

DELTA VISION STRATEGIC PLAN

Fourth Staff Draft

VOLUME 2: STRATEGY DESCRIPTIONS

**CONTENT HAS NOT BEEN APPROVED BY DELTA VISION BLUE RIBBON
TASK FORCE OR DELTA VISION COMMITTEE**

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<http://www.deltavision.ca.gov>

Comments to improve this draft are welcome at any time. Please send them to:

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Comments received before the following dates will be reviewed by staff as the draft strategic plan is revised for discussion at the subsequent Delta Vision Blue Ribbon Task Force meeting:

September 30

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Volume 2: Strategy Descriptions

The following descriptions offer greater detail on the specific strategies and actions proposed in this Strategic Plan.

Goal #1 of the Strategic Plan – “Establish the Delta ecosystem and a reliable water supply for California as the primary, co-equal goals for sustainable management of the Delta” – is an overarching priority that informs all strategies and actions. It does not have any specific strategies associated with it. The numbering in this volume therefore begins with Strategy 2.1 (the strategies are numbered according to the goals of which they are a part; e.g. Strategy 2.1 pertains to goal 2, etc).

For the context and overall strategic direction in which these strategies should be understood, please refer to Volume 1.

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1
2 **Strategy 2.1. Utilize State and Federal special**
3 **designation areas to reinforce the value and**
4 **uniqueness of the Delta.**

5
6 Our Vision strongly declared that the Delta “is a
7 unique and valued area, warranting recognition
8 and special legal status from the state of
9 California.” Despite the risks and inevitable
10 changes that will confront the Delta in the
11 coming decades, our strategic plan urges
12 recognition of the Delta’s unique natural,
13 cultural and historic character, rather than
14 abandonment of the region. Indeed, such
15 recognition is warranted at a national, as well as
16 state, level. As noted in Volume 1, the Delta is
17 the “third leg of the stool,” along with the two
18 co-equal goals, in forming the foundation for
19 the Strategic Plan.

20
21 Recognition of the Delta should occur through a
22 range of designations and initiatives. These
23 designations should be structured to increase the
24 visibility of the Delta within the state of
25 California and nationally; to strengthen the
26 recreational, tourist and agricultural economies
27 in the Delta; and to increase visitation. The
28 latter requires making the Delta more marketable and improving visitation infrastructure
29 (including recreation sites) at appropriate locations. As the recommendations of Delta Vision
30 and other initiatives are implemented, priority should be given to using the capacities of Delta
31 institutions and businesses wherever possible.

32
33 State and federal recognition of the Delta should be designed to support the Delta as a place,
34 regardless of actions taken on behalf of the environment and water supply. Recognition should
35 also contribute directly to the Delta’s economic vitality by facilitating aggressive pursuit of new
36 economic opportunities, and by identifying appropriate ways to enhance the agricultural
37 economy.

38
39 Market forces will largely guide agricultural activity in the future as they do today. But
40 incentives to farm in ways that achieve carbon sequestration, habitat restoration and other public
41 purposes should be instituted where appropriate. The Delta is already a highly productive
42 agricultural area, but the state must support continued innovation and diversification of
43 production and marketing opportunities so that agriculture can continue to thrive in the Delta of
44 the future.

Vision recommendations met:

2, 9

Performance measures:

Acres of land providing public benefits of habitat, flood conveyance, subsidence reversal, or carbon sequestration (+)

Gross regional product from recreation and tourism (+)

Gross regional product from sustainable agriculture (+)

Expenditures by public agencies for land acquisition, management, and maintenance (+)

Application steps completed for special designations (+)

1 Innovative high-value land uses, especially those that can contribute to levee financing and local
2 tax rolls, and that do not increase flood risks, should also be encouraged. On-island water
3 storage, materials handling, and other such land uses may have an important role to play in the
4 future Delta.

