or more provisions of the Delta  
10 Plan.

11 In addition, a proposed plan, program, or project must have a “significant impact” under Water Code  
12 section 85057.5(a)(4). For this purpose, the Council has determined that “significant impact” means a  
13 substantial or potentially substantial change in existing conditions that is directly, indirectly, and/or  
14 cumulatively caused by a project and that will or may affect the achievement of one or both of the  
15 coequal goals or the implementation of government-sponsored flood control programs to reduce risks to  
16 people, property, and State interests in the Delta.

17 Certain actions are statutorily excluded from the definition of “covered action,” for example:

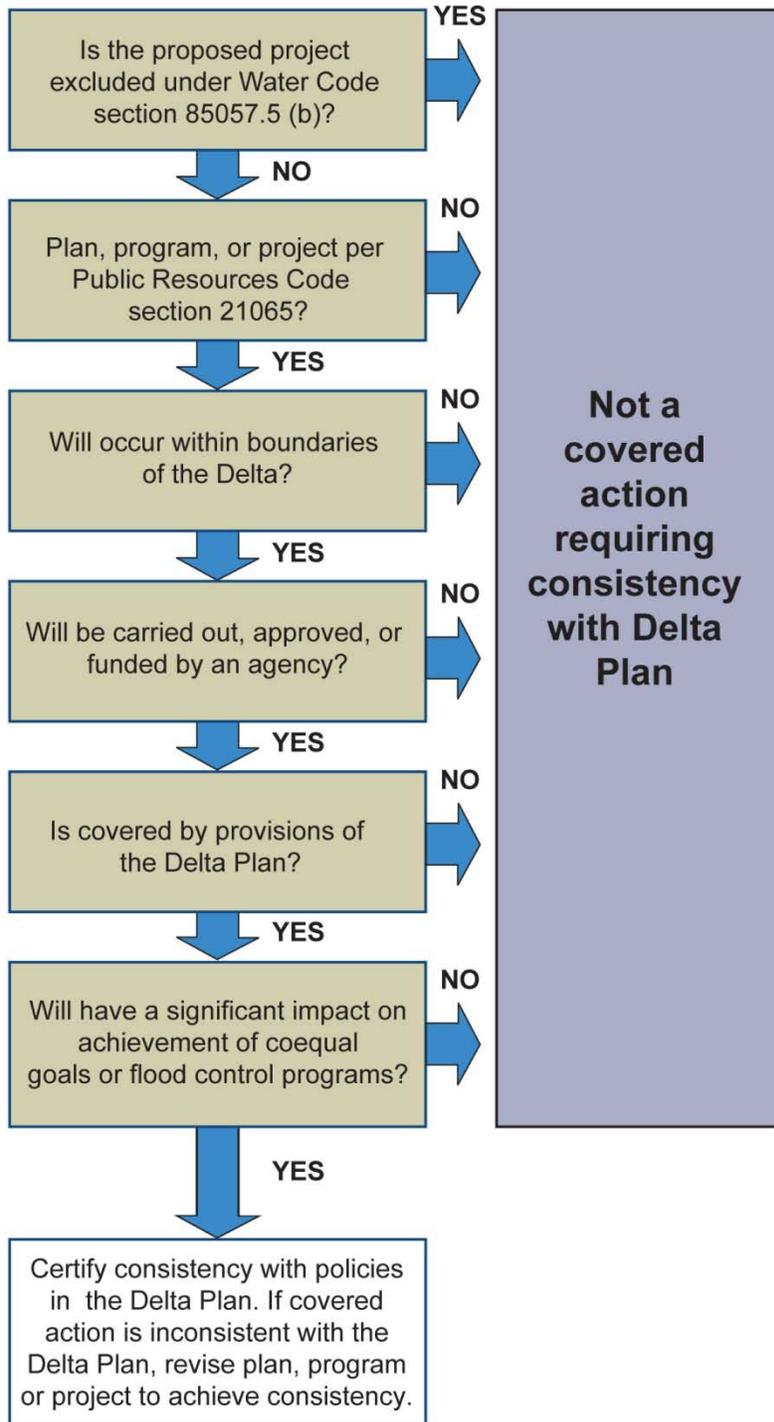
- 18 ♦ a regulatory action of a state agency (such as the adoption of a water quality control plan by the  
19 State Water Resources Control Board, or the issuance of a California Endangered Species Act  
20 permit by the Department of Fish and Game),
- 21 ♦ routine maintenance and operation of the State Water Project or the federal Central Valley  
22 Project, and
- 23 ♦ routine maintenance of levees by a reclamation district (Water Code section 85057(b)).

24 As specified in Paragraph 2 of the Council’s Administrative Procedures Governing Appeals (Appendix  
25 A), if requested, the Council’s staff will meet with an agency’s staff during “early consultation” to review  
26 the consistency of a proposed action and to make recommendations. The agency’s staff may also seek  
27 clarification of whether a proposed project is a “covered action,” provided that the ultimate determination  
28 on whether it is a covered action shall be made by the agency, subject to judicial review.

29 Figure 3.1 shows the steps in identifying a covered action. Agencies retain flexibility in how to meet these  
30 responsibilities for covered actions within the parameters of other legal authorities.

31

1 **Figure 3.1**  
2 **Decision Tree for State and Local Agencies on Possible Covered Actions**



3 WBG01281114346SAC Figure\_3-1.ai

4

## 1 Certifications of Consistency

2 State or local agencies that propose to undertake “covered actions” are required to certify with the  
3 Council, prior to initiating implementation, that these proposed plans, programs, or projects are consistent  
4 with the Delta Plan (Water Code section 85225 et seq.). The Council will develop a check list which  
5 agencies may use to facilitate the process. Additionally, as required in statute, an agency that proposes to  
6 undertake a covered action must prepare a written certification of consistency with detailed findings as to  
7 whether the covered action is consistent with the Delta Plan (Water Code section 85225). These findings  
8 must be submitted to the Council as part of the certification of consistency. Any person may appeal the  
9 certification of consistency and, if a valid appeal is filed, the Council is responsible for subsequent  
10 evaluation and determination—as provided in statute and the Council’s Administrative Procedures  
11 Governing Appeals—of whether the proposed covered action is consistent with the Delta Plan’s  
12 regulatory policies. More than one regulatory policy in the Delta Plan may apply to a covered action.

13 A covered action must not only be consistent with the Delta Plan at time of certification, but to be  
14 consistent it must also be implemented as described in its finding of consistency.

15 Certifications for consistency must demonstrate that a covered action is consistent with the Delta Plan by  
16 being fully transparent, disclosing potential impacts, demonstrating legal authority and sufficient capacity,  
17 complying with all relevant laws, and identifying how best available science will be used in decision-  
18 making and adaptive management.

19 The Act contains multiple references to the use of best available science, including specific requirements  
20 such as, for example, that ongoing ecosystem restoration or water management decisions include a  
21 science-based, transparent, and formal adaptive management strategy (Water Code section 85308(f)).  
22 Best available science involves not only the use of sound information but is a process that meets the  
23 criteria of (1) relevance, (2) inclusiveness, (3) objectivity, (4) transparency and openness, (5) timeliness,  
24 and (6) peer review (National Research Council 2004). Best available science is consistent with the  
25 scientific process (Sullivan et al. 2006). Best available science is specific to a decision context and would  
26 necessarily be related to the specific decision to be made and the time frame available for that decision.  
27 For science to be considered “best available” to support a decision, reasonable care must be taken to  
28 identify all available and relevant scientific information. Sources for best available science may include  
29 peer-reviewed publications, general scientific reports and publications, scientific expert opinion, or even  
30 anecdotal evidence. See Chapter 2 for a more detailed discussion of best available science. Table 2-1  
31 establishes the priority for the value placed on each information source.

## 32 Policy

33 G P1 Certifications for consistency with the Delta Plan must address the following:

- 34 1. All covered actions must be fully transparent by disclosing all potentially significant adverse  
35 environmental impacts and mitigations of those adverse impacts.
- 36 2. All covered actions must be based on best available science. [COUNCIL TO DISCUSS  
37 FURTHER]
- 38 3. All covered actions must demonstrate managerial and financial capacity to implement the covered  
39 action over the long term. Managerial capacity includes ownership and water rights relevant to  
40 the covered action. Financial capacity includes budgeting, capital improvement planning, and a  
41 financing plan relevant to the covered action.
- 42 4. All covered actions must identify and comply with existing relevant law, including water quality  
43 regulations and water rights.

- 1           5. Large-scale ecosystem restoration and water management covered actions must include adequate  
2           provisions to assure continued implementation of adaptive management consistent with the Delta  
3           Plan. This requirement shall be satisfied through:
- 4           ♦ an adaptive management strategy consistent with the adaptive management framework of  
5           Chapter 2;
  - 6           ♦ documentation of how the proposed covered action will achieve its desired result;
  - 7           ♦ performance measures and targets relevant to meeting the Delta Plan’s objectives  
8           enumerated in Section 85302(c), Section 85302(d), and Section 85302(e);
  - 9           ♦ monitoring and analyses requirements sufficient to make adaptive management decisions  
10          and to capture any effects that may help or hinder achieving the coequal goals as expressed  
11          in the Act or the Delta Plan;
  - 12          ♦ documentation of delineated authority by the agency responsible for the covered action to  
13          support the implementation of the full adaptive management process, including planning,  
14          implementation, monitoring, data management, analyses, obtaining the best available  
15          science, communicating results, supporting decision making, and full implementation of  
16          any changes in implementation of the covered action; and
  - 17          ♦ procedures ensuring public release of all information developed related to adaptive  
18          management, including, but not limited to, primary data, modeling, analyses, and syntheses  
19          of research findings.

## 20           **Changing the Delta Plan**

### 21           **Incorporation of Another Plan into the Delta Plan**

22           The Council may incorporate another plan, in whole or in part, into the Delta Plan. When fully  
23           incorporated, these elements of another plan become the basis for consistency determinations and relevant  
24           to the actions of State and local agencies. The agency which has the original plan authority will continue  
25           to take actions under that authority.

### 26           **Incorporation of the Bay Delta Conservation Plan into the Delta 27           Plan**

28           The Bay Delta Conservation Plan is a major project considering large-scale improvements in water  
29           conveyance and large-scale ecosystem restorations in the Delta. When completed, it must be incorporated  
30           into the Delta Plan if it meets specified conditions. Completion of the Bay Delta Conservation Plan  
31           process and the full suite of projects now under consideration in that process would have large impacts on  
32           the Delta and would affect the coequal goals. However, completion and full implementation of the Bay  
33           Delta Conservation Plan is not equivalent to satisfying the Act.

### 34           **Transparency and Communications Plan to Implement the 35           Delta Plan**

36           The Council is committed to transparency and effective participation in its processes. To that end, the  
37           Council requires full transparency in information provided to it and timely public posting of information  
38           relevant to its actions. It will post all communications received.

- 1 The Council also seeks strong working relationships with agencies and stakeholders. Important  
2 components of those effective working relationships are procedures that ensure transparency and robust  
3 procedures for early consultation that are used consistently.
- 4 Decisions of the Council will be posted on its website. A public list of policies and plans determined to be  
5 consistent and not consistent with the Act shall be maintained on the Council website and included in  
6 reports of the Council on its effectiveness in implementing the Act.
- 7 Where required by law or as it deems feasible and appropriate, the Council will provide findings for its  
8 actions, which shall be posted publicly.
- 9 Information developed by the Council or provided to the Council shall be publicly accessible on the  
10 Council's website.

## 11 References

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# Chapter 4 A More Reliable Water Supply for California

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The Sacramento-San Joaquin Delta Reform Act declared state policy for California's Water Resources and the Delta (Public Resources Code section 29702):

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

Inherent in the coequal goals, the legislature declares the following objectives inherent in the coequal goals for management of the Delta (Water Code section 85020):

*(a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.*

*(d) Promote statewide water conservation, water use efficiency, and sustainable water use.*

*(f) Improve the water conveyance system and expand statewide water storage.*

*Missing self sufficient/reduction of reliance on delta*

Increased regional self-reliance and reduced reliance on the Delta for water supplies is established as state policy (Water Code section 85021):

*The policy of the State of California is to reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy of investing in improved regional supplies, conservation, and water use efficiency. Each region that depends on water from the Delta watershed shall improve its regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts.*

Water Code sections 85302, 85303, 85304, and 85211 provide direction on the implementation of measures to promote the coequal goals and inherent objectives.

*85302. (c) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:*

*(1) Meeting the needs for reasonable and beneficial uses of water.*

*(2) Sustaining the economic vitality of the state.*

*(3) Improving water quality to protect human health and the environment.*

*85303. The Delta Plan shall promote statewide water conservation, water use efficiency, and sustainable use of water.*

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

*85211. The Delta Plan shall include performance measurements that will enable the council to track progress in meeting the objectives of the Delta Plan. The performance measurements shall include, but need not be limited to, quantitative or otherwise measurable assessments of the status and trends...*

*(b) The reliability of California water supply imported from the Sacramento River or the San Joaquin River watershed.*

The longstanding constitutional principle of reasonable use and the public trust doctrine form the foundation of California's water management policy and are particularly applicable to the Delta watershed and to the others areas that use Delta water as the basis for resolving water conflicts. (Water Code Section 85023) The constitutional principle is defined in Section 2 of Article X of the California Constitution as:

*The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water.*

# Chapter 4

## A More Reliable Water Supply for California

1  
2  
3

4 California has outstripped the capacity for its existing infrastructure to satisfy the economic,  
5 environmental, and social demands for water (Hanak et. al. 2011). The state uses more groundwater than  
6 nature replenishes (Department of Water Resources 2009). Since 1914, the State Water Resources  
7 Control Board has issued permits for the diversion of water from the Delta, but total actual diversion  
8 amounts are currently unknown and may be unsustainably over-allocated (State Water Resources Control  
9 Board 2008b). Conflicts over California’s water supplies have reached a point where the Legislature has  
10 found “the Sacramento-San Joaquin Delta watershed and California’s water infrastructure are in crisis and  
11 existing Delta policies are not sustainable” (Water Code section 85000).

12 Variability of water availability is perhaps one of the most dominant characteristics of the state’s water  
13 supply system. Most of the state’s water originates as precipitation that falls during winter months, with  
14 about two-thirds of the available runoff coming from the mountains in northern California (Hanak 2011).  
15 California has developed a complex and interconnected system of surface reservoirs, aqueducts, and  
16 water diversion facilities that store and convey water from areas that have water available for use to urban  
17 and agricultural areas that have water needs. These systems were designed during the mid 20th century  
18 with minimal consideration of the harm that these water diversions could cause to the environment and  
19 native fisheries. As a result, California’s native Delta ecosystem is in decline.

20 One of the Delta Reform Act’s key objectives is “to provide a more reliable water supply for the state”  
21 (Water Code section 29702). Therefore, the Delta Plan focuses on policies and recommendations that will  
22 increase the reliability of water supplies in the state that are available to meet demands while, at the same  
23 time, reducing local and regional reliance on Delta exports (Water Code section 85021). A responsible  
24 plan to improve water supply reliability in the state must address the problem on all fronts: control water  
25 demand and improve conservation; deal with infrastructure limitations on storage and conveyance; ensure  
26 that water flow standards to protect and restore the Delta ecosystem are updated and enforced; and  
27 develop additional local and regional water supplies through improved groundwater management, water  
28 reuse, groundwater treatment, stormwater capture and recharge, and desalination. Ultimately, water  
29 supply reliability for the state will be achieved at the regional level through a combination of sustainable  
30 water management, regional self-reliance and water balance, and improved conveyance and storage.

## 31 Policies and Recommendations

### 32 Improve Regional Water Self-Reliance

33 Since the early 1980s, California has recognized the importance to the state of improving regional water  
34 supply self-reliance through conservation and the increased development of local and regional water

1 supplies. These programs and projects increase the reliability of the state’s water supplies by controlling  
2 overall demand for the state’s limited water resources and providing a diverse array of water supplies that  
3 are more resilient under drought, emergency shortage, and climate change conditions.

4 Local and regional water supply development often makes water available from sources that historically  
5 have been unrecognized, underutilized, or unavailable. Decreased reliability of imported supplies,  
6 technological advances, and regional collaboration and innovation has made this possible. Recycled water  
7 provides an opportunity to use the same water several times before it reaches the ocean.<sup>2</sup> With additional  
8 treatment, groundwater that has been rendered non-potable by natural or human introduction of  
9 contaminants can be transformed into a drinking water supply. Similarly, desalination allows saline water  
10 to be used for drinking water. Stormwater that previously has been channelized to limit flooding and sent  
11 to the ocean can be recaptured and used for groundwater recharge (City of Los Angeles, UWMP 2010).  
12 Improved local storage, both surface and groundwater, increases the flexible management of water  
13 supplies statewide, especially through local conjunctive management programs (Hanak et al. 2011). Even  
14 retail and wholesale water rate structures play a critical role in ensuring that residential and business  
15 customers and agricultural users understand the value of the water they use and do their part to conserve  
16 the state’s water resources. While improvements to statewide water infrastructure remain critically  
17 important to long term water supply reliability, California has a wealth of local water resources that can  
18 be developed to improve regional self reliance and help achieve the coequal goals in the near term.

19 **ADDITIONAL INFORMATION TO BE PROVIDED ON REGIONAL SELF-SUFFICIENCY USING**  
20 **EXAMPLES FROM APRIL WORKSHOP AND OTHERS WHO HAVE ALREADY EFFECTIVELY**  
21 **INCORPORATED A WATER SUSTAINABILITY /REDUCED DELTA DEPENDENCY ELEMENT**  
22 **IN THEIR URBAN AND AGRICULTURAL WATER MANAGEMENT PLANS/IRWMPS**

23 The State has promoted local and regional water supply planning by requiring local agencies to develop  
24 plans, such as Urban Water Management Plans and Agricultural Water Management Plans, that forecast  
25 sources of supply and the actions needed (including demand management) to ensure that future demands  
26 are met over the next 25 years.<sup>3</sup> Since 2000, the State has also promoted voluntary integrated regional  
27 water management planning, recognizing that collaboration among the agencies within a watershed  
28 provides opportunities for better water management decisions and coordinated infrastructure  
29 investments.<sup>4</sup> Over \$2 billion in State bond funds have been made available to support implementation of  
30 projects identified in these plans.

31 Overall, statewide progress in increasing local and regional water supplies is being made. As of 2011, the  
32 Department of Water Resources reported that over 90 percent of the state’s population was covered by  
33 locally approved integrated regional water management plans. The 2009 California Water Plan indicates  
34 that statewide water use efficiency has improved, water recycling is expanding, and other local and  
35 regional water supplies are increasing. Most notable are the outstanding water management successes of  
36 major population areas, such as the City of Los Angeles, where future new water demands are now  
37 projected to be met only through increased conservation and local water supplies (Hanak et al. 2011).

38 With the enactment of the Delta Reform Act of 2009, it is now the policy of California to reduce reliance  
39 on the Delta in meeting future water supply needs (Water Code section 85021). The Act requires that  
40 “each region that depends on water from the Delta watershed shall improve regional self-reliance for  
41 water through investment in water use efficiency, water recycling, advanced water technologies, local and

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<sup>2</sup> DWR, 2009: Value of water recycling in stretching local water supplies by increasing the number of times that water is used and reused before it reaches the ocean.

<sup>3</sup> Requirement as a condition to receive state funding for water infrastructure from grant and loan programs administered by the state.

<sup>4</sup> An Integrated Regional Water Management Plan must be approved by the Department of Water Resources to receive bond funding for implementation of identified projects.

1 regional water supply projects and improved regional coordination of local and regional water supply  
2 efforts” (Water Code Section 85021).

3 However, while voluntary planning and reporting on conservation and water supply projects may occur in  
4 a regional context, the decisions to fund and implement these projects remain under the control of  
5 individual water agencies. To promote statewide sustainable water use and ensure compliance with the  
6 Delta Reform Act, water agencies need to identify their actions and investments to implement  
7 conservation and water supply projects and explain how these projects are contributing to regional  
8 self-reliance and reduced reliance on the Delta. The state’s progress in meeting its regional self-reliance  
9 goals should be summarized in future California Water Plan updates.

### 10 ***Problem Statement***

11 Additional local and regional conservation and water supply development is needed to improve regional  
12 self-reliance in order to reduce reliance on the Delta and achieve the coequal goals.

### 13 ***Policies***

14 The following policies (WR P1, WR P2, and WR P3) only apply as regulatory policies as follows:

- 15 A. A covered action involving the export of water out of the Delta, or involving the transfer of water  
16 through the Delta, is inconsistent with the Delta Plan if the need for that covered action is  
17 significantly caused by a recipient region’s failure to comply with policies WR P1, WR P2,  
18 and/or WR P3.
- 19 B. A covered action involving the use of water in part or in whole in the Delta is inconsistent with  
20 the Delta Plan if the need for that covered action is significantly caused by the water using  
21 region’s failure to comply with policies WR P1, WR P2, and/or WR P3.

22 In all other situations, WR P1, WR P2, and WR P3 are recommendations.

23 **WR P1** To promote statewide accountability in achieving the coequal goals, water suppliers that deliver  
24 water diverted or exported from the Delta or the Delta watershed shall, by December 31, 2015,  
25 include a new Water Sustainability Element in their Urban Water Management Plan and/or  
26 Agricultural Water Management Plan (or an equivalent plan). The Water Sustainability  
27 Element shall detail how water suppliers are improving regional self-reliance and reducing  
28 dependence on the Delta through investments in local and regional programs and projects. At a  
29 minimum, the Water Sustainability Element shall include:

30 **A Plan for Possible Interruption of Delta Water Supply:** Identify how reliable water service  
31 will be provided for a minimum period of at least six months in the event the Delta’s export  
32 operations are interrupted during an average water year, dry water year, and following three dry  
33 water years.

34 **Evaluation of Planned Investments in Water Conservation and Water Supply**  
35 **Development:** Identify specific programs and projects that will be implemented over the  
36 twenty year planning period and how they contribute to the improvement of regional  
37 self-reliance and reduced dependence on the Delta, including:

- 38 • Water Conservation and Water Use Efficiency
- 39 • Local Groundwater and Surface Storage
- 40 • Conjunctive Use Programs
- 41 • Water Recycling
- 42 • Use of Currently Non-Potable Groundwater

- 1           • Storm Water Capture and Recharge
- 2           • Saline Water and Brackish Water Desalination
- 3           ♦ **Evaluation of Regional Water Balance:** Provide an assessment of the long term
- 4           sustainability of water supplies to meet projected demands within the supplier's hydrologic
- 5           region, as defined by in the 2009 California Water Plan Update, over the twenty year
- 6           planning period. If the region lacks balance, indicate the steps that are being taken through
- 7           the Integrated Regional Water Management Plan to bring the region into balance. If the
- 8           region is not in balance and its Integrated Regional Water Management Plan is not
- 9           available or does not identify the steps being taken to bring the region into long-term
- 10          balance, then describe how the supplier's programs and projects are helping to bring the
- 11          region into balance.
- 12          ♦ **Sustainable Water Rate Structure:** Evaluate the degree to which the supplier's current
- 13          rate structure sustainably encourages and supports water conservation.

14 **ADDITIONAL OPTIONS FOR COUNCIL CONSIDERATION:**

- 15          A. Require the addition of a Water Sustainability Element in Integrated Regional Water
- 16          Management Plans. The element should includes an assessment of the long term sustainability of
- 17          water supplies to meet projected demands and, if the region is out of balance, a requirement for
- 18          the implementation of local and regional programs and projects that will achieve regional water
- 19          balance within the twenty year planning horizon. To be consistent with the Delta Plan, water
- 20          suppliers that deliver water diverted or exported from the Delta or the Delta watershed would be
- 21          required to be part of a Department of Water Resources-approved Integrated Regional Water
- 22          Management Plan with a Water Sustainability Element the meets the regional water balance
- 23          criteria.
- 24          B. Convert regulatory policy stated above into a recommendation. Provide recognition/incentive to
- 25          water suppliers that have achieved regional water balance or have demonstrated long-term
- 26          improvement in regional self-reliance and reduced dependence on the Delta. Recommend that
- 27          state agencies which administer state grants or loans to fund water projects or programs include in
- 28          their funding criteria a priority for Integrated Regional Water Management Plans (or individual
- 29          water suppliers) that can demonstrate through their adopted Water Sustainability Element that
- 30          they have achieved Regional Water Balance (or that, as a water supplier, they have improved
- 31          regional self-reliance and reduced their dependence on Delta diversions).
- 32          WR P2 Water suppliers that deliver water diverted or exported from the Delta or the Delta watershed
- 33          shall, at a minimum, meet the standards and timelines established in Water Code section 10608
- 34          et.seq. and section 10800 for urban and agricultural water use efficiency.<sup>5</sup>
- 35          WR P3 Retail water suppliers that deliver water diverted or exported from the Delta or the Delta
- 36          watershed shall, by December 31, 2020, develop and implement a rate structure that sustainably
- 37          encourages and supports water conservation which may include the adoption of a water budget
- 38          based rate structure.

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<sup>5</sup> SB X7-7, also known as the 20% by 2020 legislation, was enacted in 2009. For urban water suppliers, the law requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020, with incremental progress measured by a 10% reduction by December 31, 2015. Agricultural water suppliers are required to measure the volume of water delivered to customers, adopt a pricing structure based at least on quantity delivered and implement additional conservation measures that are locally cost effective and technically feasible by July 31, 2012. A report on efficient water management practices is required to be included in the supplier's agricultural management plan. In addition, the act requires agricultural management plans to be completed by December 31, 2012, with an update by December 15, 2015, and every five years thereafter. Urban and agricultural water suppliers are ineligible for state water grants or loans unless they are in compliance with the act.

## 1 **Recommendations**

- 2 **WR R1** The California Department of Water Resources, in consultation with the Council, the State  
3 Water Resources Control Board and others, should develop and approve, by December 31,  
4 2014, Urban Water Management Plan and Agricultural Water Management Plan guidelines for  
5 a Water Sustainability Element, based on the criteria contained in WR P1.
- 6 **WR R2** Beginning in 2016, State agencies should prioritize state funding for water agencies in the state  
7 that have a complete Water Sustainability Element in their adopted Urban Water Management  
8 Plans and/or Agricultural Water Management Plans and Integrated Regional Water  
9 Management Plans.
- 10 **WR R3** A proponent for a new proposed point of delivery from the State Water Project that results in  
11 increased demand for diversions from the Delta or the Delta Watershed should demonstrate that  
12 the project proponents have evaluated and implemented all other feasible water supply  
13 alternatives.

## 14 **Delta Instream Flow Criteria and the Setting of Flows**

15 Long-standing California law has granted to the State Water Resources Control Board considerable  
16 authority in the areas of water rights, water quality protection, and the setting of instream water flow  
17 criteria. In addition, the State Water Resources Control Board has the authority to enforce the Public Trust  
18 Doctrine and the provisions of the California Constitution, in Article X, Section 2, which pertain to the  
19 reasonable and beneficial use of water.

20 Unfortunately, as California's water supply has tightened—as the demands for water have increased and  
21 the sources of supply become more volatile—the State Water Resources Control Board has been at the  
22 center of political disputes over how its decisions on water allocations should be made. Often, the  
23 decisions needed to protect the State's interests in ecosystem protection and water supply reliability have  
24 been blocked by battles among competing interests. The resulting downward spiral in which the state now  
25 finds itself, with native fish populations crashing and reduced reliability of water exports from the Delta,  
26 is unsustainable.

27 If the coequal goals are to be achieved, it is essential that the State Water Resources Control Board  
28 complete the work to set flow objectives and criteria for the Delta and the major tributary streams in the  
29 Delta watershed. The state cannot afford further delay. It is impossible for the state to plan and build a  
30 reliable water system where future ecosystem flow requirements are not known. This is true everywhere  
31 in the State but especially true in the Delta. Water suppliers cannot commit to funding new projects and  
32 making effective decisions about billions of dollars of infrastructure investments until the State Water  
33 Resources Control Board process is complete. Until the flow issue is resolved, every action that  
34 potentially increases the amount of water diverted from or moved through the Delta is vulnerable to legal  
35 challenge over the question of whether there are sufficient flows to protect and restore the environment.

36 The State Water Resources Control Board is in the midst of a phased process to review and amend—or to  
37 adopt new—flow objectives for the Delta and its high priority tributary streams. The State Water  
38 Resources Control Board has set a work plan and schedule for developing flow standards for the Delta  
39 and its watershed. The first step was taken in 2010, when the State Water Resources Control Board  
40 completed its report on the *Development of Flow Criteria for the Sacramento-San Joaquin Delta*  
41 *Ecosystem* (State Water Resources Control Board 2010a). This study provides an assessment of the flows  
42 needed to protect the Delta and its ecological resources and does not include other public trust  
43 considerations. While only the starting point for the broader flow standard setting process, the report  
44 underscores the importance to California of resolving, as soon as possible, what those future flow regimes  
45 need to be.

1 Currently, the State Water Resources Control Board is in the process of addressing San Joaquin River  
2 flows and expects to complete the first phase of this process by June 2012. The State Water Resources  
3 Control Board is coordinating with the Department of Water Resources in its preparation of the Bay Delta  
4 Conservation Plan and may consider environmental documentation developed for the Plan in its  
5 proceedings. In December 2010, the State Water Resources Control Board completed a prioritized  
6 schedule and estimate of costs to complete the instream flow studies for the Delta, in accordance with  
7 Water Code Section 85087 (State Water Resources Control Board 2010b).

## 8 ***Problem Statement***

9 The State Water Resources Control Board needs to update Delta water flow standards.

## 10 ***Policies***

11 WR P4 The State Water Resources Control Board should develop flow criteria and establish flows as  
12 follows:

- 13 ♦ By June 2, 2014, adopt and implement flow objectives for the Delta that are necessary to  
14 achieve the coequal goals.
- 15 ♦ By June 2, 2018, develop flow criteria and establish flows for high priority tributaries in the  
16 Delta watershed that are necessary to achieve the coequal goals.
- 17 ♦ Prior to the dates indicated in (a) and (b), existing Delta flow objectives shall be used to  
18 determine consistency with the Delta Plan. If the State Water Resources Control Board fails to  
19 act by the dates indicated, the Council will XXX.

## 20 **OPTIONS FOR COUNCIL CONSIDERATION FOR CONSEQUENCES IF FLOWS NOT ADOPTED:**

- 21 A. The Council could use the flow criteria identified by the State Water Resources Control Board  
22 from its report on the *Development of Flow Criteria for the Sacramento-San Joaquin Delta*  
23 *Ecosystem (2010)* to determine consistency of covered actions with the Delta Plan.
- 24 B. Determine that a covered action that would increase the capacity of any water system to store,  
25 divert, move, or export water from the Delta and/or the Delta Watershed would not be consistent  
26 with the Delta Plan until the revised flow objectives are implemented.
- 27 C. Recommend that the Board cease issuing water rights permits in the Delta and the Delta  
28 watershed (or, if the absence of flow criteria is specific to one or more of the major tributaries,  
29 then the constraint could be focused to the impacted areas).

## 30 **Statewide Storage and Conveyance**

31 California's water storage and conveyance system was designed to capture, transport, and deliver water to  
32 urban and agricultural end users. This infrastructure was not originally designed to protect ecosystem  
33 values and, in its current configuration, is not sufficiently flexible to meet the coequal goals of ecosystem  
34 protection and improvements to the state's water supply reliability (Hanak et al. 2011).

35 Conveyance capacity does not match water storage. During the key times when storage space is available,  
36 water often cannot be pumped because the current Delta conveyance system impacts one or more listed  
37 species. This issue is being addressed through the Bay Delta Conservation Plan, but improvements in  
38 storage and conveyance will be needed while the Bay Delta Conservation Plan is being developed.

39 Today, the amount of storage capacity is inadequate, especially south of the Delta, to permit water users  
40 to take water at times when there is water in the Delta that can be diverted (Hanak et al. 2011). For  
41 example, in the spring of 2011, the south Delta pumps were turned off since urban and agricultural water

1 users' needs were met by other water supplies, and storage locations south of the Delta could not take the  
2 available water. Looking ahead, these infrastructure challenges will be compounded by the predicted  
3 impacts of climate warming on the state's water supplies, as precipitation and runoff patterns shift and sea  
4 level rise increases the vulnerability of the Delta to floods. The State Water Project, which owns and  
5 operates the lowest elevation dams in the state's water system and controls the Delta intakes for the state  
6 system, is particularly vulnerable to these changes (Knowles and Cayan 2002).

7 In the past decade, the Department of Water Resources has expended tens of millions of dollars on  
8 integrated storage investigations to evaluate how surface storage and conveyance may be improved.  
9 These studies have confirmed the need for expanded infrastructure; however, as yet, there is no consensus  
10 on which storage or conveyance projects the state should select. Even when a decision is made, many of  
11 the proposals being studied, especially for the large dam sites, have substantial environmental, political,  
12 and financial challenges that may delay or even preclude their construction.

13 The state must be prepared for the possibility that it could take many more years for the state to select,  
14 build, and operate large-scale storage and conveyance improvement projects. As an interim step toward  
15 increasing the state's water supply reliability, the state should consider smaller, more incremental  
16 operational and storage improvements at existing facilities that can be accomplished within the next 5 to  
17 10 years. In addition, the state needs to consider how groundwater storage and especially conjunctive  
18 management programs (in combination with conservation, local water supplies such as stormwater  
19 capture and recycled water, and water transfer programs) may significantly enhance the operational  
20 flexibility of the state's system and improve the state's water supply reliability.

## 21 ***Problem Statement***

22 Improvements in conveyance and storage are needed to provide more operational flexibility.

## 23 ***Policies***

24 At this time, there are no policies with regulatory effect included in this section.

## 25 ***Recommendations***

26 WR R4 The California Water Commission should hold hearings to identify and evaluate how large-  
27 scale storage and incremental improvements to surface and groundwater storage infrastructure  
28 and operations may be made in the Delta watershed and in areas that use water from the Delta  
29 over the next five to ten years to help achieve the coequal goals.

## 30 **Reporting and Transparency**

31 Despite the importance of improving water supply reliability to the state and its economy, California has  
32 limited information on which to base sound water management decisions. Due to the lack of standardized  
33 monitoring and reporting requirements, the state does not know how much water is available or used  
34 annually. Since 1914, the State Water Resources Control Board has issued permits for the diversion of  
35 water from the Delta, but total actual diversion amounts are currently unknown and may be unsustainably  
36 over-allocated (State Water Resources Control Board 2008b). In other regions of the state, water is  
37 pumped more quickly out of the ground than it is replenished (Department of Water Resources 2009).<sup>6</sup>  
38 Chronic groundwater overdraft statewide—essentially groundwater mining—has been estimated by the  
39 Department of Water Resources to be as high as 2 million acre-feet on a yearly average; however, recent  
40 satellite measurements of groundwater elevations within the Central Valley alone suggest that the  
41 overdraft in the last 7 years has resulted in the loss of 16.5 million acre-feet of groundwater storage  
42 (Famiglietti et al. 2011).

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<sup>6</sup> Chapter 8 Conjunctive management and Groundwater Storage, Vol 2, Resource Management Strategies

1 In recent years, the state has made a significant effort to quantify and report water use estimates by sector  
2 as well as by major hydrologic regions of the state through the California Water Plan (Department of  
3 Water Resources 2009). However, much of the water data that is available to the state from local,  
4 regional, state, and federal agencies and organizations is collected by these entities using differing  
5 methodologies and levels of detail (Hanak et al. 2011). Some data is reported on only a voluntary basis,  
6 such as the submission of annual data on regional groundwater elevations to the Department of Water  
7 Resources or the submittal of water conservation data to the California Urban Water Conservation  
8 Council, which, in 2008, was done by only 225 of the largest urban water suppliers (about half of  
9 agencies that could report). But even mandatory sources of local and regional water supply and use data,  
10 such as the Urban Water Management Plans that urban retail and wholesale water agencies (serving more  
11 than 3,000 customers) are required to update and submit to the Department of Water Resources every  
12 5 years, do not use standardized data collection formats nor are they compiled electronically in a central  
13 data base. The information from these plans is important, but it is inaccessible and as a result virtually  
14 useless for the purpose of evaluating water conservation and local water supply development trends that  
15 will contribute to the improvement of the state's overall water supply reliability.

16 Another important potential source of information about the state's water supplies are the contracts and  
17 transfer agreements involving water from the State Water Project. These documents are not developed  
18 through an open and transparent public process, and the resulting contracts and agreements, when  
19 released to the public, are difficult to understand, much less to evaluate for their implications for the  
20 state's water resources. By comparison, the Bureau of Reclamation has adopted and uses procedures that  
21 ensure that contracts and transfer agreements involving water from the Central Valley Project are  
22 developed in full view of the public, from the proposal stage through negotiations to the final decision-  
23 making. In addition, the Bureau of Reclamation requires the submission of a standardized annual report  
24 from entities that receive water from the Central Valley that includes a full water balance, including  
25 production from all sources, system losses, and changes in storage and water use as a condition in its  
26 contracts and transfer agreements (U.S. Bureau of Reclamation 2011).

## 27 ***Problem Statement***

28 Improved information needed on water use and management in California.

## 29 ***Policies***

30 WR P5 To be consistent with the Delta Plan, future contracts and agreements to export water from the  
31 Delta and/or to move water through the Delta shall be developed in a transparent manner  
32 consistent with the public process employed by the U.S. Bureau of Reclamation for Central  
33 Valley Project water supply contracts and transfers.

## 34 ***Recommendations***

35 WR R5 The Department of Water Resources, in coordination with the State Water Resources Control  
36 Board, Regional Boards, the Department of Public Health and the Council, should complete the  
37 proposed Water Planning Information Exchange (Water PIE) by January 1, 2014. This new  
38 electronic system should consolidate information in an electronic format and make it available  
39 online. It should be designed to simplify reporting processes, reduce the number of required  
40 reports, and be coordinated with the reporting requirements for the Urban Water Management  
41 Plans/Agricultural Water Management Plans and Integrated Regional Water Management  
42 Plans. Water users that receive water diverted or exported from the Delta or the Delta  
43 watershed should be full participants in the Water PIE when it becomes available. The  
44 information collected through the Water PIE should be published in the California State Water  
45 Plan Update every five years.

# 1 Groundwater

2 Groundwater is a major source of California’s water supplies. It provides roughly 30 percent to 40 percent  
3 of the state’s gross urban and agricultural water use (Hanak et al. 2011). Despite the critical nature of this  
4 water supply to the state, especially during dry years, California does not have a statewide management  
5 program or statutory permitting system for groundwater. Improved groundwater management, especially  
6 in basins that are chronically over-pumped, is needed to achieve the coequal goals.

7 The state has a long history of managing groundwater through locally controlled activities. In several  
8 areas of the state, local and regional agencies have developed voluntary sustainable groundwater plans  
9 and some have adopted groundwater ordinances under their police powers. In others, groundwater  
10 overdraft, contamination, and other serious water management problems have forced the adjudication of  
11 groundwater basins through court or administrative proceedings and to the establishment of mandatory  
12 sustainable groundwater management criteria including “safe-yield” and replenishment obligations.

13 The state has tried to encourage voluntary development of locally controlled groundwater management  
14 plans through AB 3030, SB 1938, AB 303, and the Integrated Regional Water Management program  
15 (Propositions 50 and 84) and by limiting availability of state funding (bonds or state revolving fund loans)  
16 for water infrastructure only to those agencies that have these plans in place. However, local groundwater  
17 management plans are required to comply with only 6 out of the 14 plan core elements recommended by  
18 the Department of Water Resources, which means that the plans can qualify for funding without fully  
19 providing for sustainable management of the groundwater basins (Department of Water Resources 2008).  
20 Additionally, the 2009 Delta Reform Act established a voluntary program for the collection of  
21 groundwater elevation data.<sup>7</sup> The Department of Water Resources has created the California Statewide  
22 Groundwater Elevation Monitoring Program (CASGEM), which will collect groundwater elevations and  
23 make the data available online. The first reporting deadline is January 1, 2012.

24 Although the state has made progress in encouraging more sustainable management of groundwater,  
25 unregulated pumping and severe groundwater overdraft in some regions of California has created serious  
26 economic and environmental consequences. A recent simulation of groundwater conditions in the Central  
27 Valley for 1962–2003 estimates that groundwater storage has decreased by almost 58 million acre-feet  
28 (Faunt et al. 2009). Additionally, a recent NASA study using data from the Gravity Recovery and Climate  
29 Experiment (GRACE) satellite mission suggests that 16.5 million acre-feet were taken out of groundwater  
30 storage in the Central Valley between October 2003 and March 2010 (Famiglietti et al. 2011). The costs  
31 of chronic overdraft in terms of damage to streets, bridges, canals, and the aquifer itself resulting from  
32 subsidence, reduced groundwater availability during droughts, groundwater quality, higher pumping costs  
33 to other water users in the region, and environmental damage to streams and wildlife are significant.

34 Further, the state has not conducted a comprehensive assessment of California’s groundwater basins using  
35 field data since Bulletin 118-80 was published in 1980—over 30 years ago. The Department of Water  
36 Resources provides an estimate of groundwater conditions, including overdraft, in Bulletin 118 updates as  
37 well as in the California Water Plan, but the numbers need to be further substantiated with current data  
38 and analysis. The Department of Water Resources is in the process in the process of updating the  
39 California Water Plan (2013) and has initiated an effort to expand information about statewide and  
40 regional groundwater conditions and will include case studies to illustrate successful regional strategies  
41 and opportunities for conjunctive management, groundwater banking, and integrated flood management.

42 Information on changes in groundwater storage, as well as on groundwater overdraft, are vital to the  
43 sustainable management of California’s groundwater resources and to improved reliability of the state’s

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<sup>7</sup> SBx7-6 (Senate Bill 6) adds to and amends parts of Division 6 of the Water Code, specifically Part 2.11 Groundwater Monitoring. The law requires that local agencies monitor and report the elevation of their groundwater basins to help better manage the resource during average water years and drought conditions.

1 overall water supplies. This information is also a critical element in the CALSIM modeling used by the  
2 Department of Water Resources to evaluate State Water Project water operation scenarios and resulting  
3 environmental impact assessments. The state needs this information to sustainably manage California's  
4 groundwater resources and to improve reliability of the state's water supplies.

### 5 ***Problem Statement***

6 Sustainable groundwater management is needed.

### 7 ***Policies***

8 At this time, there are no policies with regulatory effect included in this section.

### 9 ***Recommendations***

10 WR R6 The Department of Water Resources, in collaboration with the U.S. Geological Survey and  
11 other federal, state and local agencies, should update Bulletin 118 using field data, California  
12 Statewide Groundwater Monitoring Elevation Monitoring (CASGEM), groundwater agency  
13 reports, satellite imagery and other best available science by January 1, 2015. This information  
14 will be available for inclusion in the Urban Water Management Plans and Agricultural  
15 Management Plans that are required to be submitted to the state by December 31, 2015.

16 WR R7 To be consistent with the Delta Plan, water suppliers that deliver water diverted or exported  
17 from the Delta or the Delta watershed and that receive a significant percentage of their water  
18 supplies from groundwater sources should develop sustainable groundwater management plans  
19 that are consistent with both the required and recommended components of local groundwater  
20 management plans identified by the California Department of Water Resources (Bulletin 118,  
21 Update 2003).

22 WR R8 Local and regional agencies in groundwater basins that have been identified by the Department  
23 of Water Resources as being in chronic overdraft should develop a sustainable groundwater  
24 management plan, consistent with both the required and recommended components of local  
25 groundwater management plans identified by the California Department of Water Resources  
26 (Bulletin 118, Update 2003), by January 1, 2015. If local or regional agencies fail to develop  
27 and implement these groundwater management plans, the State Water Resources Control Board  
28 should take action to determine if the continued overuse of a groundwater basin constitutes a  
29 violation of the state's Constitution Article X, Section prohibition on unreasonable use of water  
30 and whether a groundwater adjudication is needed to prevent the destruction of or irreparable  
31 injury to the quality of the groundwater.

## 32 **Performance Measures**

- 33 ♦ Improved Regional Self-Sufficiency
  - 34 • Conservation – status of progress in achieving 20 percent by 2020 and other SBx7-7
  - 35 requirements
  - 36 • Local water supply development (total and by type of supply)
  - 37 • Percentage of retail water rate structures that promote water conservation
- 38 ♦ Reduced dependence on the Delta
  - 39 • Percentage of plans that identify actions that are reducing dependence on the Delta

- 1       ♦ Improved regional water balance
- 2           • Number of Urban Water Management Plans/Agricultural Water Management
- 3           Plans/Integrated Regional Water Management Plans that have completed a Water
- 4           Sustainability Element and have a plan for achieving regional water balance
- 5       ♦ Improved reliability of State Water Project deliveries
- 6           • Report in terms of long-term average reliability of the system
- 7       ♦ Number of AB 3030 groundwater management plans (with all Department of Water Resources–
- 8           identified requirements and recommendations) in place
- 9       ♦ Status of Water PIE development, implementation and participation

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# Chapter 5

## Restore the Delta Ecosystem

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### **Coequal Goals**

The coequal goals are defined in Public Resources Code Section 29702. Emphasis by bolding has been added to highlight phrases relevant to ecosystem restoration.

*29702 The Legislature further finds and declares that the basic goals of the state for the Delta are the following:*

- (a) Achieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.*
- (b) Protect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities.*
- (c) Ensure orderly, balanced conservation and development of Delta land resources.*
- (d) Improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety.*

### **Inherent Objectives**

The following objectives are inherent to the coequal goals. Emphasis by bolding has been added to highlight phrases relevant to ecosystem restoration.

*85020. The policy of the State of California is to achieve the following objectives that the Legislature declares are inherent in the coequal goals for management of the Delta:*

- (a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.*
- (b) Protect and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place.*
- (c) Restore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem.*
- (d) Promote statewide water conservation, water use efficiency, and sustainable water use.*
- (e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*
- (f) Improve the water conveyance system and expand statewide water storage.*
- (g) Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and investments in flood protection.*
- (h) Establish a new governance structure with the authority, responsibility, accountability, scientific support, and adequate and secure funding to achieve these objectives.*

### **Other Objectives**

The coequal goals and inherent objectives listed above seek broad protection of the Delta. Achievement of these broad goals and objectives requires implementation of specific strategies. Water Code sections 85022 and 85302 provide direction on the implementation of specific measures to promote the coequal goals and inherent objectives related to the Delta ecosystem restoration.

- 85022(d) (5) Develop new or improved aquatic and terrestrial habitat and protect existing habitats to advance the goal of restoring and enhancing the Delta ecosystem.*

*(6) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

*85302(c) The Delta Plan shall include measures that promote all of the following characteristics of a healthy Delta ecosystem.*

*(1) Viable populations of native resident and migratory species.*

*(2) Functional corridors for migratory species.*

*(3) Diverse and biologically appropriate habitats and ecosystem processes.*

*(4) Reduced threats and stresses on the Delta ecosystem.*

*(5) Conditions conducive to meeting or exceeding the goals in existing species recovery plans and state and federal goals with respect to doubling salmon populations.*

*85302(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following:*

*(1) Meeting the needs for reasonable and beneficial uses of water.*

*(3) Improving water quality to protect human health and the environment.*

*85302(e) The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan.*

*(1) Restore large areas of interconnected habitats within the Delta and its watershed by 2100*

*(2) Establish migratory corridors for fish, birds, and other animals along selected Delta river channels.*

*(3) Promote self-sustaining, diverse populations of native and valued species by reducing the risk of take and harm from invasive species.*

*(4) Restore Delta flows and channels to support a healthy estuary and other ecosystems.*

*(5) Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.*

*(6) Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase migratory bird habitat to promote viable populations of migratory birds.*



# Chapter 5

## Restore the Delta Ecosystem

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3 The Act defines “restoration” as “...the application of ecological principles to restore a degraded or  
4 fragmented ecosystem and return it to a condition in which its biological and structural components  
5 achieve a close approximation of its natural potential, taking into consideration the physical changes that  
6 have occurred in the past and the future impact of climate change and sea level rise” (Water Code section  
7 85066). The Act also recognizes the value of the Delta as “... the most valuable estuary and wetland  
8 ecosystem on the west coast of North and South America” (Water Code section 85022) and provides  
9 multiple references to specific features or ecosystem function to be "protected, restored or enhanced" in  
10 meeting the coequal goals.