5
6 The critical elements of our strategy for designating the Delta include:
7

- 8 **1. Apply for the designation of the Delta as a federally recognized National Heritage**
9 **Area (NHA) by 2010**, through the three major steps described below. NHAs are places
10 designated by the U.S. Congress “where natural, cultural and recreational resources
11 combine to form a cohesive, nationally-distinctive landscape arising from patterns of
12 human activity shaped by geography.” Despite being a federal designation, NHAs do not
13 entail any federal ownership or regulation of land. The National Park Service and the
14 Department of the Interior review proposed NHA management plans to see that intended
15 actions advance the mission of the Park Service and the NHA program, but otherwise the
16 federal role is limited to partnering in marketing efforts. The NHA must be consistent, as
17 well, with the CDEW Plan.
18
 - 19 a. Beginning immediately, the Delta Protection Commission (DPC) and interested
20 local entities should work to secure public support within the Delta for the
21 designation, jointly conduct the required feasibility study, and identify the
22 appropriate agency or non-profit to serve as the ongoing management entity.
23
 - 24 b. Upon completion of the feasibility study, the State of California and the local
25 management entity should apply to the U.S. Congress for the designation.
26
 - 27 c. Upon receiving the designation, the management entity and its partners must
28 develop a management plan within three years that describes how the NHA will
29 combine preservation, recreation, economic development, heritage tourism, and
30 heritage education to interpret and promote the region’s distinctive landscape.
31
- 32 **2. Create a multi-unit State Recreation Area in the Delta, potentially combining**
33 **existing and newly designated areas, by 2010.** Beginning immediately, the California
34 State Parks Department should complete a feasibility and siting study that considers at
35 least the following:
36
 - 37 a. A northern unit that includes Liberty and Prospect Islands and Little Holland
38 Tract;
39
 - 40 b. A southern unit located on Sherman Island, in an area that is visible from the
41 Antioch Bridge, is easily accessible from Highway 160, and potentially allows
42 cost-effective levee upgrades to protect the recreation site and major electricity
43 and natural gas infrastructure;
44

- 1 c. The consolidation of Brannan Island State Recreation Area, Franks Tract State
2 Recreation Area, and Delta Meadows River Park into the new multi-unit
3 structure.
4
- 5 **3. Create market structures or incentives for a sustainable Delta agriculture that**
6 **produces public benefits by 2010.** Such public benefits include wildlife habitat,
7 subsidence reversal, carbon sequestration, flood management, and recreational and
8 tourism opportunities. Actions to carry this out should include:
9
- 10 a. Ensuring that carbon farming is officially recognized as an emissions reduction
11 mechanism under AB32 (a.k.a. The Global Warming Solutions Act).
12
- 13 b. The California Department of Food and Agriculture, commodity boards, and local
14 governments should work together to allocate available U.S. Department of
15 Agriculture (USDA) Farm Bill funding to begin a regional labeling program and
16 assist in direct marketing of Delta produce in nearby cities.
17
- 18 c. The California Department of Food and Agriculture should also earmark directed
19 specialty crop funding in support of Delta agriculture, including labeling, direct
20 marketing and the development of new crops and crop varieties.
21
- 22 d. In addition, the State should use its working lands conservation programs in a
23 coherent manner to leverage the conservation funding available through the
24 USDA Farm Bill, such as that available through the Cooperative Conservation
25 Partnership Initiative.
26
- 27 e. Federal, state and local mitigation requirements and agricultural easement
28 programs should also be crafted to support the transition of Delta growers to
29 multifunctional forms of agriculture, particularly wildlife habitat and flood
30 management.
31
- 32 f. Conduct a Delta-wide study (similar to that done by the University of California’s
33 Agricultural Issues Center for Solano County) in which barriers and opportunities
34 to improve agricultural sustainability are identified through economic analysis
35 and stakeholder interviews. The study should also include analysis of the
36 potential to achieve habitat and water management objectives while maintaining
37 an economic base of agriculture in potential restoration areas.
38
- 39 g. Require an augmentation of the University of California’s research and extension
40 capacity in the Delta, and of the technical field staff of the U.S. Department of
41 Agriculture’s Natural Resources Conservation Service, in support of crops that
42 slow or reverse subsidence, improve water use efficiency and quality, are
43 compatible with wildlife, and are compatible with floodplain management.
44
- 45 h. Devise protection strategies for farmlands threatened by urbanization that rely on
46 the establishment of strategic agricultural preserves supported by agricultural

1 conservation easements, Williamson Act contracts, and transfer of development
2 rights arrangements.