11 An overarching goal for ecosystem restoration in the Sacramento-San Joaquin Delta Reform Act is to  
12 restore fisheries and wildlife to include more viable populations of native resident and migratory species.  
13 Doing so requires consideration of the ways that native species used native Delta landscapes to meet their  
14 needs at each stage of life. Native species are populations adapted to the historical climate, hydrology,  
15 and landscape pattern of the estuary (Grossinger et al. 2010). Therefore, it is a fundamental principle that  
16 conservation of native species is promoted by restoration of landscape attributes, connections, and  
17 processes at scales that allow for full expression of native species life history strategies (Moyle et al.  
18 2010). Restoration of the current “domesticated” Delta back to the historical, “wild” landscape is not  
19 possible, but two categories of understanding help to meet restoration goals. The first is to understand  
20 historical patterns and processes to the extent we can. The second is to apply principles of landscape  
21 ecology so that restored ecosystems have adequately scaled patterns and processes, are resilient to  
22 disturbances, and give competitive advantages to native species.

### 23 The Historical Delta Ecosystem

24 The Delta was historically a 700,000-acre mosaic of variable landscape types influenced by tides and  
25 river flows (historical Delta figure from Chris Enright using Brian Atwater data). Current research shows  
26 that overall, historical Delta landscapes were spatially quite stable, but showed considerable seasonal and  
27 interannual variability in flow characteristics and inundation patterns. The historical Delta can be divided  
28 into three primary landscapes. These landscapes can be classified into (1) flood basins in the north Delta,  
29 (2) tidal islands in the central Delta, and (3) distributary rivers (multiple branches flowing away from  
30 main channels) in the south Delta (Grossinger et al. 2010; Whipple et al. 2010, 2011).

31 The flood basins in the north Delta occurred at the interface between fluvial (riverine) and tidally  
32 influenced portions of the Delta where the Sacramento River entered the Delta. One defining  
33 characteristic of this region was a broad zone of non-tidal, freshwater, emergent plant-dominated  
34 wetlands that graded into tidal freshwater wetlands. These wetlands were dominated by dense stands of  
35 tules. In addition, shallow perennial ponds and lakes, riparian forests along natural levees, and seasonal  
36 wetlands were common features of the historical north Delta. The historical central Delta included about  
37 200,000 acres of tidal islands with freshwater emergent plants that were inundated regularly by spring

1 tides (tides when differences between high and low tides are the greatest). Banks of the tidal islands were  
2 commonly covered in tules with willows, grasses, sedges, shrubs, and ferns on the islands themselves.  
3 The historical south Delta contained a complex network of distributary channels with low natural levees,  
4 large woody debris, willows, and other shrubs with upland areas supporting open oak woodlands.  
5 Historical data from the Delta paint a picture of rich habitat complexity at multiple spatial and temporal  
6 scales (Grossinger et al. 2010; Whipple et al. 2010, 2011).

7 Domestication of the historical Delta landscape and ecosystem over the past 160 years has involved  
8 constructing about 1,100 miles of levees, draining the lands behind the levees for crop production, and  
9 diverting water to the southern part of the state (Hanak et al. 2011). This has produced a rich agricultural  
10 and urban economy within the Delta and far beyond its borders, but it has come at a cost to the original  
11 estuarine ecosystem and its native species. Many native species are in decline, and some are close to  
12 extinction; one fish species already extinct. More than 90 percent of wetlands have been lost to diking and  
13 draining, and floodplains in and upstream the Delta have been cut off from rivers.

14 Most tributary rivers flowing to the Delta have been dammed. Access to areas critical to fish lifecycles is  
15 now greatly reduced, including reaches of tributary rivers and streams critical to the state's iconic salmon.  
16 The once pronounced seasonal and interannual flow variability has made way to more stable conditions,  
17 and the formerly highly complex landscape described above has been replaced by a much more uniform  
18 landscape resembling a simplified, spatially and temporally fixed grid of (fewer) river channels used for  
19 north-south and east-west water conveyance. The channels are abruptly separated by artificial levees from  
20 dry, farmed islands and interspersed by a few large and shallow open water areas (flooded islands).

21 Cultivation of the peat soils also has produced subsided islands (polders) where much of the Delta is now  
22 below sea level (Lund et al. 2010). Non-native species continue to increase in the San Francisco Estuary  
23 (Cohen and Carlton 1998), and Delta fish communities continue to change in composition with native  
24 pelagic (open water) fishes undergoing a recent sharp decline (Sommer et al. 2007, Healey et al. 2008).  
25 Ecosystem restoration within the Delta landscape will not restore the historical “wild” Delta, but  
26 knowledge of the historical Delta informs managing the future by identifying what landscape elements  
27 best fit various localities where restoration projects are practical and feasible.

## 28 Landscape Ecology

29 Return to the historical Delta is not possible or even desirable, because ecosystems are always responding  
30 to natural and anthropogenic drivers of change (Folke et al. 2010). This is recognized in the definition of  
31 restoration in the Act with the goal of "...close approximation of its natural potential..." (Water Code  
32 section 85066). Envisioned restoration actions, although extensive, will nevertheless cover only a fraction  
33 of the Delta and its watershed. Therefore, effective Delta restoration requires strategies to make limited  
34 available land mimic historical landscape functions sufficiently enough that native species can use them  
35 to meet their needs. In this context, landscape restoration should not be defined by its extent alone.  
36 Rather, it is more usefully defined by relationships between interacting mosaics of elements that allow  
37 energy flows between them and corridor connections that species can navigate (Wiens 2002,  
38 Lindenmayer et al. 2008). Taking a landscape perspective and applying the principles of landscape  
39 ecology focuses on three concepts (Turner 1998). The first concept is that landscape patterns and the  
40 spatial scales at which they occur determine species responses. The landscape perspective identifies and  
41 describes the agents of pattern formation, including physical processes such as hydrology, chemical  
42 processes such as nutrient cycling, biological processes such as vegetation patterns, and the ways all  
43 processes can be “disturbed” by events such as floods and droughts. Second, the landscape perspective  
44 considers broader spatial extents than those traditionally studied in ecology. The emphasis is on  
45 identifying scales that support relationships between spatial heterogeneity and the life history of native  
46 species. For example, in the Delta, the characteristic length of the tidal excursion is a spatial scale and  
47 pathway that ties together different habitat types within one-half of a tidal cycle. Third, the landscape

1 perspective explicitly considers the role of humans in creating and affecting landscape patterns and  
2 process. Humans play a dominant role in influencing relationships between spatial patterns and ecological  
3 processes. Indeed, the restoration goals of the Delta Plan are an example of this influence.

4 The landscape perspective with its focus on spatial patterns is important to resource managers because  
5 context matters. Restored landscapes have neighboring land uses, including agriculture and urban areas.  
6 Each land use affects the other because they are connected by air, land, and water; yet humans desire  
7 often conflicting services from each. In addition, ecosystem function depends on the interplay of pattern  
8 and process over broad spatial extents and, therefore, necessarily includes the role of humans in creating  
9 and affecting these relationships. Finally, understanding that human activities can dramatically alter  
10 landscape context and the relationship between patterns and processes, resource managers have a  
11 stewardship responsibility to understand and manage these impacts.

## 12 Ecosystem Restoration

13 Delta ecosystem restoration involves adaptive management (see Chapter 2) of landscapes, ecosystems,  
14 habitats, communities, and species. The word “ecosystem” has many definitions. One straightforward  
15 definition is “an ecological community together with its environment, functioning as a unit.” A more  
16 scientific definition is “a community of organisms together with their physical environment, viewed as a  
17 system of interacting and interdependent relationships and including such processes as the flow of energy  
18 through trophic levels and the cycling of chemical elements and compounds through living and nonliving  
19 components of the system.” Importantly, ecosystems also include people. Whole ecosystems have been a  
20 management focus for several decades. The early term “ecosystem management” has more recently made  
21 way to the scientifically more accurate term “ecosystem-based management,” which explicitly recognizes  
22 that humans cannot control many important ecosystem attributes and, thus, cannot deliberately manipulate  
23 or manage entire ecosystems—humans can really only control and manage human activities that affect  
24 ecosystems (McLeod et al. 2005). The goal of management aimed at whole ecosystems is the long-term  
25 protection of ecological processes, structures, and interconnections needed to maintain the health,  
26 productivity, and resilience of ecosystems so that they can provide the services humans want and need  
27 (Grumbine 1994, Christensen et al. 1996, Szaro et al. 1998, McLeod et al. 2005). The concept of  
28 ecosystem restoration involves returning ecosystem processes, structures, and interconnections to a more  
29 natural or healthy condition that can be sustained over the long term.

30 While ecosystem-based management and restoration is concerned with the whole system, specific  
31 management actions are often aimed at individual “elements of concern” such as individual species or  
32 communities and their habitats, and on the processes that generate and sustain these elements (e.g.,  
33 selection, trophic interactions, element cycling, or disturbance). Furthermore, ecosystems exist at several  
34 spatial scales, but goal-oriented ecosystem management requires the identification of geographically  
35 bounded “places of concern” that exist in a larger landscape context (Lackey 1998). What is “of concern”  
36 reflects prevailing social and economic needs and values along with scientific understanding of the  
37 ecological processes and structures that sustain them. Definition of what is “of concern” is required to set  
38 actionable management goals and targets, but ecosystem management and restoration can and should not  
39 proceed without consideration of the larger social, ecological, and landscape context.

40 In the Delta, places of concern include regularly wetted places such as tidal marshes, brackish water  
41 marshes, floodplains, and channel margins as well as mostly dry places such as riparian zones and open  
42 and wooded upland areas. Processes of concern include the delivery of fresh and salt water; the transport,  
43 cycling, and deposition of sediments, nutrients, and contaminants; trophic interactions; and the  
44 colonization and succession involved in building biological communities. Together, the places and  
45 processes determine the quantity and quality of habitat available to species of concern in the Delta, such  
46 as desirable native resident and migratory species or harmful non-native species, and the human

1 inhabitants of the Delta. Ecosystem goods and services of concern include the provision of fresh water,  
2 food, recreational opportunities, cultural heritage and spiritual benefits, and water and air purification.

3 What then constitutes successful ecosystem restoration within the Delta? Palmer et al. (2005) propose five  
4 criteria for measuring success from an ecological perspective. First, the project should be based on a clear  
5 guiding image of the type of dynamic and healthy ecosystem to be achieved. Second, the ecological  
6 condition must be measurably improved. Third, the ecosystem should be more resilient and self-  
7 sustaining to perturbations and disturbances. Fourth, construction should produce no lasting harm. Fifth,  
8 both pre-assessment and post-assessment must be completed with public communication of results.  
9 Standards of evaluation for each of the five criteria lead to logical performance measures for restoration  
10 projects.

11 It is important to realize that landscapes, and the ecosystems and habitats they contain are not static; they  
12 change over time in response to numerous natural and anthropogenic drivers of change (Manning et al.  
13 2009, Harwell et al. 2010, Delta Independent Science Board January 2011). Change is inevitable, but  
14 more resilient landscapes and ecosystems can adapt without fundamentally or overly rapidly changing  
15 how they look and function (Folke et al. 2004). The capacity for ecological resilience is increasingly  
16 challenged worldwide by global drivers such as global climate change and human population growth, as  
17 well as by drivers once considered of more local importance, for example, past and present human land  
18 use (Foster et al. 2003, Foley et al. 2005). The Delta of the future must contend with two important  
19 drivers: (1) global drivers, such as sea level rise, increasing flow variability, and changing amounts of rain  
20 and snow; and (2) key local drivers, such as land use changes, nutrient additions, legacy and emerging  
21 contaminants, and altered hydrology.

22 What does a changing Delta mean to the fish communities that use the Delta? Lund et al. (2010) have  
23 considered how changing habitats and various conveyance options might affect fish populations of the  
24 future Delta. Their assessment led to five main conclusions. First, large-scale ecosystem change is  
25 inevitable, and the future Delta will be very different from both the current and historical Delta. Second,  
26 variability in water quality and the flow regime is necessary to reverse the decline to desirable fish  
27 species. Third, groups of fishes (smelt, anadromous, freshwater benthic, freshwater zooplanktivores, and  
28 slough-resident fishes) are favored by differing management strategies. Fourth, any water export strategy  
29 must restore habitat diversity and function throughout the Delta and Suisun Marsh. Fifth, large-scale  
30 experimentation to optimize management strategies is needed. Improved flow regimes, greater habitat  
31 diversity, and better water quality are key characteristics for achieving a healthier Delta.

32 In summary, ecosystem restoration in the Delta should be based on principles of landscape ecology and  
33 ecosystem management that consider content (“elements of concern”), context (larger scale patterns and  
34 processes), the history that has resulted in the current state of the ecosystem, and tradeoffs involved with  
35 reaching envisioned “healthy” states. Successful large-scale ecosystem restoration within the Delta will  
36 be dependent on restoring key patterns, processes, and environmental conditions, including (1) creating a  
37 more natural flow regime; (2) increasing and maintaining the extent, quality, diversity, and connectivity  
38 of estuarine habitats supporting native aquatic species; and (3) reducing threats and stresses to native  
39 species and habitats. Therefore, the policies and recommendations for ecosystem restoration focus on  
40 these three key requirements.

## 41 Policies and Recommendations

### 42 Creating a More Natural Flow Regime

43 Flow is a major determinant of physical habitat and biotic composition in riverine and estuarine  
44 ecosystems such as the Delta. Native aquatic species have evolved life histories in direct response to  
45 natural flow regimes. The ecological integrity of aquatic ecosystems depends on the natural dynamic

1 character of the ecosystems in which plants and animals have evolved (Poff et al. 1997). Flow is not  
2 simply the volume of water, but also includes the timing of flow, the frequency of specific flow  
3 conditions, the duration of various flows, and the rate of change in flows. Bunn and Arthington (2002)  
4 present four key principles showing the links between hydrology and aquatic biodiversity and the impacts  
5 of altered flow regimes. The principles are as follows: (1) flow determines physical habitat, (2) aquatic  
6 species have evolved life history strategies based on natural flow regimes, (3) upstream-downstream and  
7 lateral connectivity are essential to organism viability, and (4) invasion and success of non-native species  
8 is facilitated by flow alterations. Altered flow regimes have been shown to be a major source of  
9 degradation to aquatic ecosystems worldwide (Petts 2009).

10 The California State Water Resources Control Board (State Water Resources Control Board 2010) has  
11 recently presented summary determinations regarding flow criteria for the Sacramento-San Joaquin Delta  
12 ecosystem. Some key points are as follows: (1) non-flow changes like nutrient composition,  
13 channelization, habitat, invasive species, and water quality need to be addressed along with flows,  
14 (2) flow and physical habitat interact in many ways, but they are not interchangeable, (3) percent of  
15 unimpaired flow into the Delta is one pathway for setting flow criteria, (4) more natural flows are  
16 important to migratory cues of many fish species, (5) positive changes in flow or flow patterns benefit  
17 both humans and fish and wildlife, and (6) a coordinated land use policy within the Delta is needed.  
18 Creating a more natural flow regime within the Delta is an important step in meeting the coequal goal of a  
19 healthier Delta ecosystem.

## 20 *Flow Regime Problem*

21 Altered Delta flow regimes are detrimental to native aquatic species and encourage non-native aquatic  
22 species.

## 23 *Policies*

24 ER P1 Refer to WR P4.

## 25 **Improving Habitat**

26 Habitat is a fundamental ecological concept that refers to the place where an organism lives. This “place”  
27 is defined by physical, chemical, and biological variables (environmental structure and processes) that  
28 provide the conditions and resources a given organism needs to survive and reproduce—“wherever an  
29 organism is provided resources that allow it to survive, that is habitat” (Hall et al. 1997). In this  
30 definition, habitat is specific to a particular organism or species, and **habitats are species-specific**  
31 **components of ecosystems**. Sufficiently good habitat quantity and quality is needed to allow individuals  
32 and populations to persist. The term habitat (or “habitat type”) is also often used when referring to land  
33 cover types (e.g., open water and riparian vegetation). It is, however, important to note that land cover by  
34 itself is usually not enough to determine if the covered “place” will in fact provide good-quality habitat  
35 for a specific organism. Habitat and land cover type are not the same thing (Lindenmayer et al. 2008); an  
36 organism’s habitat is much more than land cover type, just like a person’s home is much more than a  
37 house. For example, the total area of the Delta covered by open water has not substantially changed over  
38 the last few decades, but several open water (pelagic) fish species have undergone steep declines  
39 (Sommer et al. 2007), suggesting that at least some of the open water areas in the Delta have become  
40 inhospitable to these fishes—the actual habitat available to these open water species has shrunk, even  
41 though the area covered by open water has remained fairly stable. Similarly, changing land cover patterns  
42 (e.g., increasing open water areas) does not automatically lead to increases in specific target species if  
43 detrimental conditions (e.g., poor water quality or high entrainment or predation risk) make these areas  
44 unsuitable as new habitat.

1 As “places,” habitats are species-specific “patches” in spatially heterogeneous landscapes. These patches  
2 are separated from surrounding areas by sharp or more gradual edges (Fischer et al. 2004) and may be  
3 connected to other similar patches by “corridors.” Landscape structure (composition and configuration)  
4 affects the abundance and distribution of habitats and the organisms they support. The occurrence and  
5 abundance of organisms is closely associated with the total amount of usable habitat in a landscape as  
6 well as with habitat patch sizes, shapes, and arrangements (e.g., Hannon and Schmiegelow 2002).  
7 Habitats that are too small, fragmented, or isolated may not support specific organisms over the long  
8 term—they are, in effect, no longer functional habitats for these organisms. Because habitats are  
9 species-specific, their necessary size, shape, and arrangement in a landscape differ among species. In  
10 general, however, more, larger, and better connected patches of a specific habitat are more likely to  
11 provide the conditions for the persistence of organisms associated with that habitat (Lindenmayer et al.  
12 2008).

13 Habitat loss and fragmentation due to human land use is an important driver of worldwide species losses  
14 (Foley et al 2005). In estuaries and coastal areas, overexploitation (e.g., overfishing) and habitat  
15 destruction have been identified as the leading causes of species declines and extinctions (Lotze et al.  
16 2006). Habitat restoration can lead to species recovery, especially when carried out in combination with  
17 the reduction of other impacts such as exploitation, predation, or pollution (Lotze et al. 2006).

18 **Habitat in the Delta:** The Delta is continually changing, but changes over the last 160 years have been  
19 particularly rapid and dramatic (Healey et al. 2008, Moyle et al. 2010, Baxter et al. 2010). Less than  
20 2 centuries ago, diverse and extensive estuarine landscape features ranging from open water to tidal and  
21 seasonal wetlands and forested uplands contained a multitude of habitats that supported a productive  
22 native flora and fauna adapted to the highly variable environmental conditions of the Delta. Although the  
23 present Delta continues to be a productive ecosystem, its current landscape and habitats support a much  
24 different species assemblage than the historical Delta. Many of the currently thriving species are non-  
25 native species (Cohen and Carlton 1995). They include species considered desirable (e.g., largemouth  
26 bass, a sport fish) and undesirable (e.g., the Brazilian water weed *Egeria densa*) or even harmful (e.g., the  
27 harmful cyanobacteria *Microcystis aeruginosa*) by humans. These non-native species generally evolved in  
28 different habitats with much less variable conditions (Moyle et al. 2010). In contrast, current habitat  
29 conditions are insufficient to sustain a number of aquatic and terrestrial native species such as the fishes  
30 involved in the sudden “Pelagic Organism Decline” of the 2000s (Sommer et al. 2007, Baxter et al. 2010),  
31 as well as winter- and spring-run Chinook salmon, giant garter snake, and Suisun thistle, among others  
32 (Moyle et al. 2010; Healey et al. 2008).

### 33 *Problem Statement*

34 Landscape attributes and environmental conditions have changed dramatically in the Delta and the Suisun  
35 Marsh over the last 160 years. The resultant **rapid reduction in the extent, quality, and diversity of**  
36 **estuarine habitats supporting native aquatic species has led to declines in populations of native**  
37 **resident and migratory species.** Although the Delta and the Suisun Marsh remain productive parts of the  
38 San Francisco Estuary ecosystem, their unique, native natural heritage and prized ecosystem services  
39 (e.g., the provisioning of native salmon as a food source, for recreation, and as a source of cultural,  
40 intellectual and spiritual inspiration) are in danger of being irretrievably lost.

### 41 *Policies*

42 ER P2 Actions that include ecosystem restoration shall be consistent with the following sections from  
43 the *Draft Ecosystem Restoration Program’s Conservation Strategy for Stage 2 Implementation*  
44 *for the Sacramento-San Joaquin Delta Ecological Management Zone* (California Department of  
45 Fish and Game 2010):

1 ♦ map and legend of Figure 4, page 35, “Land Elevations in the Delta Ecological Management  
2 Zone will largely determine what habitat types can be accommodated,” and accompanying text on  
3 pages 33-46; and

4 ♦ map and legend of Figure 5, page 47, “Map of Ecological Management Units within the Delta  
5 Ecological Management Zone,” and accompanying text on pages 46-49.

6 The Council may incorporate revised figures from the Ecosystem Restoration Program’s Conservation  
7 Strategy as it is revised.

8 ER P3 Actions other than ecosystem restoration shall determine if the action would adversely impact  
9 the opportunity for ecosystem restoration at the elevations shown in Figure 4 and in the  
10 Ecological Management Units shown in Figure 5, and as explained in the accompanying text of  
11 those figures. These actions shall demonstrate that any such adverse impacts will be fully  
12 avoided or minimized. Certification of consistency associated with these actions shall consider  
13 the habitat values described generally in Section 2 of the *Draft Ecosystem Restoration*  
14 *Program’s Conservation Strategy for Stage 2 Implementation for the Sacramento-San Joaquin*  
15 *Delta Ecological Management Zone* (California Department of Fish and Game 2010) and  
16 subsequent revisions of this document.

17 ER P4 Protection of floodplains in the Delta and Delta watershed is critical for achieving the coequal  
18 goals, reducing flood risk, and preserving the unique character of the Delta. For actions outside  
19 the Delta, this policy is a recommendation. To be consistent with the Delta Plan:

20 ♦ Actions affecting floodplains in the Delta or in the Delta watershed must demonstrate that  
21 impacts on the potential for ecosystem restoration or flood management have been fully  
22 considered and avoided or minimized.

23 ♦ Actions shall demonstrate that they would maintain or expand remaining large blocks of  
24 intact habitat or natural landscape, including floodplains, as described in the California  
25 Essential Habitat Connectivity Project (Department of Transportation and Department of  
26 Fish and Game 2010).

27 ♦ State and local agencies constructing new levees, substantially rehabilitating or  
28 reconstructing existing levees in the Delta and Delta watershed shall evaluate and  
29 incorporate alternatives (including use of setback levees) that would increase the extent of  
30 floodplain and riparian habitats.

31 ER P5 New or amended local or regional land use plans shall not substantially reduce opportunities for  
32 ecosystem restoration, habitat creation, channel modification for ecosystem benefit, or  
33 increased connectivity between water and land; or direct such uses away from their most  
34 effective locations as identified in the maps, legends and accompanying text of Figures 4 and 5  
35 of the *Draft Ecosystem Restoration Program’s Conservation Strategy for Stage 2*  
36 *Implementation for the Sacramento-San Joaquin Delta Ecological Management Zone*  
37 (California Department of Fish and Game 2010).

## 38 **Recommendations**

39 ER R1 The Council acknowledges the importance of expediting habitat restoration in the Delta, and  
40 recommends the prioritization and implementation of restoration projects in the following  
41 areas:

- 42 ♦ Yolo Bypass
- 43 ♦ Cache Slough Complex
- 44 ♦ Lower San Joaquin River Floodplain

- 1           ♦ Suisun Marsh  
2           ♦ Cosumnes River/Mokelumne River Confluence
- 3 ER R2 As part of its Strategic Plan, the Delta Conservancy should:
- 4           ♦ Develop and adopt criteria for prioritization and integration of large-scale ecosystem  
5 restoration in the Delta, with sustainability and use of best available science as foundational  
6 principles.
- 7           ♦ Develop and adopt methods and processes for ownership and long-term operations and  
8 management of restored and/or conserved land in the Delta and Suisun Marsh.
- 9           ♦ Recommend sources for long-term financing for programs and projects that include  
10 covering costs of long-term operations and management and “Payment in Lieu of Taxes.”
- 11           ♦ Develop and adopt a formal mutual agreement with the Department of Water Resources,  
12 Department of Fish and Game, federal interests, and other State and local agencies on  
13 implementation of ecosystem restoration.
- 14           ♦ Develop in conjunction with the Wildlife Conservation Board, the Department of Water  
15 Resources, Department of Fish and Game, and other State and local agencies, a plan and  
16 protocol for acquiring the land necessary to achieve ecosystem restoration consistent with  
17 the coequal goals and the *Draft Ecosystem Restoration Program’s Conservation Strategy*.

## 18 Reducing Threats and Stresses

19 Ecosystem restoration cannot succeed in the face of persistent threats to the well-being of the habitats and  
20 species it seeks to restore. The current degraded habitat conditions for many native Delta species are the  
21 result of the combined impacts of multiple drivers and stressors, including physical and chemical habitat  
22 degradation, increased mortality from entrainment into water diversions and from predation, and  
23 insufficient food resources (Sommer et al. 2007, Baxter et al. 2010, Delta Independent Science Board  
24 January 2011). Expected climate change impacts (e.g., higher temperatures) will likely further degrade  
25 native species habitat in the Delta, while benefitting many non-native species. Successful recovery of  
26 native species requires aggressive habitat restoration aimed at increasing the extent, quality (including  
27 connectivity), and diversity of native species habitats, and improvement of habitat conditions through  
28 reduction of multiple threats and stresses on native species habitats. Conversely, invasive species can only  
29 be successfully controlled by the reduction of habitat conditions that favor these species over native  
30 species.

### 31 *Problem Statement*

32 Habitat suitable for non-native invasive species has increased in the Delta and the Suisun Marsh, and  
33 many non-native species are now thriving. New species continue to arrive every year. **Although some  
34 key non-native species are considered desirable by humans, others are undesirable or harmful.**  
35 None of these species is part of the unique native natural heritage of the Delta and the Suisun Marsh, but  
36 some have been here for more than a century and have become an integral part of this ecosystem.

### 37 *Policies*

38 ER P6 Actions shall demonstrate that the potential for new introductions of or improved habitat  
39 conditions for non-native invasive species have been fully considered and avoided or  
40 minimized in a way that appropriately protects the ecosystem.

## 1 **Recommendations**

2 ER R3 Pending development and adoption of an invasive species management plan for the Delta, the  
3 Department of Fish and Game should fully implement the following sections of the *Draft*  
4 *Ecosystem Restoration Program's Conservation Strategy for Stage 2 Implementation for the*  
5 *Sacramento-San Joaquin Delta Ecological Management Zone (Department of Fish and Game*  
6 *2010)*:

- 7 ♦ List of "Potential Stage 2 Actions for Non-Native Invasive Species" on p. 54; and
- 8 ♦ Text in section "III.B. Invasives" on pages 53-58.

9 ER R4 By January 1, 2013 the Delta Science Program, in conjunction with the Department of Fish and  
10 Game, the Department of Water Resources and other relevant agencies should conduct  
11 workshops with the objective of providing specific recommendations to the Council for  
12 measures to minimize stressor impacts on the Delta ecosystem and on the prioritization of such  
13 measures.

## 14 **Bay Delta Conservation Plan**

15 The Bay Delta Conservation Plan is a 50-year plan being prepared through a collaboration of State,  
16 federal, and local water agencies, State and federal resource agencies, environmental organizations, and  
17 other interested parties. It will be incorporated into the Delta Plan if it meets the requirements of Water  
18 Code section 85320, including the approval by the Department of Fish and Game of the Bay Delta  
19 Conservation Plan as a natural community conservation plan and its approval as a habitat conservation  
20 plan pursuant to the federal Endangered Species Act. The plan will include a scientifically based adaptive  
21 management program to ensure incorporation of new scientific information into decisions on water  
22 management and conservation measures.

## 23 **Problem Statement**

24 The Bay Delta Conservation Plan is expected to significantly affect the coequal goals required by the  
25 Delta Reform Act. The Bay Delta Conservation Plan planning process has been under way since 2006,  
26 but the plan will not be completed prior to adoption of the Delta Plan in 2012.

## 27 **Recommendations**

28 ER R5 The involved federal, State, and local agencies should complete the Bay Delta Conservation  
29 Plan process (i.e., receive required incidental take permits) consistent with the Delta Reform  
30 Act no later than December 31, 2014. If the Bay Delta Conservation Plan process is not  
31 completed by this date consistent with the Delta Reform Act, the Council will proceed with  
32 ecosystem and conveyance planning recommendations independent of the Bay Delta  
33 Conservation Plan process for inclusion in the first five-year update of the Delta Plan.

## 34 **Performance Measures**

35 Performance measures derive from the goals and objectives in the Act and from requirements for  
36 large-scale ecosystem restoration within the Delta. The performance measures should address progress in  
37 achieving each of the following objectives in the Act:

38 85302(c) *The Delta Plan shall include measures that promote all of the following characteristics of a*  
39 *healthy Delta ecosystem.*

40 (1) *Viable populations of native resident and migratory species.*

41 (2) *Functional corridors for migratory species.*

1                   (3) *Diverse and biologically appropriate habitats and ecosystem processes.*

2                   (4) *Reduced threats and stresses on the Delta ecosystem.*

3                   (5) *Conditions conducive to meeting or exceeding the goals in existing species recovery*  
4                   *plans and state and federal goals with respect to doubling salmon populations.*

5 85302(e) *The following subgoals and strategies for restoring a healthy ecosystem shall be included in the*  
6                   *Delta Plan.*

7                   (1) *Restore large areas of interconnected habitats within the Delta and its watershed by*  
8                   *2100*

9                   (2) *Establish migratory corridors for fish, birds, and other animals along selected Delta*  
10                   *river channels.*

11                   (3) *Promote self-sustaining, diverse populations of native and valued species by reducing*  
12                   *the risk of take and harm from invasive species.*

13                   (4) *Restore Delta flows and channels to support a healthy estuary and other ecosystems.*

14                   (5) *Improve water quality to meet drinking water, agriculture, and ecosystem long-term*  
15                   *goals.*

16 (6) *Restore habitat necessary to avoid a net loss of migratory bird habitat and, where feasible, increase*  
17                   *migratory bird habitat to promote viable populations of migratory birds.*

18 Performance measures derived from these objectives can be grouped as follows:

19 Species Performance Measures:

20                   ♦ Progress toward achieving viable populations of native resident and migratory species or species  
21                   groups

22                   ♦ Progress toward achieving recovery for listed species in the Delta

23                   ♦ Progress toward achieving the state and federal "doubling goal" for wild, Central Valley  
24                   anadromous fishes

25 Flow Performance Measures:

26                   ♦ Successful adoption of criteria for Delta inflows and outflows by January 2, 2014, and the  
27                   adoption of flow criteria for the major tributary rivers to the Delta by January 2, 2018

28                   ♦ Progress toward meeting adopted Delta inflow and outflow criteria and major tributary flow  
29                   criteria

30 Habitat and Migratory Corridor Performance Measures:

31                   ♦ Progress toward developing new or improved aquatic and terrestrial habitat, and documented use  
32                   of these habitats by key species

33                   ♦ Progress toward protecting existing habitats and documented use of these habitats by key species

34                   ♦ Progress toward restoring large areas of interconnected habitats for native resident and migratory  
35                   species in the Delta and its watersheds by 2100

36                   ♦ Acres of habitat conserved for native resident and migratory species in the Delta

- 1 ♦ Progress toward achieving diverse and biologically appropriate habitats and ecosystem processes
- 2 ♦ Progress toward restoring habitat that is necessary to avoid a net loss of migratory bird habitat
- 3 ♦ Quantity of permanent or appropriate seasonal connectivity along all major migratory routes to
- 4 allow adequate migration between native fish spawning, rearing, and migration habitat
- 5 ♦ Quantity of contiguous corridors for migration of fish and birds, and documented use of these
- 6 corridors by key species
- 7 ♦ Rates of key processes (e.g., primary production, decomposition, nutrient uptake, and respiration)
- 8 in restored habitats compared to non-restored habitats
- 9 Threat and Stressor Performance Measures:
- 10 ♦ Progress toward reducing numbers and proportion of native resident and migratory species (as
- 11 larvae, juveniles, or adults) taken at water diversion points
- 12 ♦ Progress toward decreasing annual trend in number of new, uncontrolled harmful invasive species
- 13 ♦ Progress toward decreasing abundance and distribution of harmful invasive aquatic and terrestrial
- 14 species
- 15 ♦ Reduced concentrations of nutrients (nitrogen and phosphorus compounds) that support the
- 16 growth of undesirable algae or excessive growth of nuisance aquatic plants

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# Chapter 6

## Improve Water Quality to Protect Human Health and the Environment

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The protection and improvement of water quality is inherent to meeting the coequal goals of the State. Water quality plays a critical role in the achievement of a more reliable water supply, and protection, restoration, and enhancement of the Delta ecosystem. Water quality also contributes to the values of the Delta as an evolving place. The Sacramento-San Joaquin Delta Reform Act (Public Resources Code section 29702) directly calls for improving water quality in various sections of the statute:

*85020. The policy of the State of California is to achieve the following objectives that the Legislature declares are inherent in the coequal goals for management of the Delta:...(e) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

*85022(d) The fundamental goals for managing land use in the Delta are to do all of the following: ...(6) Improve water quality to protect human health and the environment consistent with achieving water quality objectives in the Delta.*

*85302(d) The Delta Plan shall include measures to promote a more reliable water supply that address all of the following: (3) Improving water quality to protect human health and the environment.*

*85302(e) The following subgoals and strategies for restoring a healthy ecosystem shall be included in the Delta Plan.... (5) Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.*

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# Chapter 6

## Improve Water Quality to Protect Human Health and the Environment

### Introduction

Improving water quality is key to achieving the coequal goals. A host of agencies regulate water quality, as described in this chapter. The Delta Plan includes recommendations to improve water quality, and the Council urges that regulatory agencies apply the highest and best available standards to improving water quality.

Water quality in the Delta is influenced by climatic conditions (freshwater inflows and drought cycles), in-Delta water and land uses, tidal influences, and in-Delta and export diversions and operations. Water quality is generally better in the north Delta than in the central and southern Delta because Sacramento River inflows are greater than inflows from the San Joaquin River, and because the proportion of agricultural drainage discharges into the San Joaquin River is greater than discharges into the Sacramento River. The State Water Resources Control Board has listed Delta Waterways, various streams, rivers and sloughs within the Delta, the Carquinez Strait, and San Francisco Bay as having impaired water quality pursuant to section 303(d) of the federal Clean Water Act (State Water Resources Control Board 2010). Contaminants of concern include organophosphate, pesticides (diazinon and chlorpyrifos), pyrethroid insecticides, carbamate pesticides (carbaryl and carbofuran), herbicides (propanil, diuron, and others), fungicides, elemental and methyl mercury, selenium, copper, polychlorinated biphenyls, polycyclic aromatic hydrocarbons, flame retardants, pharmaceuticals and personal care products, nutrients, and others. Additional water quality issues within the Delta include salinity, bromide, dissolved organic carbon compounds, dissolved oxygen, pathogens, turbidity, temperature, toxic algal blooms, and invasive species. Exceedances in these constituents impair the ability of these waters to support beneficial uses, such as municipal water supply, recreational use, agricultural water supply, and aquatic life and wildlife beneficial uses. Sources of impairment include agriculture, urban runoff, resource extraction and abandoned mines, and ballast water (invasive species).

The State Water Resources Control Board and nine Regional Water Quality Control Boards regulate water quality within the State of California, including waters for which water quality standards are required by the federal Clean Water Act. The Regional Water Quality Control Boards develop water quality control plans (Basin Plans), which establish water quality standards and implementation plans for achieving those standards for all surface water and groundwater within their respective regions. Water quality standards include beneficial uses, numeric and narrative water quality objectives established to protect those uses, and a policy that prohibits any degradation of existing high-quality waters. In the Delta and the Suisun Marsh, the Central Valley and San Francisco Bay Regional Water Quality Control Board Basin Plans and the State Water Resources Control Board Bay-Delta Plan establish water quality objectives (standards), and provide implementation plans to achieve those objectives. The Bay-Delta Plan

1 establishes water quality objectives for which implementation is best achieved through assigning  
2 responsibilities to water right holders and water users, because the parameters to be controlled are  
3 primarily significantly affected by flows and diversions; these responsibilities were established in Water  
4 Rights Decision 1641. By establishing these largely flow-based objectives, the Bay-Delta Plan is intended  
5 to provide reasonable protection for beneficial uses that require control of salinity and water project  
6 operations (State Water Resources Control Board 2006).

7 Sources of pollution in the Delta include both point and non-point sources. The State Water Resources  
8 Control Board and Regional Water Quality Control Boards issue National Pollutant Discharge  
9 Elimination System permits for municipalities and industries; permits include both General Permits and  
10 individual permits (e.g., the General Permits covering stormwater discharges from industrial and  
11 construction activities; individual National Pollutant Discharge Elimination System permits for  
12 wastewater treatment facilities). These permits are reviewed and modified, if necessary, at 5-year  
13 intervals. The Regional Water Quality Control Boards regulate other discharges of waste through issuance  
14 of Waste Discharge Requirements or waivers of Waste Discharge Requirements. For example, the Central  
15 Valley Regional Water Quality Control Board Irrigated Lands Regulatory Program regulates waste  
16 discharges from irrigated agriculture. This program grants conditional waivers of Waste Discharge  
17 Requirements to growers if they comply either individually or as part of an agricultural coalition, with  
18 program requirements.

19 Placement of a water body on the list of impaired water bodies, also known as the Clean Water Act  
20 303(d) list, initiates a process to develop a Total Maximum Daily Load (TMDL) to address each pollutant  
21 causing the impairment. A TMDL defines how much of a pollutant a water body can tolerate and still  
22 meet water quality standards. The TMDL must account for all the sources of a pollutant, including both  
23 point sources and non-point sources (i.e., discharges from wastewater treatment facilities; runoff from  
24 urban areas, agriculture, and streets or highways; "toxic hot spots"; and aerial deposition). In addition to  
25 accounting for past and current activities, TMDLs may also consider projected future growth that could  
26 increase pollutant levels. The TMDL identifies waste load allocations for point sources, and load  
27 allocations for nonpoint sources; in addition, a margin of safety is included to account for uncertainty. An  
28 implementation plan is developed, which specifies a set of actions that must be carried out to ensure the  
29 TMDL results in achievement of water quality standards. TMDLs are implemented through amendments  
30 to the appropriate Water Quality Control Plan (Basin Plan).

31 The 2010 Integrated Report (State Water Resources Control Board 2010) prioritizes TMDLs to be  
32 developed for each water body-pollutant combination on the Clean Water Act 303(d) list, and establishes  
33 a schedule for their completion. A map showing the current TMDLs adopted and under development is  
34 presented in Figure XX.

35 **Placeholder for figure to show location of TMDLs under development in the Central Valley and**  
36 **Delta.**

37 The U.S. Environmental Protection Agency (EPA) recently issued an Advanced Notice of Proposed  
38 Rulemaking (EPA 2011) as part of an effort to assess the effectiveness of current water quality programs  
39 designed to protect aquatic species in the Bay-Delta Estuary. The document identifies the key water  
40 quality issues affecting Bay-Delta aquatic resources and summarizes current research for each of these  
41 issues, including ammonia, selenium, pesticides, emerging contaminants, and other parameters restricting  
42 estuarine habitat and the migratory corridors of anadromous fish. The notice is intended to solicit public  
43 comment on possible EPA actions to address water quality conditions affecting the Bay-Delta Estuary.  
44 EPA may make changes to its programs in the Bay-Delta Estuary through a formal rulemaking process as  
45 a result of further evaluation and consideration of public comment. These changes could affect federal  
46 water quality programs administered by the State.

1 Water quality in the Delta is also regulated by the San Francisco Bay Conservation and Development  
2 Commission, which has jurisdiction on all tidal areas of the Bay, including the Suisun Marsh. The San  
3 Francisco Bay Conservation and Development Commission policies regarding water quality are intended  
4 to prevent the release of pollution into Bay waters to the greatest extent feasible. The San Francisco Bay  
5 Conservation and Development Commission makes decisions regarding water quality impacts based on  
6 evaluation by and the advice of the San Francisco Regional Water Quality Control Board. In addition to  
7 State actions, the San Francisco Bay Conservation and Development Commission will review federal  
8 actions, permits, projects, licenses, and grants affecting the Bay, including the Suisun Marsh, pursuant to  
9 the federal Coastal Zone Management Act.

10 As described in Chapter 3, all covered actions must identify and comply with existing relevant law,  
11 including water quality regulations and water rights. The State Water Resources Control Board and  
12 Regional Water Quality Control Boards are the regulatory agencies with statutory authority to adopt water  
13 quality control plans, including regulating waters for which water quality standards are required by the  
14 federal Clean Water Act (Water Code sections 13170 and 13240). The Council recognizes the State Water  
15 Resources Control Board's role and authority in regulating water quality, and supports and encourages the  
16 timely development and enforcement of programs (e.g., water quality standards, TMDLs, Waste  
17 Discharge Requirements, and NPDES) to reduce pollutant loads and progress toward compliance with  
18 pollutants that are causing water quality impairments in the Delta. The Council also supports and  
19 encourages the completion of the elements of the California Water Board's 2010 *Update to Strategic Plan*  
20 *2008-2012* (June 2010) and the *Strategic Workplan for Activities in the San Francisco Bay/Sacramento-*  
21 *San Joaquin River Delta Estuary* (July 2008) prepared by the State Water Resources Control Board,  
22 Central Valley Regional Water Quality Control Board, and San Francisco Bay Regional Water Quality  
23 Control Board.

24 The following presents recommendations intended to support water quality improvements in the Delta  
25 and achievement of the coequal goals.

## 26 Policies and Recommendations

### 27 Salinity

28 The San Francisco Bay-Delta Estuary has always been a place where freshwater mixes with saltwater.  
29 The location of the freshwater-saltwater interface along the upstream-downstream axis of the estuary  
30 shifts with the seasons and from year to year depending on the amount of precipitation and Delta outflow  
31 (Malamud-Roam et al. 2007, Kimmerer 2004). This freshwater-saltwater gradient has also changed over  
32 time. Changes to the seasonal inflow to the Delta caused by upstream diversions, storage of water behind  
33 the State and federal water project dams, and operation of the State and federal Delta pumps have  
34 generally shifted the salinity gradient upstream, and reduced salinity variability. Currently, most of the  
35 Delta is maintained as a freshwater environment year-round for water supply purposes. Native fish  
36 species that evolved in a system with seasonally and inter-annually variable salinity are challenged by the  
37 lack of salinity variability, and introduced aquatic plants and introduced fish species such as largemouth  
38 bass, bluegill, and catfish thrive (Moyle et al. 2010).

39 Allowing salinity to vary in a way that benefits native fish species, however, could affect agricultural and  
40 municipal uses of Delta water. Elevated salinity reduces crop yields (Hoffman 2010) or, if high enough,  
41 makes water unusable for agricultural purposes. Seawater contamination of municipal water supplies  
42 makes water unpalatable, contributes to the formation of harmful disinfection byproducts, and increases  
43 corrosion of pipes and equipment.

1 The salinity regime in the Delta is driven both by natural flows and water management. Achievement of  
2 the coequal goals will require comprehensive flow standards that balance ecosystem and water supply  
3 needs.

4 Salinity also is a contaminant discharged to Delta and Delta waterways resulting from human activities  
5 (such as agriculture and wastewater treatment). Salinity in this context is addressed under Drinking Water  
6 Quality below.

### 7 ***Problem Statement***

8 Changes to the natural patterns of salinity in the Bay-Delta Estuary have created conditions that are  
9 unfavorable for native estuarine fish and favorable to introduced species. However, allowing salinity to  
10 vary in a way that benefits native fish species could affect agricultural and municipal uses of Delta water.

### 11 ***Policies***

12 WQ P1 Refer to WR P4.

## 13 **Drinking Water Quality**

14 Delta waters must be of suitable quality to support beneficial uses that include municipal and domestic  
15 drinking water and body-contact recreation. Urban runoff, agricultural runoff, and municipal wastewater  
16 discharges to Delta waters contain salinity, pathogens, and other pollutants that affect the suitability of  
17 these waters for drinking water purposes. Furthermore, exceedances of pathogens and pathogen indicators  
18 can cause illness in persons recreating in those waters.

19 In addition, the drinking water supply (groundwater) of many communities within the area served by  
20 water exported from the Delta is contaminated by nitrates and other pollutants, particularly in the San  
21 Joaquin Valley. Survey findings show that a financial burden is borne by low-income households with  
22 nitrate-contaminated water (Pacific Institute 2011). The high cost of accessing water from alternative  
23 sources, coupled with the low earnings of households, makes safe drinking water in these communities  
24 unaffordable (Pacific Institute 2011).

### 25 ***Problem Statement***

26 Pollutants contained in municipal, industrial, and agricultural discharges to the Delta and its tributary  
27 waterways contribute to the degradation of Delta water supplies for drinking water and body-contact  
28 recreation where water may be ingested.

### 29 ***Policies***

30 At this time, there are no policies with regulatory effect included in this section.

### 31 ***Recommendations***

32 WQ R1 The Central Valley Regional Water Quality Control Board should complete the Central Valley  
33 Drinking Water Policy by July, 2013, with implementation to follow.

34 WQ R2 The State Water Resources Control Board and/or Central Valley Regional Water Quality  
35 Control Board should develop regulations to protect the quality of groundwater used for  
36 drinking water.

37 WQ R3 The California Department of Public Health should prioritize funding for disadvantaged  
38 communities that lack safe drinking water supplies.

- 1 WQ R4 The State Water Resources Control Board and Central Valley Regional Water Quality Control  
2 Board should require participation by all water users that directly and indirectly discharge flows  
3 to the Delta in the Central Valley Salinity Alternatives for Long-Term Sustainability Program.

## 4 Environmental Water Quality

5 The Delta ecosystem is influenced by a variety of pollutants discharged into Delta and tributary waters.  
6 Currently, excessive amounts of ammonia and nitrate, and the ratio of nitrogen to phosphorus are  
7 negatively affecting the productivity and species composition of phytoplankton in the Delta, and  
8 stimulating growth of nuisance algae (Wilkerson et al. 2006, Dugdale et al. 2007, Jassby 2008, Glibert  
9 2010). This may negatively affect ecosystem dynamics and cause localized toxicity to aquatic organisms  
10 (Werner et al. 2008). In addition, Delta and tributary waters are impaired by pesticide contamination from  
11 urban and agricultural pollutants. Pesticides in current use cause measurable toxicity in the Delta and its  
12 tributaries, and new types of pesticides continue to be approved. New pesticides are sometimes approved  
13 for use without a full understanding of the potential impacts on aquatic species and ecosystems (Kuivila  
14 and Hladik 2008, Werner et al. 2008).