- 3
4 i. Require the Delta Protection Commission to continue working with the USDA to
5 seek approval of funding for a Resource Conservation and Development (RC&D)
6 Council to promote natural resource-based economic development. Among other
7 functions, the RC&D should seek funding to develop housing for agricultural
8 laborers in and around the Delta.
9

10 4. **Create special enterprise zones at the major “gateways” to the Delta.** Though
11 recreation and tourism should be enhanced throughout the Delta, the buildings and
12 services required to expand the industry should be concentrated in highly visible
13 locations near highways and population centers, and in areas with relatively low disaster
14 risks (i.e. above sea level or well protected by high-quality levees for other purposes).
15

- 16 a. By 2010, the Governor’s Office of Planning Research should issue a model
17 ordinance to local governments to create these zones.
18
19 b. By 2013, the legislature should pass legislation providing tax breaks and/or low-
20 interest loans within these zones to appropriate investments in welcome centers,
21 interpretive centers, recreational support services, and transportation (both land
22 and water) from these locations to points of interest throughout the region.
23
24 c. Potential sites for such gateways include Rio Vista on the west; Freeport, West
25 Sacramento, or the Yolo Bypass on the north; Stockton on the east; and Antioch,
26 Discovery Bay or Lathrop on the south.
27
28 d. There should be at least one gateway on each of the four sides of the Delta to
29 ensure visibility and access.
30
31

1 **Strategy 3.1: Restore extensive interconnected habitats, especially critical land-water**
2 **interfaces, within the Delta and Delta watershed**

3
4 Estuarine ecosystems like the historic Delta
5 are complex, highly variable systems with
6 many interrelated components. Each must be
7 present and fully capable of providing its
8 function to sustain the ecosystem as a whole.
9 Major disruptions of this ecosystem complex –
10 and each of its parts – have contributed
11 significantly to the systemic failures
12 confronting California today.

13
14 Revitalizing the Delta ecosystem is
15 challenging and cannot be implemented
16 piecemeal; all restoration components must be
17 present and function together (see Figure 4).
18 Furthermore, revitalization must be conducted
19 and managed consistently across agencies and
20 jurisdictions and must effectively incorporate
21 science-based adaptive management. The
22 governance structure must be capable of
23 supporting this goal.

24
25 This strategy focuses on creating diverse
26 mosaics of habitats and ecosystem processes
27 that are appropriately connected and is the
28 cornerstone upon which other restoration
29 strategies are built. This strategy specifically
30 calls for restoration of intertidal marshes,
31 seasonal floodplains, and open water
32 embayments. The preservation and linkage to
33 adjacent upland areas that support grasslands
34 and seasonal wetland complexes including vernal pools are described in the Land Use Strategy
35 (#6.2).

36
37 While current understanding cannot give quantitative predictability in ecosystem response to
38 restoration and other revitalization efforts combined with uncertainty in the nature of climate
39 change, sea level rise, population growth, seismicity, and similar uncontrollable drivers of
40 change, it is sufficient to guide initial actions from which much can be learned. Initial
41 experiences in some recent large scale restorations such as in the Yolo Bypass provide
42 encouraging evidence of quick responses. The eventual total amounts and types of restoration
43 needed can be determined only through implementation within a rigorous adaptive management
44 framework that will identify when the goal and objectives have been achieved.

Vision recommendations met:

1, 3

Performance measures:

Acres of restored tidal marsh, Delta (not accounting for sea level rise) (+)

Acres of restored tidal marsh, Suisun (not accounting for sea level rise) (+)

Acres of restored shallow open water habitat in the Delta (+)

Acres of active floodplain (+)

Acres of seasonal wetlands and grasslands (+)

Acres of fall open water habitat between 0.5-6 parts per thousand salinity (+)

Percent of aquatic food web support by diatoms (+)

Number and geographic distribution of large habitat complexes incorporating two or more interconnected habitat types (+)

1
2 To focus public policy processes on the types and scales of restoration needed, targets for several
3 types of habitat are proposed. In most cases these targets are derived from the best available
4 analyses of the Delta, largely organized through CALFED, but have not yet been tested through
5 discussion in public policy processes or full scientific review. The needed scientific review can
6 be completed in a relatively short time period concurrent with the policy making process.
7 Initiating action is critical and will provide improved information for policy making over time.
8

9
10 Unless otherwise stated, studies and restoration work would be carried out by the Delta
11 Conservancy (described below under Goal 7), the California Department of Fish and Game
12 (DFG), the U.S. Fish and Wildlife Service (USFWS), the Department of Water Resources
13 (DWR), the federal Bureau of Reclamation (Reclamation), the Delta Engineering and Science
14 Board, and various scientific research organizations, within a time frame concurrent with the
15 type of restoration recommended below. (See strategy 7.1 for more description of the
16 governance structure that would carry out these and other revitalization strategies.)
17