15 Selenium is another contaminant of concern in agricultural runoff, particularly in the San Joaquin Valley  
16 where naturally occurring selenium has concentrated in soils and shallow groundwater because of  
17 continued irrigation and changes in groundwater hydrology, causing reproductive toxicity to fish and  
18 wildlife (Luoma et al. 2008). Selenium compounds are found in some invertebrate species that could be  
19 harmful to fish and wildlife consuming these organisms. Methylmercury also bioaccumulates in the food  
20 web to concentrations in some Delta fish that currently exceed public health criteria and require  
21 consumption warnings.

### 22 *Problem Statement*

23 Pollutants contained in municipal, industrial, agricultural and other non-point source discharges to the  
24 Delta and its tributary waterways, including pollutants that bioaccumulate and biomagnify in the food  
25 web, contribute to the impairment of the Delta ecosystem.

### 26 *Policies*

27 At this time, there are no policies with regulatory effect included in this section.

### 28 *Recommendations*

29 WQ R5 The State Water Resources Control Board and the San Francisco Bay and Central Valley  
30 Regional Water Quality Control Boards are currently engaged in regulatory processes that  
31 would improve water quality in the Delta. In order to achieve the coequal goals, it is essential  
32 that these ongoing efforts be completed and if possible accelerated, and that the Legislature and  
33 Governor devote sufficient funding to make this possible. The Council specifically  
34 recommends that:

- 35 ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley  
36 Regional Water Quality Control Boards should develop and adopt numeric objectives for  
37 nutrients in the Delta and Delta watershed by January 1, 2014.
- 38 ♦ The State Water Resources Control Board, the San Francisco Bay and Central Valley  
39 Regional Water Quality Control Boards, and the Department of Pesticide Regulation  
40 should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan  
41 Amendment for diazinon and chlorpyrifos by January 1, 2013.
- 42 ♦ The State Water Resources Control Board, the San Francisco Bay and Central Valley  
43 Regional Water Quality Control Boards, and the Department of Pesticide Regulation

- 1 prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum  
2 Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016.
- 3 ♦ The San Francisco Bay and Central Valley Regional Water Quality Control Boards should  
4 develop and implement Total Maximum Daily Load and Basin Plan Amendment for  
5 organochlorine pesticides, selenium, and methyl-mercury, to address water quality  
6 impairment in the Delta, in accordance with the time schedule provided in the 2010  
7 Integrated Report.
- 8 WQ R6 The State Water Resources Control Board and Regional Water Quality Control Boards should  
9 work collaboratively with the Department of Water Resources, Department of Fish and Game  
10 and other agencies and entities that monitor water quality in the Delta to develop and  
11 implement a Delta Regional Monitoring Program that will be responsible for coordinating  
12 monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular  
13 basis.
- 14 WQ R7 The Central Valley Regional Water Quality Control Board, consistent with existing Water  
15 Quality Control Plan policies and water rights law, should require responsible entities that  
16 discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate  
17 whether all or a portion of the discharges can be recycled or otherwise used in order to reduce  
18 contaminant loads to the Delta.
- 19 WQ R8 The State Water Resources Control Board and Regional Water Quality Control Boards should  
20 conduct or require special studies to identify sources of toxicity in Delta waters and sediments.
- 21 WQ R9 To comply with the San Francisco Bay Conservation and Development Commission water  
22 quality policies and facilitate the commission's impact determination, proponents of actions  
23 potentially affecting water quality in Suisun Marsh should consult with the San Francisco  
24 Regional Water Quality Control Board and obtain all necessary authorizations early in the  
25 process.

## 26 Performance Measures

- 27 To track progress in meeting the Council's objectives, the Council will assess the status and trends in  
28 water quality through use of monitoring data collected by the State Water Resources Control Board,  
29 Regional Water Quality Control Boards, and other entities in the Central Valley and Delta. Specifically,  
30 the Council will assess progress based on measurements of the following:
- 31 ♦ Salinity variability
- 32 ♦ Levels of drinking water constituents of concern (total organic carbon, salinity, bromide,  
33 nutrients, and pathogens) in water diverted from the Delta for municipal use
- 34 ♦ Concentrations of methylmercury and other bioaccumulating substances in the tissues of Delta  
35 fish
- 36 ♦ Concentrations of nutrients (nitrogen and phosphorus compounds) that support the growth of  
37 undesirable algae or excessive growth of nuisance aquatic plants
- 38 ♦ Instances of measurable toxicity in the Delta and its tributaries due to pesticides and other  
39 pollutants
- 40 ♦ Instances of dissolved oxygen depletion below applicable standards

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# Chapter 7

## Reduce Risk to People, Property, and State Interests in the Delta

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4

Water Code sections 85305, 85306, 85307, and 85309 require the Delta Plan to include specific objectives.

85305. *(a) The Delta Plan shall attempt to reduce risks to people, property, and state interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments.*

*(b) The council may incorporate into the Delta Plan the emergency preparedness and response strategies for the Delta developed by the California Emergency Management Agency pursuant to Section 12994.5.*

85306. *The council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and non-project levees.*

85307. *(a) The Delta Plan may identify actions to be taken outside of the Delta, if those actions are determined to significantly reduce flood risks in the Delta.*

*(b) The Delta Plan may include local plans of flood protection.*

*(c) The council, in consultation with the Department of Transportation, may address in the Delta Plan the effects of climate change and sea level rise on the three state highways that cross the Delta.*

*(d) The council, in consultation with the State Energy Resources Conservation and Development Commission and the Public Utilities Commission, may incorporate into the Delta Plan additional actions to address the needs of Delta energy development, energy storage, and energy transmission and distribution.*

Based upon Water Code Section 85309, the Council shall consider a proposal from the Department of Water Resources, in consultation with the Corps of Engineers and the Central Valley Flood Protection Board, to coordinate flood and water supply operations of the State Water Project and the federal Central Valley Project.

# Chapter 7

## Reduce Risk to People, Property, and State Interests in the Delta

### Introduction

The Delta is an inherently flood-prone area at the confluence of two massive watersheds. The watersheds of the Sacramento and San Joaquin Rivers collectively drain approximately 43,000 square miles. What was historically a tidal marsh formed through the interaction of fluctuating sea levels and an influx of alluvial sediments from river floods has been transformed. It is now a complex labyrinth of reclaimed islands and waterways created through the construction of levees, many of which were constructed over the past 150 years using light equipment and local, uncompacted sediments and organic matter, and with little or no foundation preparation.

The Delta (the legal Delta and Suisun Marsh) includes more than 1,335 miles of levees that protect approximately 839,610 acres of land. These levees face potential threats such as large runoff events, earthquakes, extreme high tides, wind-generated waves, subsidence, and sea level rise. Individually, each of these threats is enough to cause serious concern; together, they represent a potential for catastrophic disruption of the Delta. A mass failure of the levee system would have real life-and-death impacts, and property losses that could total billions of dollars. Levee failures not only create direct damage and potential loss of life from flooding, but also change the configuration of the Delta—both water and land—and alter the mixing of fresh water with salt water. A failure could also have significant effects on California's economy from interruption of service to 25 million urban water users and to approximately 3 million acres of irrigated farmland that depend, in part, on water conveyed through the Delta.

The portfolio of risk-reduction strategies must consider urban and rural communities as well as agricultural lands in the process of identifying evaluating, and prioritizing investments in the levee system. Risks can be reduced through an emergency preparedness, response, and recovery system; appropriate land uses; and strategic levee improvements.

Flood risk is assessed in terms of the likelihood of a flood event occurring, the chance of failure from that flood event, and the associated consequences. Consequences can entail loss of life and economic and environmental damage. Risk of flooding in the Delta is likely to increase over time as a result of several factors: continued development within the floodplains, inadequate levees, inadequate channel capacities, seismic vulnerability, continuing subsidence, climate change, and sea level rise. It is estimated that by the year 2100, sea level rise may reach 55 inches (California Climate Action Team 2010, California Ocean Protection Council 2011). Failure of significant parts of the Delta's flood management system will be unavoidable.

Flood risk reduction cannot absolutely prevent harmful inundation from floods, but can reduce its likelihood and social and economic impacts. History has shown that unavoidable structural failures in the

1 system will occur as a result of extraordinary events, imperfect knowledge, and imperfect materials. Risks  
2 must be well understood, and then managed and controlled to the extent possible through public  
3 awareness, adequate emergency management planning, and enforcement of existing flood management  
4 regulations. Many studies and efforts addressing flood management and emergency preparedness,  
5 response, and mitigation are underway, and will be considered by the Council for ongoing Delta flood  
6 risk management. These studies include the Central Valley Flood Protection Plan, FloodSAFE, and the  
7 U.S. Army Corps of Engineers Delta Islands Levees Feasibility Study, the Long Term Management  
8 Strategy for Dredging, periodic inspection system, and levee safety action classification system. The  
9 Delta Plan will consider the findings of these studies to guide the Council in implementing its policies and  
10 making determinations of consistency.

11 This chapter presents risk-reduction policies and recommendations necessary for the achievement of the  
12 coequal goals.

## 13 Floodplain and Floodway Protection

14 Adequate flood flow capacity is critical for managing flood risks to upstream, adjacent, and downstream  
15 land uses, and for overall Delta water management and ecosystem integrity. Both the Federal Emergency  
16 Management Agency (FEMA) and the State Central Valley Flood Protection Board play a role in  
17 designating floodways to accommodate flood flows. “Designated Floodway” refers to the channel of the  
18 stream and that portion of the adjoining floodplain reasonably required to provide for the passage of a  
19 design flood; it is also the floodway between existing levees as adopted by the Central Valley Flood  
20 Protection Board or the Legislature.

21 The State Central Valley Flood Protection Board, under Section 8609 of the Water Code, has the  
22 authority to designate floodways in the Central Valley. Title 23 of California Code of Regulations  
23 provides further details of the Board’s regulatory authority; specifically, Article 5, Section 107, regulates  
24 land uses in Designated Floodways. Under the National Flood Insurance Program, FEMA establishes  
25 regulatory floodways, and participating communities are expected to regulate development within their  
26 floodways in accordance with the regulations defined primarily by federal regulations.<sup>8</sup>

27 Despite these regulations, land use policies guiding development in floodways are not consistent across  
28 Delta counties. Additionally, floodways have not been established for many of the channels within the  
29 Delta by either FEMA or the State Central Valley Flood Protection Board. In light of these problems, the  
30 Delta Plan should address these issues and highlight the need for policies and recommendations that  
31 accommodate floodplain and floodway protection. Concerns that floodways may expand and deepen as a  
32 consequence of sea level rise and changes to rainfall and snow patterns over the next 100 years must be  
33 addressed and accommodated. Development in existing or future floodplain or bypass locations in the  
34 Delta or upstream can permanently eliminate the availability of these areas for future floodplain usage.

### 35 *Problem Statement*

36 Structures constructed in the floodway that encroach on existing floodplains and potential future  
37 floodplain or bypass locations in the Delta and upstream could reduce the flood carrying capacity of the  
38 Delta.

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<sup>8</sup> 44 Code of Federal Regulations 60.3(b)(6,7,10) requires the following:

- *Notify, in riverine situations, adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the Administrator;*
- *Assure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained;*
- *Require until a regulatory floodway is designated, that no new construction, substantial improvements, or other development (including fill) shall be permitted within Zones A1-30 and AE on the community’s Flood Insurance Rate Map (FIRM), unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.*

## 1 **Policies**

2 RR P1 Refer to ER P4.

3 RR P2 Existing or potential value of floodways<sup>9</sup> or potential floodways shall not be encroached<sup>10</sup>  
4 upon nor diminished without mitigating for potential or future flood flows, except as provided  
5 in this Delta Plan.

6 RR P3 Existing or potential value of floodplains<sup>11</sup> or potential floodplains shall not be encroached  
7 upon nor diminished except as provided in this Delta Plan. The following areas are identified in  
8 the Delta Plan as potential floodplains and should also provide ecosystem benefit:

- 9 ♦ Areas located in the Yolo Bypass from Fremont Weir through Cache Slough to the  
10 Sacramento River outside of the existing floodplain easement, including the confluence of  
11 Putah Creek into the bypass;
- 12 ♦ The Cosumnes River/Mokelumne River confluence, as defined by the North Delta Flood  
13 Control and Ecosystem Restoration Project (Department of Water Resources 2010);
- 14 ♦ The San Joaquin River/South Delta Floodplain. This areas extends north from the southern  
15 boundary of the legal Delta, including all of Pescadero Tract, Paradise Cut and Reclamation  
16 Districts R-2075, R-2064, R-2085, R-2094, R-2095, the portion of R-1007 generally north  
17 of Bethany Road and the portion of R-2058 north of Interstate 205, and the undeveloped  
18 portion of Stewart Tract. This area will be modified upon completion of studies by the  
19 Department of Water Resources that will define the floodplain as referenced in Water Code  
20 section 9613(c).

## 21 **Recommendation**

22 RR R1 The Legislature should fund and the Department of Water Resources and the Central Valley  
23 Flood Protection Board should complete their investigation of the bypass and floodways in the  
24 San Joaquin River to reduce potential flooding near Paradise Cut, as required by Water Code  
25 section 9613(c).

26 RR R2 The current efforts led by the U.S. Army Corp of Engineers—the *San Francisco Bay Long*  
27 *Term Management Strategy for Dredging and the Delta Dredged Sediment Long-Term*  
28 *Management Strategy*—should be continued and supported so that desirable dredging to  
29 support the Delta Plan and the coequal goals, might be achieved. Appropriate dredging might  
30 increase flood conveyance while at the same time acquiring material which might be used for  
31 levee maintenance (U.S. Army Corps of Engineers 2002).

## 32 **Delta Levee Design Criteria**

33 The 1992 Delta Protection Act designated the Delta as a flood-prone area and defined the most  
34 appropriate land uses as agriculture, wildlife habitat, and where specifically provided, recreation (Public  
35 Resources Code section 29704). Although levees were constructed in the Delta to reduce the risk of

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<sup>9</sup> As defined by California Code of Regulations, Title 23, Division 1, Chapter 1, Article 2, Section 4: (n) *Floodway*. "Floodway" means the channel of a river or other watercourse and the adjacent land areas that convey flood waters.

<sup>10</sup> As defined by California Code of Regulations, Title 23, Division 1, Chapter 1, Article 2, Section 4: (m) *Encroachment*. "Encroachment" means any obstruction or physical intrusion by construction of works or devices, planting or removal of vegetation, or by whatever means for any purpose, into any of the following: (1) any flood control project works; (2) the waterway area of the project; (3) the area covered by an adopted plan of flood control; or (4) any area outside the above limits, if the encroachment could affect any of the above.

<sup>11</sup> As defined by the FEMA National Flood Insurance Program: *Floodplain*: Any land area susceptible to being inundated by flood waters from any source. <http://www.fema.gov/business/nfip/19def2.shtm>.

1 flooding, the historical performance of many levees in the Delta is poor. Many levee failures have been  
2 attributed to high flood flows, and some levees have failed in the absence of any type of flood. If a  
3 significant earthquake does occur on faults near the western Delta, one or more levees could fail or  
4 subside (Department of Water Resources 2009). With this in mind, it is more important than ever that the  
5 levees in the Delta are designed, constructed, and maintained to provide the level of flood risk reduction  
6 commensurate with the land and resource uses they protect.

7 As discussed in Delta Vision, the level of flood protection provided by levee classifications should be  
8 related to an acceptable risk for the types of land use located behind the levee (Delta Vision Blue Ribbon  
9 Task Force 2008). A classification system is needed that aligns levee design with corresponding  
10 appropriate land and resource uses, ranging from habitat or ecosystem protection up to protection of large  
11 urban areas comprising thousands of people and homes. During the last few decades, state and federal  
12 agencies have developed various levee standards. These standards were designed to either establish  
13 minimum criteria that would make the levees and the properties protected eligible for grants or  
14 rehabilitation funds, or minimum criteria that would allow development behind the levees. The four most  
15 prominent existing standards are listed below:

- 16 ♦ **FEMA Hazard Mitigation Plan:** Meeting this standard allows the Delta island or tract to be  
17 eligible for FEMA disaster grants and assistance following levee failures and island inundation.
- 18 ♦ **USACE Public Law 84-99:** Meeting this standard allows the Delta island or tract to be eligible  
19 for USACE funding for levee rehabilitation and island restoration following levee failures and  
20 island inundation, provided the reclamation district applies for and is accepted into the program  
21 and passes a rigorous initial inspection and periodic follow-up inspections. Both of the above two  
22 standards are based primarily on levee geometry with minimum freeboard and maximum  
23 steepness of slopes. Although the geometry implies a minimum slope stability factor of safety,  
24 neither standard is associated with a level of protection and neither addresses seismic stability.
- 25 ♦ **FEMA 100-year (Base Flood) Protection:** This standard, often called the 1 percent annual  
26 chance flood level of protection, is based on criteria established in the Code of Federal  
27 Regulations and is often used with established USACE criteria to meet certain freeboard, slope  
28 stability, seepage/underseepage, erosion, and settlement requirements. Meeting this level of flood  
29 protection means that communities will not require mandatory purchase of flood insurance or be  
30 subject to building restrictions. This standard generally does not address seismic stability. Very  
31 few levees in the central Delta meet this standard.
- 32 ♦ **DWR 200-year Urban Levee Protection:** This standard is similar to the FEMA standard, but for  
33 a 200-year level of flood protection. It is generally based on established USACE criteria.  
34 However, unlike USACE criteria, the DWR 200-year Urban Levee Protection requires that  
35 seismic stability be addressed. Not meeting this standard, or making adequate progress toward it,  
36 will generally prohibit further development behind an urban or urbanizing levee. Although almost  
37 none of the levees in the central Delta meets this standard, most do not protect urban areas, with  
38 the exceptions of the outer fringes of the Delta near West Sacramento, Sacramento's Pocket Area,  
39 and Stockton.

40 It is likely more useful to properly align land and resource uses with specific levee design criteria. This  
41 can help ensure that land and resource uses realize appropriate flood risk protection, but also signal that  
42 future alterations and changes to land and resource uses must remain in alignment with appropriate levee  
43 design criteria. To that end, this section provides policies that address the alignment of land and resource  
44 uses with appropriate levee design criteria.

45 While most of the attention is typically directed toward flood risk reduction for life and property, flood  
46 protection is also a consideration for habitat and ecosystem values and goals. Among other

1 considerations, setback levees that expand flood conveyance capacity and reduce flood risk while  
 2 providing ecosystem restoration and recreational opportunities are worthwhile (U.S. Army Corps of  
 3 Engineers 2002).

4 **Problem Statement**

5 Many Delta levees are not adequately designed and/or maintained to protect the existing land and  
 6 resource uses.

7 **Policies**

8 RR P4 Actions occurring after January 1, 2015 shall conform to the classifications defined in  
 9 Table 7-1. Actions protected by Class 5 levees must conform by 2025 in accordance with the  
 10 Central Valley Flood Protection Act of 2008 (Government Code section 65865.5(a)(3)).

**Table 7-1**  
**Levee Classifications for Land and Resource Uses**

		Levee System Goals					Minimum Design Criteria
Levee System Classification	Description	Land Use					
		Wetlands/ Habitat	Agricultural	Infrastructure	Rural Residential Uses with less than 10,000 people <sup>c</sup>	Urban Residential Uses with more than 10,000 people <sup>c</sup>	
<b>Class 1</b>	No specific goal <sup>a</sup>	✓	NA	NA	NA	NA	Designed to manage the flood risk to the level appropriate for individual ecosystem restoration projects.
<b>Class 2<sup>b</sup></b>	HMP	✓	✓	NA	NA	NA	Current DWR nonurban levee design criteria.
<b>Class 3</b>	PL84-99	✓	✓	✓	NA	NA	Current DWR nonurban levee design criteria.
<b>Class 4</b>	FEMA – 100-year	✓	✓	✓	✓ <sup>d</sup>	NA <sup>d</sup>	Current DWR nonurban levee design criteria, and must be accredited by FEMA as providing protection from the 100-year flood event.
<b>Class 5</b>	DWR – 200-year <sup>e</sup>	✓	✓	✓	✓ <sup>d</sup>	✓ <sup>d</sup>	Current DWR urban levee design criteria for the 200–year flood event. and must be accredited by FEMA as providing protection from the 100-year flood event

Notes:

NA: Denotes Not Acceptable

✓: Denotes Acceptable

HMP: Hazard Mitigation Plan. FEMA geometrical levee criteria.

PL84-99: Public Law 84-99 standards developed by the US Army Corps of Engineers.

FEMA-100-year: Levees accredited by FEMA as providing 100 year flood protection.

<sup>a</sup> Class 1 levees are designed to serve the need of the habitat, and may be allowed to periodically fail.

<sup>b</sup> Islands where Class 2 levees are appropriate include those, after adequate consideration, that are judged to have no specific Statewide interest and may not be reclaimed after a levee failure.

<sup>c</sup> Levee protection for legacy towns should be determined based on site specific needs (e.g., floodwalls) and financing available.

<sup>d</sup> Levees for areas with residential, commercial, and industrial businesses should comply with requirements contained in the Natural Resources Agency "Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento-San Joaquin Valley," and ultimately upgrade to at least Class 5 (Federal Emergency Management Agency 200-year).

<sup>e</sup> In accordance with the Central Valley Flood Protection Act of 2008 (Senate Bill 5, Machado)

1 RR P5 Until the Department of Water Resources adopts criteria to define locations for future setback  
2 levees, any action located next to the land side of a levee shall demonstrate adequate area is  
3 provided to accommodate setback levees, as determined by a registered civil engineer or  
4 geologist.

## 5 Flood Management Investment

6 The Delta is inherently flood-prone, but its levees protect its residents, its agricultural land, and energy,  
7 communications, and transportation facilities vital to the economic health of California (Public Resources  
8 Code section 32301(h)). Levee maintenance and improvements in the Delta are critical for reducing risks  
9 to acceptable levels. Depending on the ownership of the levee, the responsibilities for these activities—  
10 and the financial investment required—are assigned to state agencies and/or local landowners and  
11 reclamation districts.

12 Although many major levees are Project levees and managed by state agencies, 65 percent of the levees in  
13 the Delta are non-Project local levees. These levees are not part of the federal flood-control program and  
14 are maintained by local agencies (primarily reclamation districts) that are partially reimbursed by the  
15 State. It is difficult for local agencies to raise funds for the local share of state and federal assistance  
16 programs. Also, few Delta properties have federal or private flood insurance, and as a result, these  
17 uninsured property owners may be solely responsible for repairs and losses following a levee failure.

18 Although the State has expended tens of millions of dollars since 2000 on Delta levee operation,  
19 maintenance, and improvement, significant funding would still be needed to raise all Delta levees to  
20 PL84-99 standards. Given the potential threats faced by Delta levees, risk must be reduced through a set  
21 of management policies that prioritize strategic and focused investments of resources into levees in a  
22 manner that best balances the multitude of uses in the Delta. The State is required to promote effective  
23 strategic levee investments and recommend prioritization of State investments (Water Code section  
24 85305(a), 85306).

### 25 *Problem Statement*

26 There is no clear state policy for flood management and state funding within the Delta. Priorities need to  
27 be set for state-funded flood management investments.

### 28 *Policies*

29 RR P6 An action utilizing State investments for levee improvements in the Delta shall:

- 30 ♦ Reduce risk of loss of life.
- 31 ♦ Not result in an increase in the number of people at risk.
- 32 ♦ Recognize the wide variability of conditions across the Delta, including: depth of  
33 inundation upon failure; current height and condition of existing levees; degree of exposure  
34 to seismicity, sea level rise, climate change, and river flood levels; the ability of land uses  
35 to recover from short or long-term inundation, and the consequences to water quality,  
36 critical utilities and transportation corridors.
- 37 ♦ Evaluate investment in alternative flood management strategies, comparing levee upgrade  
38 to flood-proofing, relocation of infrastructure, and flood insurance.

# 1 Emergency Preparedness and Response

2 Emergency preparedness is the first line of flood defense. It is imperative that federal, State, and local  
3 governments—the citizens themselves—be prepared for a variety of emergency situations. Emergency  
4 response should be routinely tested and practiced (Delta Vision Blue Ribbon Task Force 2008).

5 To effectively and reliably reduce risks to people, property, and state interests in the Delta, a multifaceted  
6 strategy of coordinated emergency preparedness, appropriate land use planning, and prioritized  
7 investment in flood protection infrastructure is necessary and prudent. Delta levees not only protect life  
8 and personal property, but also play a large role in protecting vital infrastructure, including the State’s  
9 water conveyance system. Despite the risks of levee failure, no published emergency action plan exists  
10 that addresses the consequences to federal and State water supply deliveries of catastrophic levee failure  
11 in the Delta. Although investment in flood protection infrastructure can considerably reduce the  
12 likelihood of a catastrophic levee failure, failures are inevitable and will require the implementation of  
13 well-coordinated and carefully developed emergency response planning efforts. To reduce response time  
14 while optimizing the effectiveness of the response effort, such plans will need to harness the unique  
15 capabilities of each agency with a mission in the Delta.

16 Despite the vital importance of adequate preparation, no Delta-wide emergency response plan exists. The  
17 California Emergency Management Agency, Department of Water Resources, and several local agencies  
18 are preparing individual emergency response plans for the Delta, but the development of these should be  
19 coordinated, tested, and practiced. Strategies being prepared as directed by SB27 will address this issue,  
20 and will be considered in the Delta Plan.

## 21 *Problem Statement*

22 Levee failures and flooding can and will place human life and property in danger, and can also have  
23 potentially significant implications for the State’s water supply and the health of the Delta ecosystem.

## 24 *Policies*

25 At this time, there are no policies with regulatory effect included in this section.

## 26 *Recommendations*

27 RR R3 The following actions should be taken to promote emergency preparedness in the Delta:

- 28 ♦ The Department of Water Resources and local flood management agencies should prepare  
29 and regularly update *Delta Multi-Hazard Coordination Plans and Inland Mass Evacuation*  
30 *Plans*; and participate in “Golden Guardian”-like emergency response exercises, Inland  
31 Mass Evacuation exercises, and emergency preparedness public training, notification, and  
32 outreach programs.
- 33 ♦ In consultation with local agencies, the Department of Water Resources should expand  
34 their emergency stockpiles to make them regional in nature and usable by a larger number  
35 of agencies. The Department, as a part of this plan, should evaluate the potential of creating  
36 stored material sites by “over-reinforcing” western delta levees.
- 37 ♦ State and local agencies and regulated utilities that own and/or operate infrastructure within  
38 the Delta should prepare emergency response plans to protect the infrastructure from  
39 long-term outages resulting from failures of the Delta levees. The emergency procedures  
40 should consider methods that also would protect Delta land use and ecosystem.

- 1                   ♦ Responsible Emergency Management Authorities should consider and implement the  
2                   recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code  
3                   section 12994.5).

## 4           **Limitation of Liability**

5           The U.S. Army Corps of Engineers and other federal agencies are afforded immunity from liability of any  
6           kind for damages arising from flood events through the provisions of the Flood Control Act of 1928.  
7           However, this immunity is not enjoyed by parties outside of the federal government.

8           The most notable recent court decision on flood liability was the November 2003 *Paterno vs. State of*  
9           *California* decision. The California Court of Appeals found the State liable, by inverse condemnation, for  
10           damages incurred by flooded residents as a result of failure of a Yuba River levee that the State did not  
11           design, build, or even directly maintain. This decision makes it possible that the State will ultimately be  
12           held responsible for the structural integrity of much of the federal flood-control system in the Central  
13           Valley—approximately 1,600 miles of State-Federal project levees that protect more than half a million  
14           people and property exceeding \$50 billion in value.

15           In another California court case, *Arreola vs. Monterey County*, local agencies were held liable in July  
16           2002 for 1995 flood damages to property owners that resulted from a failure to properly maintain the  
17           Pajaro River project.

### 18           ***Problem Statement***

19           As the risks of levee failure and corresponding damage increase, California’s courts have generally  
20           exposed public agencies, and the State specifically, to significant financial liability for flood damages  
21           (California Department of Water Resources 2005).

### 22           ***Policies***

23           At this time, there are no policies with regulatory effect included in this section.

### 24           ***Recommendations***

25           RR R4    The Legislature should provide specific immunity for public safety flood protection activities,  
26                   similar to that provided for police and correctional activities (Government Code section 844),  
27                   and fire protection activities (Government Code section 850).

28           RR R5    The Legislature should require an adequate level of flood insurance for individuals, businesses,  
29                   and industries in floodprone areas.

## 30           **Financing of Local Flood Management Activities**

31           No regional authority exists to facilitate the assessment and disbursement of funds for Delta levee  
32           operations, maintenance, and improvements, or to collect and provide timely data and reporting on levee  
33           conditions. Such an authority could act to consolidate activities relating to levees conditions assessment,  
34           data collection efforts, emergency preparedness notification, and fee authority. This could provide for a  
35           more centralized and responsive entity managed on a local basis for Delta interests.

### 36           ***Problem Statement***

37           Financing of local levee operations, maintenance, and related data collection efforts is not well  
38           coordinated.

### 39           ***Policies***

40           At this time, there are no policies with regulatory effect included in this section.

## 1 **Recommendations**

2 RR R6 A Delta Flood Management Assessment District should be created with fee assessment  
3 authority (including over state infrastructure) to provide adequate flood control protection and  
4 emergency response for the regional benefit of participants within the Delta.

5 This district should be authorized to:

- 6 ♦ Develop, fund, and implement a regional plan of flood management for both Project and  
7 non-Project levees of the Delta in cooperation with the existing reclamation districts, cities,  
8 counties, and owners of infrastructure protected by the levees;
- 9 ♦ Survey levees and report survey and conditions data to the Department of Water Resources  
10 at least every 5 years;
- 11 ♦ In coordination with the Department of Water Resources and Corp of Engineers, establish  
12 standardized flood risk measurement data. This data should support the development of  
13 Expected Annual Damage values for the Delta. Expected Annual Damage is a measure of  
14 risk that integrates the likelihood and consequences of flooding, and is also the standard  
15 measure of the benefits of reducing flood risk;
- 16 ♦ Notify residents and landowners of flood risk on an annual basis;
- 17 ♦ Develop emergency procedures including but not limited to evacuation.

18 Note that the Council is recommending in the Finance Plan (FP R4) that the proposed agency  
19 be given funding (up to \$110 million) to develop and implement the regional plan.

## 20 **Subsidence Reduction and Reversal**

21 Much of the central Delta lands are composed of peaty soils that exist naturally as fibrous, low-density,  
22 compressible soils usually in a saturated state. To grow crops in such soils, farmers constructed levees and  
23 dikes around the tracts and drained the fields. Drying saturated peat reduces its volume by 50 percent.  
24 Early cultivation practices included burning, which further reduced the volume and altered the structure.  
25 Over time, long-term oxidation chemically reduced the peaty soils to small particles and gases that blew  
26 away gradually. Today, much of the central Delta is below sea level, with some islands commonly 12 to  
27 15 feet below sea level, requiring levees that are 20 to 25 feet high to hold back water every day.  
28 However, some recent practices that can reverse subsidence have been investigated. The State is  
29 participating in subsidence reversal pilot studies on Sherman and Twitchell islands and other areas.

### 30 ***Problem Statement***

31 Agricultural practices have promoted deep subsidence over the last 150 years. Although subsidence has  
32 slowed or halted in many areas, some regions of the Delta continue to subside.

### 33 ***Policies***

34 At this time, there are no policies with regulatory effect included in this section.

### 35 ***Recommendations***

36 RR R7 State agencies should not renew or enter into agricultural leases on western Delta islands that  
37 promote or contribute to subsidence on the leased land unless the lessee participates in  
38 subsidence-reversal or reduction programs.

## 1 Reoperation of Upstream Reservoirs and Peak Flow Attenuation to 2 Improve Flood Management

3 The federal and State agencies have initiated evaluations to modify flood control management procedures  
4 on an individual stream basis but have not completed a comprehensive Delta watershed analysis. How  
5 reservoirs upstream of the Delta are operated can have substantial impacts on flood flows through the  
6 Delta; therefore, operations procedures among the responsible authorities should be well coordinated.

### 7 *Problem Statement*

8 Flood and water supply operations are not well coordinated between State and federal entities.

### 9 *Policies*

10 At this time, there are no policies with regulatory effect included in this section.

### 11 *Recommendations*

12 RR R8 U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, and Department of Water  
13 Resources should modify flood control management procedures for reservoirs upstream of the  
14 Delta considering sea level rise, changes in precipitation, and changes in water supply  
15 operations.

## 16 Performance Measures

- 17 ♦ Percentage of Delta levees that comply with the protection classifications shown in Table 7-1  
18 based on land and resource uses.
- 19 ♦ Percentage of residential and commercial structures covered by flood insurance in the Delta.
- 20 ♦ Decrease in Delta area flood risk over time as measured by Expected Annual Damage.
- 21 ♦ The development of written emergency preparedness and response plans and the frequency of  
22 emergency preparedness drills.
- 23 ♦ Percentage of floodplains or floodways defined and regulated to protect flood capacity.

## 24 References

- 25 California Climate Action Team. 2010. State of California Sea-Level Rise Interim Guidance Document.  
26 Developed by the Sea-Level Rise Task Force of the Coastal and Ocean Working Group, with  
27 science support provided by the Ocean Protection Council's Science Advisory Team and the  
28 California Ocean Science Trust. October.
- 29 California Ocean Protection Council. 2011. Resolution of the California Ocean Protection Council on  
30 Sea-Level Rise. Adopted March 11.
- 31 Delta Vision Blue Ribbon Task Force. 2008. Delta Vision Strategic Plan. Sacramento, CA. October.
- 32 Department of Water Resources. 2005. "Flood Warnings: Responding to California's Flood Crisis."  
33 White Paper. [http://www.water.ca.gov/pubs/flood/  
34 flood\\_warnings\\_\\_\\_responding\\_to\\_california's\\_flood\\_crisis/011005floodwarnings.pdf](http://www.water.ca.gov/pubs/flood/flood_warnings___responding_to_california's_flood_crisis/011005floodwarnings.pdf).
- 35 Department of Water Resources. 2009. Delta Risk Management Strategy Final Phase 1 Report. March.

- 1 Department of Water Resources. 2010. North Delta Flood Control and Ecosystem Restoration Project
- 2 Final Environmental Impact Report. Sacramento, CA. October.
- 3 U.S. Army Corps of Engineers. 2002. Sacramento and San Joaquin River Basins California
- 4 Comprehensive Study, Interim Report. Sacramento District.



## Chapter 8

# Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place

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The Sacramento-San Joaquin Delta Reform Act declared state policy for the resources and values of the Delta (Public Resources Code section 29702):

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

*(b) Protect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities.*

*(c) Ensure orderly, balanced conservation and development of Delta land resources.*

Inherent in the coequal goals, the legislature declares the following objectives inherent in the coequal goals for management of the Delta (Water Code section 85020):

*(a) Manage the Delta's water and environmental resources and the water resources of the state over the long term.*

*(b) Protect and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place.*

Water Code Section 85302(h) provides direction on the implementation of measures to promote the coequal goals and inherent objectives.

*(h) The Delta Plan shall include recommendations regarding state agency management of lands in the Delta.*

## Chapter 8

# Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place

## Introduction

Since the mid-1800s, the Delta’s economy and culture have been defined by managing water to create farmable land, and by using the Delta’s waterways to move people and goods between the San Francisco Bay Area and Central Valley. In the past 100 years, the importance of the Delta has been elevated by a growing network of infrastructure, such as roadways, fresh water conveyance, power lines, and pipelines that connect the Delta to other regions of the state. More recently, the population of some Delta communities has grown as people who work in the San Francisco Bay Area, Sacramento, and Stockton regions relocate to enjoy the rural lifestyle offered by the Delta. A growing appreciation of the Delta’s character and role in California’s history has moved the Legislature to act to protect and enhance the Delta “as an evolving place.”

Over the decades, the Delta has evolved into a place with its own culture, recreation, agriculture, and environment—a place with unique rural character that the State of California believes should be protected and enhanced.

The Delta’s predominant land use has remained agriculture, and its varied crops surround small unincorporated and “legacy communities,” towns with distinct natural, agricultural, and cultural heritage. Cultural events, specialty local businesses, and recreational opportunities near these towns are attractive to many visitors. Industries in the Delta serve the region’s agricultural, transportation, and recreation sectors. The Delta is also an important corridor and crossroads for utilities and other infrastructure; a complex network of pipelines and above-ground transmission lines serve and connect the Delta with surrounding urban regions and other parts of California.

Risks to the Delta are increasing. Urbanization at the edges of the Delta, an aging levee system, climate change, rising sea levels, and other pressures threaten to overwhelm the Delta. The Delta’s water and environmental resources need long-term management to address these concerns. Despite the need, federal, State, and local decisions influencing land and water uses in the Delta are not well coordinated. There is no clear, consistent regional or statewide plan to collectively address these concerns.

1 Critical plans are being completed by others and will be considered by the Council to inform future Delta  
2 Plan policies. These include:

- 3 ♦ Delta Economic Sustainability Plan (development by the Delta Protection Commission; Public  
4 Resources Code section 29759.)
- 5 ♦ Plan to establish state and federal designation of the Delta as a place of special significance  
6 (development by the Delta Protection Commission; Water Code section 85301 (b) (1))
- 7 ♦ Proposal to protect, enhance, and sustain the unique cultural, historical, recreational, agricultural,  
8 and economic values of the Delta as an evolving place in a manner consistent with the coequal  
9 goals (development by the Delta Protection Commission; Water Code section 85301(a))
- 10 ♦ Proposal to expand the network of state recreation areas in the Delta (development by the  
11 California Department of Parks and Recreation; Water Code section 85301(c)(1))
- 12 ♦ Proposal to establish market incentives and infrastructure to protect and enhance the economic  
13 and public values of Delta agriculture (California Department of Food and Agriculture; Water  
14 Code section 85301(c)(2))

## 15 Policies and Recommendations

### 16 Economic Sustainability

17 The legislature established that the Delta Protection Commission “is the appropriate agency to identify  
18 and provide recommendations to the Delta Stewardship Council on methods of preserving the Delta as an  
19 evolving place as the Delta Stewardship Council develops and implements the Delta Plan” (Public  
20 Resources Code section 29703.5(a)). The Delta Protection Commission’s Land Use and Resource  
21 Management Plan for the Primary Zone of the Delta (2010) identifies concerns about funding availability  
22 for maintenance of recreational facilities and for the provision of new facilities.

23 Public Resources Code section 29778.5 established the Delta Investment Fund in the State Treasury,  
24 which can be used for implementing the regional economic sustainability plan once adopted by the Delta  
25 Protection Commission. The Legislature, however, has yet to make appropriations to the fund.

#### 26 *Problem Statement*

27 Delta economic drivers are changing. Economic development planning is required to sustain the  
28 economic vitality of the Delta while achieving the coequal goals.

#### 29 *Policies*

30 At this time, there are no policies with regulatory effect included in this section. The Delta Plan will rely  
31 heavily on local and regional direction to achieve the recommendations cited below, and relies on the  
32 regulatory policies of other sections to ensure progress toward the coequal goals.

#### 33 *Recommendations*

34 DP R1 The Economic Sustainability Plan should include, but not be limited to, planning for the  
35 following items:

- 36 ♦ public safety, including flood protection;
- 37 ♦ continued economic sustainability of Delta agriculture;
- 38 ♦ long term strategies for legacy communities vital to the tourist economy;
- 39 ♦ flood management;

- 1           ♦ recreation; and,
- 2           ♦ infrastructure to support the proposed economic strategies.
- 3 DP R2    The Legislature should consider appropriate funding for implementation of the Economic
- 4           Sustainability Plan consistent with the Delta Plan.
- 5 DP R3    The Legislature should consider reasonable payments in lieu of taxes to replace lost local
- 6           government revenues resulting from the removal of properties from property tax rolls for
- 7           ecosystem habitat or water supply purposes.

## 8   **Land Use and Resource Management**

9   Current and future population growth will increase the demand for developable land, particularly in areas  
10 near the Bay Area, Stockton, and Sacramento. Historically, this demand has resulted in the conversion of  
11 open space, primarily agricultural land, to residential and commercial uses (Delta Protection Commission  
12 2010). In addition, development in deep floodplains and below sea level, which is hazardous for new  
13 residents and existing communities, has not been adequately constrained (Delta Vision Blue Ribbon Task  
14 Force 2008). Therefore, there is a need for the five Delta counties to establish and implement a resources  
15 management plan for the Delta, and for the Delta Stewardship Council to consider that plan and  
16 recommendations of the commission in the adoption of the Delta Plan (Public Resources Code section  
17 29703.5(a)).

### 18   ***Problem Statement***

19   There are growing concerns that increasing urbanization adjacent to the Delta and within the Secondary  
20 Zone may adversely affect resources in the Secondary Zone. The Act requires orderly, balanced  
21 conservation and development of land resources throughout the Delta.

### 22   ***Policies***

23   At this time, there are no policies with regulatory effect included in this section.

### 24   ***Recommendations***

25 DP R4    The Department of Fish and Game and U.S. Fish and Wildlife Service should develop rules for  
26           voluntary Safe Harbor agreements with property owners whose actions contribute to the  
27           recovery of listed threatened or endangered species.

28 DP R5    A Delta Flood Management Assessment District should be created. Refer to RR R6.

## 29   **Natural, Agricultural, and Cultural Heritage**

30   The Delta's history is rich with a distinct natural, agricultural, and cultural heritage. It is home to the  
31 community of Locke, the only town in the United States built primarily by early Chinese immigrants.  
32 Other legacy communities include Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton,  
33 Knightsen, Rio Vista, Ryde, and Walnut Grove. (Public Resources Code section 32301(f)). The cultural  
34 heritage, agricultural/economic base, recreational resources, and biological diversity of the Delta should  
35 be preserved and recognized in public/private facilities, such as museums, recreational trails, community  
36 parks, farm stands, community centers, and water access facilities within the Delta (Delta Protection  
37 Commission, 2010, Land Use Policy P-1).

38   The Delta is a unique and valued area, warranting recognition and special legal status from the State of  
39 California (Delta Vision Blue Ribbon Task Force 2008). Designation as a National Heritage Area would  
40 communicate the Delta's stature as one of America's most distinctive and culturally significant regions  
41 and encourage investment in recreation.

1 ***Problem Statement***

2 The coequal goals shall be achieved in a manner that protects and enhances the unique cultural,  
3 recreational, and agricultural values of the California Delta as an evolving place. To encourage economic  
4 investment in the rich cultural values of the Delta, including recreational and agricultural activities, the  
5 Delta warrants recognition and special legal status.

6 ***Policies***

7 At this time, there are no policies with regulatory effect included in this section.

8 ***Recommendations***

9 DP R6 The Council supports the designation of the Delta and Suisun Marsh as a National Heritage  
10 Area.

11 DP R7 The Council supports the development of major gateways to promote the Delta's identity,  
12 visibility, and access.

13 **Performance Measures**

- 14 ♦ Designation of the Delta and Suisun Marsh as a National Heritage Area
- 15 ♦ Completion of the Delta Economic Sustainability Plan
- 16 ♦ Creation of Delta Flood Management Assessment District
- 17 ♦ Gross revenue from agricultural in the Delta
- 18 ♦ Gross revenue from recreation and tourism
- 19 ♦ Acres of agriculture
- 20 ♦ Acres of undeveloped open space

21 **References**

22 Delta Vision Blue Ribbon Task Force. 2008. Delta Vision Strategic Plan. Sacramento, CA. October.

23 Delta Protection Commission. 2010. Land Use and Resource Management Plan for the Primary Zone of  
24 the Delta. Adopted February 25.

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# Chapter 9

## Finance Plan Framework to Support Coequal Goals

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# Chapter 9

## Finance Plan Framework to Support Coequal Goals

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America is slowly recovering from a severe recession, and California’s economy lags behind the nation’s. Together with a multi-year state budget crisis in which annual spending exceeds available revenue, financing infrastructure and new programs becomes immensely challenging for the State and local governments.

The current economic climate will limit the ability to quickly develop the full range of water or ecosystem improvements necessary to achieve the coequal goals. However, the planning timeframe for the Delta Plan runs to the year 2100, which allows time for gradual steps toward improving the situation, and to stage actions, policies, and projects over time, which fits with an adaptive management structure based on science—a system that constantly modifies, adjusts, and changes actions and projects as new information becomes available.

The Delta Plan includes policies for water conveyance, conservation, and efficiency together with ecosystem restoration, flood risk reduction, water quality protection, science, and governance. The finance plan proposes strategies to generate ongoing revenue and capital construction funds for these policies.

The Finance Plan is based on the following key tenets:

- ◆ Beneficiaries (those who benefit from the water resources of the Delta and its watershed) should pay for the benefits they receive.
- ◆ Stressors (those whose actions adversely affect the Delta ecosystem) should pay for the stresses they place on the ecosystem.

However, simply stating the principle that beneficiaries pay and those who stress the Delta ecosystem should also pay does not resolve the necessary or appropriate level of the fees. Nor does it adequately ensure funds to pay for large, statewide public benefits. Some funds are currently available and should be spent in ways that truly focus on coequal goals and support significant actions that implement the Delta Plan.

This section outlines the principles of a financing system, background information on federal, state, and local funding for water and Delta ecosystem purposes, and recommendations for financing a staged Delta Plan through the year 2100. It is envisioned that the implemented finance plan will be integrated with other ongoing programs by related agencies.

# 1 Guiding Principles

2 As the costs of Delta improvements become known and the Finance Plan is refined, the plan should be  
3 shaped by a set of guiding principles:

- 4 ♦ Implementation of the Delta Plan will require an array of funding sources and authority. Diversity  
5 in financing will enhance revenue stability. Likewise, State and federal funds for activities that  
6 implement the Delta Plan must be reserved for public benefits not otherwise required for project  
7 mitigation or by law for other purposes.
- 8 ♦ The “beneficiary pays” principle is a common financing approach for water projects. The  
9 challenge is to determine the beneficiaries and design a cost allocation method scaled to the  
10 benefit.
- 11 ♦ A companion principle to “beneficiary pays” is “stressors pay.” Human activity that causes  
12 negative operational or environmental impacts should be assessed a fee to repair the damage. An  
13 example of the stressors pay approach was the Department of Fish and Game Bay Delta fishing  
14 license stamp fee, dedicated to protecting fisheries resources in and around the Delta.
- 15 ♦ Capital construction projects, whether for water reliability purposes or improvement in the Delta  
16 ecosystem, should be undertaken simultaneously with the development of beneficiary and user  
17 fees. Delay in establishing a beneficiary/stressor fee structure will inevitably delay any needed  
18 capital improvement projects.
- 19 ♦ The Finance Plan should include mechanisms to ensure that user fees remain dedicated to their  
20 intended purpose. Given state and federal budget constraints, care must be taken to assure users  
21 that their contributions will not be diverted to other purposes.
- 22 ♦ Targeted finance plans should be developed for major Delta Plan activities (habitat restoration,  
23 flood risk reduction, regional water supply investments, and water conveyance.) Beneficiaries and  
24 stressors should be identified in each of these areas, and user fees should be developed to match  
25 these stressors and beneficiaries with planned investments in each of these areas.
- 26 ♦ Existing contributions for closely related activities should be considered for crediting. Site-  
27 specific contributions by agencies should not be credited (for example, the installation of fish  
28 screens and waste treatment costs.)
- 29 ♦ To the extent possible, user fees should be volumetrically based for water diversions and for the  
30 discharge of contaminants. Other stressors that do not lend themselves to a volumetric-based  
31 quantification will require a different fee structure.

## 32 Background

33 Operations, maintenance, and capital expenditures for water infrastructure consume a significant amount  
34 of resources in California. A cursory review of financial data from selected entities that provide water-  
35 related services in California found that expenditures in California exceed \$40 billion annually  
36 (Table 9-1). These expenditures likely include some overlap, but the expenditures are significant.