18 In concert with the proposed governance structure, restoration and associated scientific
19 monitoring and research efforts, regardless of implementing organization, must follow an
20 adopted CDEW Plan and Adaptive Management Plan with the Delta Science and Engineering
21 Board reviewing and approving design, research, and monitoring programs for consistency with
22 these plans. Any restoration efforts implemented prior to establishment of the CDEW Plan and
23 its Adaptive Management Plan shall be reviewed by the CALED Science Program and the ERP
24 Implementing Agencies (CDFG, USFWS, NMFS) for consistency with the Draft ERP Stage 2
25 Conservation Strategy and existing monitoring and research priorities and science as described in
26 the DRERIP Delta Conceptual Models. Development of the CDEW Plan itself should build
27 directly upon the work contained in Delta Vision's *Initial Ecosystem Restoration Activities*
28 prepared in December 2007, the ERP Stage 2 Conservation Strategy, the DRERIP Delta
29 Conceptual Models, findings from the POD studies, updates to endangered species recovery
30 plans, updates to biological opinions prepared for OCAP, and findings from BDCP.
31

32 With this as context, initial short term targets are recommended, with the recognition that over
33 time additional areas for ecosystem restoration will be identified and prioritized. As studies
34 demonstrate a direct correlation between restoration strategies and improved functioning of the
35 ecosystem, and the need for more restoration, it is projected that as many as one hundred
36 thousand acres might be restored over time. The implementation of these restoration projects
37 should be led by the proposed Delta Conservancy, with substantial local representation on its
38 governing body and effective working relationships with local governments, land owners and
39 other stakeholders.
40

41 The key elements of this strategy are as follows:
42

43 **1. Increase frequency of floodplain inundation and establish new floodplains.**

44 Floodplains provide ecosystem benefits as well as flood management, possible
45 conjunctive use and improving levee protections downstream by reducing peak flood
46 stages.

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- a. **Sacramento River/Yolo Bypass.** Increase interannual inundation frequency on the Yolo Bypass by 2015 without compromising flood protection, as this is its primary function. Modify Fremont Weir and internal waterway features as needed to allow the Yolo Bypass achieve two inundation conditions to the extent possible: (1) flood at least 60 days continuously between January and April every other year except during critical dry years, and (2) provide multiple inflow pulses at 2-3 week intervals during this inundation period. These conditions promote primary and secondary productivity, splittail spawning and rearing success, and juvenile Chinook salmon rearing success (see DRERIP conceptual models). Improvements shall address passage impediments to adult and juvenile salmon, sturgeon, and splittail at the Fremont Weir, Lisbon Weir, Toe Drain, and other barrier points. These actions will be balanced with existing fish and wildlife benefits provided in the bypass.
 - b. **Mokelumne River.** Establish new seasonal floodplains where the Mokelumne River enters the Delta by 2015. Acquire the necessary lands and update the Draft North Delta Flood Protection EIR (Staten and McCormick-Williamson Tract) to provide for integrated seasonal floodplain habitat, linkage to planned adjacent intertidal marsh, and additional flood protection for lands along the lower Mokelumne and Cosumnes River corridors. Investigate incorporating northern portion of New Hope Tract into flood corridor.
 - c. **San Joaquin River.** Establish lower San Joaquin River floodplain along either bank of the San Joaquin River below Vernalis and along Old River to Fabian Tract and implement any feasible projects by 2015. Identify suitable lands in context of available San Joaquin River flows, channel carrying capacity to convey flood flows, options for flood bypass configurations, and land surface elevations all necessary to provide seasonal floodplain habitats as part of flood protection efforts.
 - d. **Upstream Floodplains.** Investigate the potential for (and implement by 2015 where feasible) additional floodplain habitats further upstream along all the rivers and streams entering the Delta capable of supporting salmonid rearing and splittail reproduction. Identify suitable lands in context of available flows, channel carrying capacity, and land surface elevations all necessary to provide seasonal floodplain habitats as part of flood protection efforts.
2. **Restore intertidal marsh.** (See Figure 7.) The amount of tidal marsh restoration for the Delta and Suisun Marsh originates from a mixture of prior studies, best available current information, and the recognition that meeting the Delta Vision ecosystem revitalization goal and objectives will require a “substantial” amount of tidal marsh restoration. For Suisun Marsh, the 1999 Habitat Goals Report recommended 17,000-22,000 acres of tidal marsh restoration. The 2000 CALFED Record of Decision called for restoring 7,000-9,000 acres of tidal marsh in Suisun. The 2006 Central Valley