**Table 9-1**  
**Annual Budgets/Expenditures in California for Selected Agencies (\$ Millions)**

<b>Agency</b>	<b>Budget/Expenditures</b>	<b>Source</b>
Local Cities, Counties, and Special Districts-Water, 2008	\$23,100	California State Controller, 2010
Local Cities, Counties, and Special Districts-Wastewater, 2008	\$12,900	California State Controller, 2010
Local Cities, Counties, and Special Districts-Flood Control, 2008	\$2,900	California State Controller, 2010
California Department of Water Resources, Fiscal Year 2012 Budget	\$3,600	www.ebudget.ca.gov
State Water Resources Control Board, Fiscal Year 2012 Budget	\$800	www.ebudget.ca.gov
Department of Fish and Game, Fiscal Year 2012 Budget	\$400	www.ebudget.ca.gov
US Bureau of Reclamation, Central Valley Project expenditures, Fiscal Year 2012 Budget	\$200	U.S. Department of Interior Budget Justifications, 2012
U.S. Army Corps of Engineers, California expenditures, Fiscal Year 2012 Budget	\$200	Fiscal Year 2012 Civil Works Budget, U.S. Army Corps of Engineers

1 Since the CALFED Bay-Delta Program was instituted in 1995 to restore ecological health and improve  
 2 water management in the Delta, there have been significant expenditures in the Delta. Since 1995,  
 3 roughly \$400 million has been spent on average each year by federal, State, and local water users. The  
 4 Legislative Analyst’s Office estimated that \$1.3 billion should be spent annually on Delta ecosystem  
 5 restoration (Legislative Analyst’s Office 2011).

6 Traditionally, the State has financed water infrastructure with general fund obligation bonds supported by  
 7 tax revenues. These bonds were approved by the voters and repayment is guaranteed by the State’s  
 8 general taxing power. For the State Water Project, however, even though guaranteed by taxes, general  
 9 obligation bonds were paid back mainly by user fees. Since 2000, the State has issued close to \$20 billion  
 10 in general obligation bonds for water-related purposes, spread over six separate bonds (not all of these  
 11 bonds have been issued yet). A benefit of financing water projects with general obligation bonds is that  
 12 any costs allocated to the public good (such as some ecosystem benefits) are repaid by taxpayers, the  
 13 primary beneficiaries.

14 With the State’s current fiscal condition, access to the bond market has become more expensive. Coupled  
 15 with the reduced likelihood of getting voter approval for general obligation bonds, new approaches to  
 16 water infrastructure financing are needed. This also creates the need to find an approach to cover those  
 17 ecosystem costs previously paid for by general obligation bonds.

## 18 Financing Needs

19 The Finance Plan for the Delta Plan has two parts: immediate needs over the 5 to 10 years and near-term  
 20 expenditures that might occur through 2025. This framework allows time to develop a Finance Plan that  
 21 puts financing in place for operational needs while developing a broader-based financing approach for  
 22 long-term improvements based on phasing, adaptive management, and integration with ongoing  
 23 programs.

1 The ultimate costs of the Delta Plan are dependent on completion of the Bay Delta Conservation Plan,  
2 with funding of an identified export facility and a comprehensive and funded ecosystem mitigation plan  
3 needed to satisfy the requirements of federal and state law. Naturally, if the Bay Delta Conservation Plan  
4 is not completed, an alternative plan must be developed for the purposes of the Delta Plan.

## 5 Immediate Needs

6 There are three immediate financing needs:

- 7 ♦ **Urgent expenditures for water reliability and ecosystem protection:** Initial steps to protect the  
8 existing Delta water export system from flood risks, and needed ecosystem improvements to  
9 reduce damage by operations of the existing export pumps in the Delta. Those immediate needs  
10 are discussed in the various chapters of the Delta Plan. These recommendations are in addition to  
11 other ongoing efforts that should continue to be funded. Examples of these include implementing  
12 the Biological Opinions, funding levee subventions, funding science, and many more. The total  
13 cost of additional short-term needs is approximately \$XXX million annually for the next 5 years.
- 14 ♦ **Funding a strong Delta Science Program, including funds for the Independent Science  
15 Board and the state’s share of the Interagency Ecological Program.** Science funding is likely  
16 to be more than 50 percent of the needs for oversight on an ongoing basis.
- 17 ♦ **Continuing the existing operational duties imposed by the 2009 Delta Protection Act.** The  
18 Act created the Delta Stewardship Council (which includes the Delta Science Program and  
19 Independent Science Board) and the Delta Conservancy, and modified the duties of the existing  
20 Delta Protection Commission. Annual costs for the operation of all of these functions are  
21 approximately \$XX million per year.

## 22 Continuation of Near-term Planning, Science, and Related Needs

23 The Council strongly supports completion of the Bay Delta Conservation Plan. It is not known what type  
24 of facility or what related Delta ecosystem mitigation will be required. With the exception of Bay Delta  
25 Conservation Plan ongoing planning costs, which are to come from the water contractors, it is not likely  
26 that many of the additional costs will occur prior to 2017. For this reason, the Council does not  
27 contemplate need for state funds during this time for the Bay Delta Conservation Plan. Should  
28 circumstances change, the Council is open to reconsidering this question of interim funding.

### 29 *Bay Delta Conservation Plan Costs and Existing Funding Sources*

30 When the Delta Plan speaks of potential funding sources for the Bay Delta Conservation Plan, it should  
31 be understood that the same sources are also “potential” for the Delta Plan, and for many other plans and  
32 projects of State, federal, and local agencies interested in California’s water and Delta ecosystem.  
33 Inclusion here under the Bay Delta Conservation Plan designation is not a determination that the Council  
34 considers one or another of the potential sources to be solely available for the Bay Delta Conservation  
35 Plan, or for any other activity. They qualify as options as this stage.

36 On the basis of currently available information from the Bay Delta Conservation Plan, the approximate  
37 costs of a facility and related ecosystem improvements needed to gain State and federal approval is  
38 approximately \$15.8 to \$16.7 billion in capital costs and an additional \$4.9 to \$5.6 billion in operating  
39 costs over the 50-year permit period. These costs are divided among the Bay Delta Conservation Plan’s  
40 four primary functions—water conveyance, habitat restoration, management of other stressors, and  
41 program oversight—as shown in Table 9-2. The Council notes that preliminary cost estimates are just  
42 that: preliminary. California needs hard estimates, and this is one important reason why we support  
43 completion of the process.

1 **Options for Bay Delta Conservation Plan Funding**

2 Bay Delta Conservation Plan has been premised on the pledge of water contractors to pay the full cost of  
 3 any new Delta export facility and the Delta ecosystem mitigation required to meet the requirements  
 4 imposed on the Bay Delta Conservation Plan by federal and State law.

5 Pending completion of the Bay Delta Conservation Plan and a full understanding of the Delta ecosystem  
 6 improvements related to Bay Delta Conservation Plan (including flow standards), it is impossible to  
 7 project the detailed funding options that might be necessary. However, it is highly likely that user fees,  
 8 revenue bonds, and sources other than the state general fund or state general obligation bonds will be the  
 9 primary source of funding.

Table 9-2  
 Summary of Bay Delta Conservation Plan Costs and Existing Funding Sources (\$M)

Program Function	Bay Delta Conservation Plan*		
	Capital Costs	Operating Costs	Total
Water Conveyance	\$12,691	\$2,934	\$15,625
Habitat Restoration	\$2,557	\$390	\$3,947
Other Stressors	\$13	\$1,446	\$1,459
Program Oversight		\$477	\$477
<b>Total</b>	<b>\$15,261</b>	<b>\$5,247</b>	<b>\$21,508</b>

\* Over 50-year permit period, in million dollars, midpoint cost estimate.

10 **Recommended Financing Strategy for the**  
 11 **Delta Plan**

12 The Council considers it unlikely that the General Fund of the state or state general obligation bonds will  
 13 indefinitely fund implementation of the Delta Plan.

14 In general, human activities that stress the system should be the starting point of the financial strategy.  
 15 Large federal and State contributions should be secondary. Because the Delta Plan will be implemented  
 16 and water system improvements and Delta ecosystem improvements will occur through the year 2100,  
 17 any new fees established should be staged over that time.

18 ***Immediate Funding Recommendations***

19 **FP R1** No less than \$50 million should be allocated from existing bond funds, or from any new funds  
 20 authorized by voters to the Delta Conservancy to commence implementation of the ecosystem  
 21 restoration portion of the Delta Plan.

22 **FP R2** Public and private agencies with infrastructure crossing the Delta should protect their assets  
 23 from flooding.

24 ♦ The California Public Utilities Commission should immediately commence a formal  
 25 hearing to impose a reasonable fee for flood and disaster prevention of regulated privately  
 26 owned utilities that cross the Delta. Publicly owned utilities should also be encouraged to  
 27 develop similar fees. The Council, in consultation with the California Public Utilities  
 28 Commission and the Delta Protection Commission, should allocate these funds between  
 29 state and local emergency response and flood protection entities in the Delta, including the

- 1 State of California. If a regional flood management agency is authorized by law, the local  
2 share would be allocated to that agency for its purposes.
- 3 ♦ The California Public Utilities Commission should direct all regulated public utilities in  
4 their jurisdiction to immediately take steps to protect their facilities in the Delta from the  
5 consequences of a catastrophic failure of levees in the Delta, and to minimize the impact on  
6 the State's economy.
- 7 ♦ The Governor, by Executive Order, should direct state agencies with projects or  
8 infrastructure in the Delta to set aside a reasonable amount to pay for flood protection and  
9 disaster prevention. The local share of these funds should be allocated as described above.
- 10 FR R3 A regional flood management agency should be created which at first is funded with  
11 \$10 million dollars to develop a benefit assessment plan for the Delta. The council also  
12 recommends an additional \$100 million for implementation, to be funded by Propositions 1E  
13 and 84 to match on a 50 percent basis with non state funding.
- 14 FP R4 The Legislature should allocate \$50 million of Prop. 1E funds to the Department of Water  
15 Resources and direct the Department to begin the acquisition of land or easements for the  
16 proposed San Joaquin/South Delta Flood Plain.
- 17 FP R5 Appropriate funding should be continuously appropriated in support of the Department of  
18 Water Resources' Delta Levees Subventions and Special Projects, FloodSAFE, and the Central  
19 Valley Flood Protection Board.
- 20 FP R6 A clear report on total spending for water resources in California should be established. For the  
21 purpose of accountability, all existing sources of funding for water facilities and operations, and  
22 all currently authorized bond spending for water resource purposes, should be consolidated in  
23 one water budget for the State of California. The Council, which assumed the duties and  
24 responsibility of the previous CALFED Bay-Delta Authority in preparing a state-federal  
25 CALFED crosscut budget, should continue to fulfill those duties.
- 26 FP R7 User Fees/Stressors Fees to support the coequal goals and the Delta Plan.
- 27 ♦ The Legislature should grant the Council the authority to develop reasonable fees for  
28 beneficiary, and reasonable fees for those who stress the Delta ecosystem, and apply such  
29 fees to the operational costs of the Council, the Delta Conservancy and the Delta Protection  
30 Commission to allow implementation of the Delta Plan.
- 31 ♦ The costs of operations of the Council, Delta Conservancy, and Delta Protection  
32 Commission should be advanced for a period of ten (10) years. As previously discussed,  
33 the unified budget of the new governance structure is approximately \$XX million.
- 34 ♦ Repayment of these costs would be made in annual amounts commencing in 2022, from the  
35 fees imposed as recommended above. Repayment should be completed no later than 2032.
- 36 ♦ Revenue bond authority should be granted to implement the Delta Plan should a fiscal  
37 partner be found.
- 38 FP R8 The Delta Conservancy should investigate carbon offsets as a revenue source for Delta islands.
- 39 FP R9 Clarify assessment authority for local water agencies. The California State Legislature should  
40 amend AB 3030 and SB 1938 to allow local agencies to assess fees under Proposition 218.

## 1 ***Near-term Funding Recommendations***

2 FP R10 Establish a Public Goods Charge for Water. The Legislature should create a public goods  
3 charge (similar to the energy public goods charge created in 1996) on urban water users, and  
4 agricultural users as well. This fund would provide for ecosystem costs that were once paid  
5 with general obligation bonds, or could be used for State water management costs such as  
6 developing the California Water Plan Update.

7 FP R11 By January 2015, the Department of Water Resources should complete a report on  
8 recommendations for prioritized State investments for levee operations, maintenance, and  
9 improvements in the Delta. The report should be developed, based upon a Delta-wide  
10 comparative benefit/cost analysis. Benefits should be specifically identifiable and calculable  
11 but broadly based, not limited to an analysis of the value of land behind a levee. Such a report  
12 should be developed in collaboration with the Council, local agencies, federal agencies and the  
13 proposed new Delta Flood Management Assessment District.

## 14 **Funding Sources**

15 Some potential funding sources that could be part of a financing strategy are described in this section. In  
16 developing the financing strategy, the approaches used by other major programs around the country were  
17 also explored. Some of the more innovative approaches are described here.

### 18 ***Capital Funding Sources***

19 To implement the Delta Plan infrastructure improvements, and for financing habitat acquisitions and  
20 improvements, capital funding sources will need to be identified. Capital funding sources may include  
21 federal appropriations, State general fund appropriations, State-issued debt, local debt, and private  
22 funding.

#### 23 ***Federal Appropriations***

24 Federal appropriations pay for the taxpayers' share of capital costs and require the approval of Congress.  
25 Federal authorization already exists for several Delta programs, and the challenge will be for Congress to  
26 appropriate funds annually. Similar to the State's financial condition, there are increasing demands from  
27 all sectors of the federal budget, which makes obtaining federal funding more difficult.

#### 28 ***General Fund Appropriations***

29 General Fund appropriations may pay for the taxpayer share of capital and operating costs and may be  
30 used for any purpose. However, the State's fiscal condition will limit their availability in the future.

#### 31 ***State-issued Debt***

32 The State traditionally has issued two types of debt for water related infrastructure: general obligation  
33 bonds and revenue bonds. General obligation bonds must be approved by voters, and their repayment is  
34 guaranteed by the State's general taxing power, resulting in typically low interest costs. Revenue bonds  
35 do not require voter approval because they are secured by a designated revenue stream, such as water  
36 sales. Revenue bonds may be a preferred mechanism.

#### 37 ***Local Government Debt***

38 Construction expenditures might be funded by debt issued by local governments or water agencies.  
39 Depending on the type of project being financed, local entities may be able to issue debt based on their  
40 increased revenue streams or may be able to establish some type of improvement or assessment district.

## 1 ***Conservation Organizations***

2 A variety of conservation organizations provide funds for land and water acquisition and management.  
3 The Nature Conservancy, for example, has been active in the region. Nonprofit (501(c) (3)) organizations  
4 could be created to accept tax-deductible gifts that could be operated for Delta projects and programs.

## 5 **Repayment and Operations and Maintenance Funding Sources**

6 A finance plan requires identifying revenue sources to repay capital costs and to pay for ongoing  
7 operations, maintenance and replacement costs.

## 8 ***User Charges for Water***

9 Water agencies generate revenue by selling water. Water sale revenues are normally used to recover water  
10 supply and quality costs, including operations and maintenance expenses and debt repayment for  
11 infrastructure investments in facilities. The cost of developing new water supplies is usually factored into  
12 the price for all water supplies. However, surface water sale revenues are limited by the elasticity of  
13 demand. If demand is at all elastic (price responsive), then water users will take less water as price  
14 increases (or shift to groundwater if available), and water revenues may fall below expectations. Funding  
15 very large investments in new water supplies may exceed the capacity of current users given the  
16 economic returns they receive for water. This result is a common feature of markets. Allowing  
17 reallocation of resources among users may be required for the long-term economic vitality of the State.

## 18 ***Fines and Forfeitures***

19 Significant dollars are raised annually as the result of administrative and civil enforcement actions. Water  
20 Code section 13260 provides that the State Water Resources Control Board can collect fees to deposit in  
21 the Waste Discharge Permit Fund. For fiscal year 2008–2009, revenues and expenditures were about  
22 \$80 million. Most expenditure is for National Pollutant Discharge Elimination System permit and  
23 stormwater programs, and for waste discharge requirements. Within these programs, most costs are for  
24 permitting, enforcement, and compliance (State Water Resources Control Board 2009). The Council  
25 should research the potential for assigning fees, fines, and forfeitures generated from actions detrimental  
26 to the Delta directed to Delta activities.

## 27 ***Reallocating Funds***

28 Given the number of agencies involved with Delta operations, funds might be generated by reallocating  
29 dollars among agencies.

## 30 ***Cost Efficiencies***

31 Water supply and quality improvements, improved ecosystem health, and levee improvements may result  
32 in verifiable cost savings. In general, such cost savings represent a potential source of funding for the  
33 Delta Plan. Additional studies are needed to determine whose costs and how much cost might be saved.

## 34 ***Carbon Offsets/Tule Farming***

35 Carbon markets are increasingly accepted by State and federal authorities and private markets as a means  
36 to offset carbon emissions. A seller can develop carbon offsets to be sold on the market. The offset can be  
37 developed based either on sequestration or reduction of greenhouse gas emissions. The cost of an offset  
38 has recently ranged from \$8 to \$30 per ton-year (American Society of Farm Managers and Rural  
39 Appraisers California Chapter 2009).

40 Conversion of farmed Delta islands with peat soils to natural wetlands or water bodies could provide two  
41 types of offsets. The Delta subsides at a rate of 1 to 3 inches a year, mostly in the form of carbon dioxide

1 releases (Ingebritsen et al. 2000). The amount of carbon dioxide emissions from farmed Delta islands is  
2 2.5 to 6.5 tons per acre per year.

3 When the land is converted to cattails or tules, this loss is stopped. Dead plant material, largely carbon,  
4 accumulates in the form of new peat soil. The U.S. Geological Survey has been measuring carbon  
5 sequestration on an experimental plot on Twitchell Island for about 15 years. The additional carbon  
6 dioxide sequestered by cattails or tules amounts to another 12 to 20 tons per acre per year using high and  
7 low ranges, and potential revenue per acre is \$100 to \$800 per acre per year. It appears that carbon  
8 dioxide offsets might repay a significant share of Delta island acquisition and wetland restoration costs.  
9 Net revenue of \$200 per acre per year is worth about \$3,000 to \$4,000 per acre in net present value terms  
10 as compared to the cost of land, which may be \$3,000 to \$10,000 per acre (American Society of Farm  
11 Managers and Rural Appraisers California Chapter 2009).

## 12 User Fees and Stressor Fees

13 User fees and stressor fees are conceptually similar but somewhat different. User fees may be assessed  
14 because the user benefits from improvements funded by the fee. Stressor fees are justified because fee  
15 revenues are used to reduce unwanted stressors, and because the fees provide incentive to reduce  
16 stressors. User fees are collected based on amount of a resource used. Stressor fees are collected based on  
17 the amount of stressor released or caused. In either case, physical measurement of the amount of use or  
18 stressor is required.

### 19 *Diversion Fees*

20 Diversion fees are commonly assessed based on both use and stress. That is, diversions may benefit from  
21 expenditures, but they may also contribute to stress.

22 A number of factors limit the feasibility of additional diversion fees in California. In particular, water  
23 users adamantly oppose any new diversion fees, unless perhaps the fees are developed by water users  
24 themselves. In 2005, for example, a letter from 39 water district and city managers to Governor  
25 Schwarzenegger included the following request (Senator Perata, et al. 2005):

26 *...do not include CALFED user fees as part of the 2005-06 state budget. Any such*  
27 *proposal is entirely inappropriate, given that all versions of the CALFED needs*  
28 *assessment aired to date have avoided grappling directly with the "beneficiary pays"*  
29 *principle. CALFED cost allocations should be proposed only after CALFED has*  
30 *conducted an open public hearing process in which all stakeholders have had the*  
31 *opportunity to present testimony on appropriate beneficiary payments. Until this process*  
32 *has been completed, no financing plan for CALFED can be considered complete and*  
33 *ready for implementation as part of the state budget.*

34 Existing laws, such as Proposition 218, limit the ability of any state or local government to establish new  
35 diversion fees. Enabling legislation would be required.

36 The potential for diversion fees is also limited by the inconsistency and lack of water diversion  
37 measurement in some places. Diversions are measured by a variety of methods, and some diversions are  
38 not routinely measured. The costs of standardized measurement could be significant relative to the  
39 amount of fees collected.

40 Several efforts in the past estimated the fees that could be collected if the fees were similar to Bureau of  
41 Reclamation restoration fees. In 2000, one author estimated that average non-Central Valley Project  
42 contract diversions of 13.182 million acre feet with fee levels similar to Central Valley Project restoration  
43 fees could provide about \$105 million in annual revenues (Wahl 2000). In 2004, CALFED estimated that  
44 potential fee levels per acre-foot-year of diversion would raise \$25 million in annual funds based on

1 “normal” non-Central Valley Project contract diversions of 16.522 million acre feet. These fee levels  
2 were \$1.50 for all users, or \$1.25 for agriculture and \$2.50 for urban users, or \$3.25 for Delta exporters  
3 and \$1 for all others (CALFED 2004). CALFED also estimated that a residential fee of \$1 per month per  
4 household in the CALFED solution area could raise \$106 million annually.

### 5 ***Fishing Fees and Payments***

6 From 2004 through 2009, recreational fishing within the Bay-Delta watershed below the first dam  
7 required a Bay-Delta Sport Fishing Enhancement Stamp. In 2009, about 300,000 stamps were sold at a  
8 retail cost of \$6.30, and gross revenues were about \$1.9 million. These funds were used to leverage a  
9 75 percent cost share from the federal Sport Fish Restoration Act. In 2009, Assembly Bill 1052 repealed  
10 the stamp (California Department of Fish and Game 2011a). The Council should consider supporting  
11 legislation to renew this funding source.

12 A stressors-based finance charge would collect fees based on removals of desirable species. In 2011,  
13 inland steelhead anglers are required to purchase a Steelhead Report Card at a cost of \$6.48, and a North  
14 Coast Salmon Report Card costing \$5.66 is required for all anglers taking salmon in the Smith River  
15 System or Klamath-Trinity River System (California Department of Fish and Game 2011b). Annual  
16 revenues from 2001 to 2006 from the steelhead card averaged about \$200,000 (Jackson 2007). Any  
17 person fishing commercially for salmon in California must purchase a commercial fishing salmon stamp  
18 for \$85. Similar fees might be collected when substantial salmon fishing is again allowed in the  
19 Bay-Delta system. In 2006, about 500,000 freshwater and 1 million saltwater days were taken for salmon  
20 fishing (California Department of Fish and Game 2010). Revenue potential from recreational salmon  
21 cards is perhaps \$500,000 to \$1 million annually.

### 22 ***Hydropower Fees***

23 Fees could be collected from hydropower generators in the Bay-Delta system. The State Water Resources  
24 Control Board collects fees from licensed Federal Energy Regulatory Commission projects of \$0.017 per  
25 kilowatt capacity, and higher fees are collected from facilities that recently renewed their Federal Energy  
26 Regulatory Commission licenses (State Water Resources Control Board 2010). These fees must be used  
27 to cover authorized costs of the Water Rights Program. The potential for additional revenues from  
28 hydropower generators is unknown.

### 29 ***Other Stressor Fees***

30 A variety of stressor fees might be used to help finance programs within the Delta Plan. Seven types of  
31 stressor fees have been considered:

- 32 1. Water quality loading charge: charge measured pollutant loads in water discharges.
- 33 2. Land use charge: charge land use practices that contribute to stressors.
- 34 3. Retail sales fees: charge retail sales of products that may become stressors.
- 35 4. Habitat alteration fees: charge existing or proposed land alterations that contribute to habitat  
36 stressors.
- 37 5. Special diversion fees: charge water diversions that contribute more than average to entrainment,  
38 stranding, or flow-related habitat loss.
- 39 6. Recreation use fees: charge for recreation that contributes to stressors.
- 40 7. Hatchery fees: charge hatcheries for management practices that damage Delta resources.