1 Joint Venture Habitat Management Plan identifies that more than 23,000 acres of
2 managed wetland could be restored to tidal marsh without adversely affecting target
3 waterfowl populations, even without tidal marshes providing food resources for
4 waterfowl (which they do). The Suisun Marsh Plan, currently being developed,
5 follows the CALFED ROD targets. To date, the only plan that contains recommended
6 tidal marsh restoration acreages for the Delta is the Draft ERP Stage 2 Conservation
7 Strategy. This Plan describes large-scale restoration and opportunity areas rather than
8 establishing quantitative targets.
9

- 10 a. **Delta, near term.** Restore 15,000 acres of intertidal marsh in the Delta by
11 2020, with geographic priority on locations with the greatest anticipated
12 benefit to ecosystem processes and feasibility for restoration.
13
14 b. **Delta, longer term.** Restore up to an additional 15,000 acres intertidal marsh
15 in the Delta by 2040. If adaptive management monitoring indicates prior
16 restoration and other activities have not yet accomplished ecosystem goals,
17 restore as much remaining land of suitable elevation as possible by 2060.
18
19 c. **Suisun Marsh, near term.** Restore 12,500 acres of intertidal marsh in Suisun
20 Marsh by 2020.
21
22 d. **Suisun Marsh, longer term.** Restore another 12,500 acres of intertidal marsh
23 in Suisun Marsh by 2040 and additional acreage as lands become available if
24 adaptive management monitoring indicates prior restoration and other
25 activities have not yet accomplished ecosystem goals.
26

27 **3. Restore tidal open water areas.**
28

- 29 a. **Complete studies to enhance native foodweb organisms and address**
30 **harmful invasive species interference.** By 2015, initiated under the auspices
31 of the CALFED Science Program and ERP agencies and then under the
32 proposed governance and science and engineering structures, complete
33 additional scientific studies to examine the most effective strategies for
34 restoring tidal open water embayments in the Delta to increase diatom-based
35 primary productivity and minimize adverse effects of harmful invasive plants,
36 fish, and invertebrates on native fish.
37
38 b. **Near term targets if restoration viable.** Restore sufficient acres to achieve
39 20,000 total acres of tidal open water habitats in the Delta by 2020.
40 Restoration locations should be able to achieve fall open water conditions of
41 temperature below critical thresholds and salinity of 0.5 to 6 parts per
42 thousand to support rearing habitat for resident native fish. Achieving this
43 quantity of open water habitat requires a mix of physical habitat restoration
44 and providing appropriate flows.
45

1 c. **Longer term targets if restoration viable.** Restore an additional 15,000
2 acres of tidal open water habitats in the Delta by 2040.

3
4 **4. Grasslands and seasonal wetland complexes.** Protection and enhancement of these
5 lands is an essential component of providing ecosystem functions today and allowing
6 for sustainable intertidal communities in the future with projected sea level rise.
7 Strategies for their protection and enhancement are described under Land Use,
8 Strategy 6.2.

9
10 **5. General principles applicable to all types of restoration**

- 11
12 a. Establish managed wetlands in advance of restoring tidal action in order to
13 reverse subsidence where feasible and needed. Consider marketing carbon
14 sequestration credits for these subsidence-reversal efforts to assist with
15 offsetting restoration implementation costs.
- 16
17 b. Initiate comprehensive land and easement (with purchase option) acquisition
18 programs that make suitable lands available for restoration. For lands targeted
19 for later restoration, use either lease-back approaches or easements with
20 purchase options that allow existing land uses until restoration can proceed.
- 21
22 c. Include large blocks of land encompassing broad topographic variability that
23 support restoration of diverse ecosystem complexes. Thinking of the Delta
24 broadly as a large “bowl”, lands around the perimeter of the Delta are where
25 these conditions are found. Interior Delta islands (the “deep” Delta) do not
26 provide these conditions whereas some islands closer to the margin provide
27 some suitable topographic variability.