1 Of these seven stressor-based fees, the water quality loading charge appears to be relatively most feasible.  
2 The “polluter pays” principle is well established in law. Many waste dischargers already pay fees that are  
3 set by the State Water Resources Control Board and deposited into the Waste Discharge Permit Fund. For  
4 fiscal year 2008–2009, revenues were about \$80 million.

5 Most of the loads of some pollutants, ammonia and certain chemicals in particular, come from known  
6 discharges where the amount of load can be measured. The cost of removing the stressors by another  
7 means may determine a fair and efficient charge level. There are important measurement and  
8 administrative costs, but these could be small compared to revenues.

9 The other stressor based fees are generally not as straightforward. For land use charges, a fee for land  
10 management practices that release methyl mercury, perhaps, the stressor being introduced is often diffuse,  
11 not well measured, and the amount may vary substantially based on location and local conditions. It may  
12 be unfair or expensive to set land use changes based on diffuse and hard-to-measure stressors. Proposition  
13 218 procedures must be applied for stormwater fees, so they would likely apply to land use charges as  
14 well.

15 A charge on retail sales of stressor materials such as pesticides or fertilizers might also be problematic  
16 because materials are used in a wide variety of locations and situations. The legal feasibility of such  
17 charges is not clear.

18 There is good potential to establish charges for some types of habitat alteration practices, such as wetland  
19 conversions. However, such charges might fall under Proposition 218. The special diversion charge  
20 would be difficult to justify because the amount of unusual damage via entrainment, stranding, or flow  
21 habitat loss would often be difficult to quantify and value. Hatchery management fees might be inefficient  
22 compared to other efforts to improve hatchery practices.

23 The revenue potential from stressors fees is unknown, but not believed to be large. Also, it is likely that  
24 any stressor fees could be spent for a very limited range of activities that would benefit the persons paying  
25 the fee. There is some potential for revenues in the form of fishing stamps (probably less than \$5 million  
26 annually) and additional water quality loading charges.

### 27 ***Water Marketing Fees***

28 Water marketing fees would be applied to water transfers in the Delta watershed. These fees would be  
29 above and beyond any existing watershed diversion or export fees. The State Water Resources Control  
30 Board currently collects fees associated with change in water rights required for transfers.

31 The number of water transfers that occur between existing water agencies is not large compared to total  
32 statewide water use. During the drought years of 2008 and 2009, about 400,000 acre-feet of cross-Delta  
33 transfers were reported annually.<sup>12</sup> If such transfers paid a fee of \$10 per acre-foot, revenues might be  
34 \$4 million annually. However, the volume of transfers in most years would be much less than in 2008 and  
35 2009.

### 36 ***Public Goods Charges***

37 In 1996 a public goods charge for electricity sold by CPUC-regulated for-profit public utilities was  
38 approved in California as part of the energy sector deregulation. The public goods charge is a fee applied  
39 to a utility bill to fund public-interest programs related to utility services. More recently, interest in a  
40 public goods charge for water has increased as a potential tool for achieving the objectives of Assembly  
41 Bill 32, known as “The Global Warming Solutions Act of 2006.” (Griffin, Leventis, and McDonald  
42 2010). In a study prepared for the California Public Utilities Commission by the U.C. Berkeley Goldman

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<sup>12</sup> *Water Strategist*, February 2009 issue provides 2008 summary (Smith 2009).

1 School of Public Policy, a public goods charge for water was proposed that consisted of a volumetric  
2 charge on individual water utility bills.

3 While the design of a public good charge would need to be developed, given the passage of Proposition  
4 26, a two-thirds vote would be required to implement it. The primary purpose of a public goods charge  
5 should be to fund investments or activities that have broad, statewide benefit. These include statewide  
6 planning, ecosystem enhancements, or investments that reduce reliance on imported supplies.

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**Appendix A**  
**I. Administrative Procedures Governing Appeals**  
**II. Statutory Provisions Requiring Other**  
**Consistency Reviews**  
**III. Other Forms of Review or Evaluation by**  
**the Council**

[ADOPTED 9/23/2010]

**DELTA STEWARDSHIP COUNCIL**

- I. ADMINISTRATIVE PROCEDURES GOVERNING APPEALS**
- II. STATUTORY PROVISIONS REQUIRING OTHER CONSISTENCY REVIEWS**
- III. OTHER FORMS OF REVIEW OR EVALUATION BY THE COUNCIL**

**PART I- ADMINISTRATIVE PROCEDURES GOVERNING APPEALS**

**Introduction**

1. Purpose. These administrative procedures govern how the Delta Stewardship Council considers appeals with regard to:
  - a) Adequacy of certifications of consistency with the Delta Plan submitted to the council by a state or local public agency pursuant to Water Code sections 85225.10 and 85225.30; and
  - b) Determinations by the Department of Fish and Game that the Bay Delta Conservation Plan has met the requirements of Water Code section 85320 for inclusion in the Delta Plan.

NOTE: Authority cited: Water Code sections 85001, 85020(h), 85022, 85057.5, 85200, 85210, 85212, 85225, 85225.5, 85225.10, 85225.15, 85225.20, 85225.25, 85225.30, 85300, 85320(e).

**Review of certifications of consistency with Delta Plan**

2. Any state or local public agency proposing to undertake a covered action, as defined in Water Code section 85057.5 is encouraged to consult with the council at the earliest possible opportunity, preferably no later than 30 days before submitting its certification to the council pursuant to Water Code section 85225, to ensure that the project will be consistent with the Delta Plan. The council's staff will meet with the agency's staff to review the consistency of the proposed action and to make recommendations, as appropriate. During this early consultation, the agency's staff may also seek clarification on whether the proposed project is a "covered action"; provided that the ultimate determination on whether it is a covered action shall be made by the agency, subject to judicial review.

NOTE: Authority cited: Water Code sections 85212, 85225, 85225.5, 85225.30.

3. At least 10 days prior to its submission of a certification to the council, a state or local public agency that is not subject to open meeting laws (that is, the Bagley-Keene Open Meeting Act [Gov.Code sec.11120 et seq.] or the Brown Act [Gov.Code sec.54950 et seq.]) with regard to its certification, shall post, for public review and comment, its draft certification conspicuously on its website and in its office, mail it to all persons requesting notice, and include any public comments received in the record submitted to the council in the case of an appeal. A state or local public agency that is subject to open meeting laws with regard to its certification is encouraged to take those actions.

NOTE: Authority cited: Water Code sections 85225, 85225.30.

4. a) Any certification of consistency filed by a state or local agency pursuant to Water Code section 85225 shall set forth detailed findings that the covered action is consistent with the Delta Plan. The council shall prepare a checklist that agencies may use to assist them in preparing the certification and making the required findings.

b) A state or local agency shall submit to the council, no later than 10 days after receiving notice of an appeal pursuant to Paragraph 8, the record that was before the state or local agency at the time it made its certification, including a table of contents of documents contained therein and a brief chronology of events and actions relevant to the covered action. The record shall be certified by the state or local agency as being “full and complete.” Given the tight, statutory deadlines for hearing and deciding appeals, a state or local agency is nevertheless strongly encouraged to submit the record at the time it files its certification of consistency, to ensure the opportunity for thorough review by the council in the event of an appeal.

c) The failure by a state or local agency to submit the record to the council on a timely basis as required by subparagraph (b), shall be grounds for the council to affirm the appeal on the basis that there was not substantial evidence presented to support the certification of consistency.

d) Any filings required by this Paragraph (4) shall be submitted in electronic form to facilitate availability and public access, and shall be public records.

NOTE: Authority cited: Water Code sections 85225, 85225.30.

5. Any person, including any member of the council or its executive officer, who claims that a proposed covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, that action will have a significant adverse impact on the achievement of one or both of the goals of the Act or implementation of government sponsored flood control programs to reduce risks to people and property in the Delta, may file an appeal with regard to a certification of consistency submitted to the council no later than 30 calendar days after that submittal.

NOTE: Authority cited: Water Code sections 85225.10 (a), 85225.15, 85225.30.

6. The appeal shall clearly and specifically set forth the basis for the claim that the covered action is inconsistent with the Delta Plan. The appeal shall be in writing and set forth the following information:

- a) Appellant's name and address;
- b) The name and address of the party, if any, whose proposal is the subject of the appeal;
- c) A description of the covered action that is the subject of the state or local public agency certification;
- d) The identity of the state or local government body whose certification is being appealed;
- e) The specific grounds for appeal; and
- f) A detailed statement of facts on which the appeal is based.

The appeal shall be filed in electronic form.

NOTE: Authority cited: Water Code sections 85225.10 (b), 85225.30.

7. The appeal shall be considered "filed" with the council when the appellant's appeal is received, determined by staff to contain all of the information listed in Paragraph 6, and a hard-copy is printed and stamped "Filed" by the council staff with the date of filing indicated.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.30.

8. Within five working days of the filing of an appeal with the council, the executive officer shall:

- a) Post a notice and brief description of the appeal and its effective date in a conspicuous location in the council's office and on its website;
- b) Mail to the affected state or local public agency and to any third party whose proposal is the subject of the certification, a copy of the notice and a brief description, with a copy of the appeal documents filed with the council;
- c) Mail copies of the appeal to each member of the council, and to the Delta Protection Commission for informational purposes consistent with Public Resources Code section 29773; and

d) Mail notice to the appellant that the appeal has been filed and stating the effective date of filing.

NOTE: Authority cited: Water Code sections 85225.30.

9. The council or its executive officer may request from the appellant further information necessary to clarify, amplify, correct, or otherwise supplement the information submitted with the appeal, within a reasonable period. The council or by delegation its executive officer may dismiss the appeal for failure of the appellant to provide information requested within the period provided, if the information requested is in the possession of or under the control of the appellant.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.25, 85225.30.

10. The council or its executive officer may supplement the record submitted by the state or local agency if the council or its executive officer determines that additional information was part of the record before the agency, but was not included in the agency's submission to the council.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.25, 85225.30.

11. The appellant, the state or local agency, the Delta Protection Commission, or any other person may testify before the council regarding an appeal. Presentations may be oral or in writing, shall address only whether the record supports the certification of consistency, and shall be as brief as possible. Written submissions should be provided to the council at least 10 days prior to the hearing to ensure that they, or in appropriate cases, summaries, may be circulated to council members for their review ahead of the hearing. The council's presiding officer may establish reasonable time limits for presentations.

NOTE: Authority cited: Water Code sections 85225.10, 85225.20, 85225.25, 85225.30.

12. All written submissions to the council may be in electronic form.

NOTE: Authority cited: Water Code section 85225.30.

13. The council shall hear all appeals of certifications of consistency filed pursuant to Water Code section 85225 within 60 days of filing unless:

a) The parties agree to a reasonable extension approved by the executive officer, taking into account the circumstances of the matter subject to appeal and the council's hearing schedule and associated workload, or

b) The council, or by delegation its executive officer, determines that the issue raised on appeal is not within the council's jurisdiction or does not raise an appealable issue.

NOTE: Authority cited: Water Code sections 85225, 85225.20, 85225.30.

14. The council shall make its decision on the appeal within 60 days of hearing the appeal, and shall make specific written findings defining the covered action under review and either denying the appeal or remanding the matter to the state or local public agency for reconsideration of the covered action based on the finding that the certification of consistency is not supported by substantial evidence in the record before the state or local public agency that filed the certification.

NOTE: Authority cited: Water Code sections 85225.20, 85225.25, 85225.30.

15. No covered action which is the subject of an appeal shall be implemented unless one of the following conditions has been met:

a) The council has denied the appeal;

b) The public agency has pursuant to Water Code section 85225.5 decided to proceed with the action as proposed or modified and has filed with the council a revised certification of consistency addressing each of the findings made by the council, 30 days has elapsed and no person has appealed the revised certification; or

c) The council or its executive officer has dismissed the appeal for one or both of the following reasons:

1. The appellant has failed to provide information in her possession or under her control within the time requested or
2. The issue raised is not within the council's jurisdiction or fails to raise an appealable issue.

NOTE: Authority cited: Water Code sections 85225.5, 85225.25, 85225.30.

### **Review of Bay Delta Conservation Plan**

16. If the Department of Fish and Game (department) determines that the Bay Delta Conservation Plan (BDCP) referred to in Water Code section 85053 meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan, it shall file the BDCP and its determination with the council.

NOTE: Authority cited: Water Code sections 85053, 85225.30, 85320.

17. Upon receipt of the department's determination, the executive officer of the council shall:

a) Post a notice and brief description of the BDCP, the department's determination, the date of filing and the right of any person to appeal that determination on its website and in a conspicuous location in the council's office;

b) Mail a notice and brief description of the BDCP, the department's determination and the right of appeal to any person requesting notice; and

c) Mail copies of the determination to each member of the council.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

18. Any person, including any member of the council or its executive officer, may appeal to the council the determination of the department that the BDCP meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

19. a) Any appeal to the council made pursuant to Paragraph 18 shall be made within 30 days of the later of the following:

1. the filing with the council of the department's determination that the BDCP meets all the requirements of Water Code section 85320 for inclusion in the Delta Plan, or
2. the conclusion of the council's hearing or hearings held pursuant to Water Code section 85320(d).

b) The appeal shall be in writing and filed in electronic form. It shall clearly set forth the specific grounds for the appeal and the specific facts upon which it is based. These shall include a list of each specific requirement of Water Code section 85320 that the BDCP allegedly fails to meet. The appeal shall be considered filed with the council when the appellant's appeal is received, determined by staff to contain all the information required in this paragraph, and a hard-copy is printed and stamped "Filed" by the council staff with the date of filing indicated.

c) If an appeal is filed before the council publicly notices a hearing to be held pursuant to Water Code section 85320(d), the council, in its discretion, may combine the hearing on appeal and the hearing pursuant to Water Code section 85320(d).

NOTE: Authority cited: Water Code sections 85225.30, 85320.

20. Within five working days of the filing of an appeal pursuant to Paragraph 18, the executive director shall:

- a) Post a notice and brief description of the appeal on its website and in a conspicuous location in the council's office;
- b) Mail a notice and brief description of the appeal to any person requesting copies of such appeals; and
- c) Mail copies of the appeal and a brief description of the appeal to each member of the council.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

21. The council or its executive officer may request from the appellant or the department additional information necessary to clarify, amplify, correct, or supplement the information submitted with the appeal within a reasonable period.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

22. Any appeal made pursuant to Paragraph 18 may be dismissed if the council or its executive officer determines that it does not raise an appealable issue or if the appellant has failed to provide requested information to support her charge within a reasonable time, if that information is in the possession of or under the control of the appellant.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (e).

23. The council shall determine, based upon a preponderance of the evidence, whether the department correctly determined that the BDCP meets all of the requirements of Water Code section 85320 for inclusion in the Delta Plan. In reaching its decision, the council shall give weight to the reasoning and factual findings of the department. The council may seek clarification from the department of its reasoning and factual findings prior to the council making its final determination.

NOTE: Authority cited: Water Code section 85225.30, 85320(b), (e).

23.5 a) The council shall conduct any hearing on an appeal made pursuant to Paragraph 18 in a manner deemed most suitable to ensure fundamental fairness to all parties concerned, and with a view toward securing all relevant information and material necessary to render a decision without unreasonable delay.

b) The hearing need not be conducted according to technical rules relating to evidence and witnesses. Any relevant evidence shall be considered if it is the sort of evidence on which responsible persons are accustomed to rely in the conduct of serious affairs, regardless of the existence of any common law or statutory rule which might make improper the admission of such evidence over objection in a court proceeding.

Unduly repetitious or irrelevant evidence shall be excluded upon order of the council or its chairperson.

c) Subject to Paragraph 23, evidence before the council includes, but is not limited to, the record before the department. The record will not include a transcript of any proceedings before the department unless provided by a party to the proceedings or requested by the council.

d) Any interested person may testify before the council regarding an appeal concerning the BDCP. Speakers' presentations shall be to the point and shall be as brief as possible. Visual and other materials may be used as appropriate. The council may establish reasonable time limits for presentations; such time limits shall be made known to all affected persons prior to any hearing. Where speakers use or submit to the council visual or other materials, such materials shall become part of the hearing record and shall be identified and maintained as such. Speakers may substitute reproductions of models or other large materials but shall agree to make the originals available upon request of the executive director.

e) Council members may ask questions of the appellant, the department's representative(s), any third party appearing at the hearing or staff. Questioning of speakers at the hearing by other persons shall not be permitted except by permission of the Chairperson.

f) Interested persons may submit written comments concerning an appeal. Any such comments will be considered by the council if they are received by the council at or before the hearing on the appeal; provided that those written comments should be submitted to the council at least 10 days prior to the hearing to ensure that they, or in appropriate cases, summaries, may be circulated to council members for their review ahead of the hearing.

g) The council may continue the hearing where it determines that a continuance would be appropriate.

NOTE: Authority cited: Water Code sections 85225.30, 85320(e).

24. The council's decision shall include specific written findings. The council shall post its decision on its website and mail copies to the department and all parties requesting notice.

NOTE: Authority cited: Water Code sections 85225.30, 85320(e).

25. If the council decides that the department incorrectly determined that the BDCP meets all of the requirements of section 85320 for inclusion in the Delta Plan, and consequently grants the appeal, the department may revise its determination to meet the issues raised by the council, or may respond to the council's findings in detail, setting forth reasons why it has concluded that the BDCP meets all of the requirements of

section 85320 for inclusion in the Delta Plan. Unless the council decides that the department's determination, as submitted or revised, correctly concludes that the BDCP meets all of the requirements of section 85320 for inclusion in the Delta Plan, the BDCP shall not be incorporated in the Delta Plan and the public benefits associated with the BDCP shall not be eligible for state funding.

NOTE: Authority cited: Water Code sections 85225.30, 85320 (a), (b), (e).

### **Ex Parte Contact Restrictions Applicable to All Appeals**

26. Hearings on appeals are subject to the ex parte communication restrictions of California Administrative Procedures Act (Gov. Code § 11430.10 et seq.). Under that Act, an ex parte communication is a "communication, direct or indirect, regarding any issue in the proceeding, to the [council or council member] from an employee or representative of an agency that is a party or from an interested person outside the agency, without notice and opportunity for all parties to participate in the communication." (Gov. Code § 11430.10.) The restrictions apply from the date that the appeal is filed to the date that the council reaches a final decision on the appeal.

NOTE: Authority cited: Government Code sections 11430.10, 11430.80, Water Code section 85225.30.

27. To ensure compliance with these provisions, members should avoid ex parte communications while an appeal is pending. If they nevertheless receive one, such as by an individual sending a letter to a member concerning a pending matter, the member should notify the council's legal adviser or executive officer so that appropriate measures can be taken.

NOTE: Authority cited: Government Code sections 11430.10, 11430.80, Water Code section 85225.30.

28. At the first appropriate meeting after an appeal is anticipated or filed, the council's legal adviser will remind the council of this restriction and answer questions about its scope.

NOTE: Authority cited: Government Code sections 11430.10, 11430.80, Water Code section 85225.30.

### **Official Notice**

29. Notwithstanding any provision of these procedures to the contrary, the council may take official notice in any hearing that it conducts, of any generally accepted technical or scientific matter within the council's jurisdiction, and of any fact that may be judicially noticed by the courts of this State.

NOTE: Authority cited: Government Code section 11515, Water Code section 85225.30.

### **Filings and Mailings**

30. All filings and mailings required by sections 1-29 of these procedures may be made electronically.

NOTE: Authority cited: Water Code section 85225.30.

### **Consolidation of Appeals**

31. The council, at its discretion, may consolidate appeals raising similar issues.

NOTE: Authority cited: Water Code section 85225.30.

## **PART II—STATUTORY PROVISIONS REQUIRING OTHER CONSISTENCY REVIEWS (AFTER ADOPTION OF THE DELTA PLAN)**

In several other sections of SB X7 1, the council is directed to review for consistency with the Delta Plan, various plans of specified public agencies. This Part is directed at those reviews, which fall outside the scope of the procedures covered by Part I.

### **1. Delta Protection Commission’s Economic Sustainability Plan.**

Public Resources Code section 29759 requires the Delta Protection Commission (DPC), by July 1, 2011, to adopt an economic sustainability plan. That plan must include information and recommendations that inform the council’s policies regarding the socioeconomic sustainability of the Delta’s region.

Public Resources Code section 29761.5(b) requires the DPC to transmit copies of the plan to the council within 60 days of adoption. The council is required, within 180 days of the adoption of the plan, to review the plan for consistency with the Delta Plan.

### **2. Local and Regional Planning Documents.**

Water Code section 85057.5(b)(3), excepts from the definition of “covered action”, regional transportation plans prepared pursuant to Government Code section 65080.

Paragraph (4) of that same section, excepts from the definition of “covered action”, plans, programs, projects or activities within the secondary zone of the Delta that the applicable metropolitan planning organization under Government Code section 65080 has determined is consistent with either a sustainable communities strategy or an alternative planning strategy that would achieve specified greenhouse gas emission reduction targets as determined by the Air Resources Board.

Because they are not “covered actions”, these types of local and regional planning documents are not subject to the statutory provisions governing consistency of state and local public agency actions (Water Code secs. 85225 et seq.), or the council’s Administrative Procedures Governing Appeals (Part I, above), with one exception noted in paragraph (d), below.

However, Water Code section 85212 provides a separate requirement and process for consistency review by the council of these types of local and regional planning documents.

In particular:

- (a) The council is required to review and provide timely advice to local and regional planning agencies regarding the consistency of local and regional planning documents, including sustainable communities strategies and alternative planning strategies prepared pursuant to Government Code section 65080, with the Delta Plan.
- (b) The council’s input must include, but not be limited to, reviewing the consistency of local and regional planning documents with the ecosystem restoration needs of the Delta and reviewing whether the lands set aside for natural resources protection are sufficient to meet the Delta’s ecosystem needs.
- (c) A metropolitan planning organization preparing a regional transportation plan that includes land within the primary or secondary zones of the Delta must consult with the council early in the planning process regarding the issues and policy choices relating to the council’s advice.
- (d) No later than 60 days prior to the adoption of a final regional transportation plan, the metropolitan planning organization must provide the council with a draft sustainable communities strategy and an alternative planning strategy, if any. Concurrently, the metropolitan planning organization must provide notice of its submission to the council in the same manner in which agencies file a certificate of consistency with regard to covered actions.
- (e) If the council concludes that the draft strategies are inconsistent with the Delta Plan, the council must provide written notice of the claimed inconsistency to the metropolitan planning organization no later than 30 days prior to the adoption of the final regional transportation plan.

(f) If the council provides timely notice of a claimed inconsistency, the metropolitan planning organization's adoption of the final regional transportation plan must include a detailed response to the council's notice.

### **PART III--OTHER FORMS OF REVIEW OR EVALUATION BY THE COUNCIL**

1. Interested parties, including federal, state and local public agencies, are encouraged to confer with the council or its executive officer over the scope and potential impacts of the interim plan developed under Water Code section 85084. Interested parties will be provided an opportunity to comment and provide input on the interim plan as it is developed.
2. Similarly, prior to adoption of the Delta Plan, project proponents are encouraged to consult with the council or its executive officer early in the planning stages of projects that may constitute "covered actions" under Water Code section 85057.5 once the Delta Plan is adopted. Subject to available resources, the council may review and comment on planning documents and environmental review documents regarding potential "covered actions".
3. Subject to available resources, the executive officer or his designee may meet with interested parties, upon their request, to help mediate relevant disputes, including disputes, once the Delta Plan is adopted, over whether a project constitutes a "covered action" under Water Code section 85057.5. The intent of this mediation will be to provide an objective and informal forum for dispute resolution that will serve as a more efficient alternative to costly and time-consuming litigation.
4. Interested parties, including federal, state and local agencies, are encouraged to confer and coordinate with the council or its executive officer with regard to agency plans, studies, strategies, and recommendations required, or otherwise suggested, to be considered by the council for incorporation into the Delta Plan.