28
29 **Criteria Used for Selecting Restoration Areas and Establishing Restoration Priorities**

30
31 Ecosystem restoration opportunities in the Delta are defined by a suite of criteria describing
32 opportunities relative to desired outcomes and constraints that preclude restoration altogether or
33 require resolution before moving forward. By applying all these criteria, regions and specific
34 locations emerge where restoration efforts should be targeted by priority. The proposed Delta
35 Conservancy would take the lead in selecting restoration areas and establishing priorities, with
36 accountability to the proposed Council.

37
38 ***Opportunity Criteria***

- 39
40 1. **Topography.** Since many ecosystem restoration initiatives will entail reconnecting
41 lands to the estuarine and riverine environments, elevation of the land relative to the
42 tides and rivers is the fundamental criterion for restoration. Tidal marsh must be
43 within modern ranges of the tides. Accommodating future sea level rise must occur in
44 those elevations immediately above current intertidal zones. Shallow open water
45 occurs at elevations below low tide, with target depth dictating how far below low
46 tide is appropriate. Floodplains inherently are above current tidal elevations and

- 1 suitable elevations depend strongly on how high source river flows can rise during
2 large flow events.
3
- 4 2. **Topographic variability and habitat complexity.** Variability in elevations, within
5 the desired ranges, supports the ability to establish interconnected complexes of
6 multiple habitat types.
7
- 8 3. **Size and shape to support branching (dendritic) channel networks in tidal**
9 **marshes.** Branching channel networks that are self-maintaining require a minimum
10 drainage area as well as shapes of restoration parcels that are not too “long and
11 narrow” to allow branching to occur. Defining the minimum size is not possible for
12 the Delta at this time, as there are no historical examples nor adequate maps or
13 historical accounts available to assess relationships between marsh size and channel
14 network geometry. The Department of Fish and Game has recently begun
15 investigations into historical accounts that may yield some insight.
16
- 17 4. **Length of interfaces across habitat types and associated connectivity.** Restoration
18 parcels that provide for lengthy interfaces between habitat types, including uplands to
19 wetlands, floodplains to wetlands, and wetlands to open water can, *if connected*,
20 provide for a greater magnitude of exchange of organisms, energy, nutrients, water,
21 and other materials which in turn promote greater ecosystem functions.
22
- 23 5. **Sea level rise accommodation.** Delta Vision is using the sea level rise numbers
24 recommended in September 2007 by the CALFED Independent Science Board Chair
25 and the CALFED Lead Scientist of 55 inches by 2100, with a greater proportion of
26 that rise occurring later in the 21st century. These numbers do contain considerable
27 uncertainty. Restoration sites that can accommodate sea level rise, primarily by
28 allowing shift of natural habitats into higher elevations through adjusting their
29 position laterally across the landscape, will provide greater long-term sustainability of
30 the ecosystem functions those habitats provide.
31
- 32 6. **Known presence of target species and natural communities for actions taken in**
33 **the near term.** Restoration efforts in the near term should focus in locations where
34 the primary species and natural community targets already occur and thus have the
35 greatest potential to provide benefits in the shortest time frame possible. Modern
36 distributions may reflect availability of suitable habitat rather than historical ranges,
37 however. Thus, as conditions improve throughout the system, restoration should
38 proceed over greater geographic extents.
39
- 40 7. **Corridors within complexes.** Organisms move within and between natural habitats
41 in order to meet their needs and avoid predation on daily, spring-neap tidal, seasonal,
42 and interannual time scales. Successful movement depends wholly upon availability
43 of corridors for these migrations.
44
45
46

1 ***Constraints Criteria***
2

- 3 8. **Proximity to influence of export pumps.** Export pumps exert major influences on
4 water flow directions and velocities in the Delta. Fish in all life stages as well as their
5 primary and secondary production and the nutrients that support productivity are
6 subject to direct entrainment as well as inability to reach appropriate habitats when
7 subject to export pump effects on Delta hydrology. Thus, locating restoration as far
8 from pumps as possible reduces the significance of this constraint. Conversely,
9 relocating export pumps away from productive habitats reduces the relevance of this
10 constraint.
11
- 12 9. **Position relative to future possible water supply conveyance.** The altered
13 hydrology of the Delta due to conveying water to the export pumps also affects
14 habitat suitability by changing flow direction and minimizing variability important to
15 many species and natural communities. Locating restoration away from modern and
16 possible future effects of conveyance will improve the functionality of those restored
17 habitats.
18
- 19 10. **Proximity to major wastewater inputs.** Loadings of nutrients and contaminants
20 from wastewater inputs can affect species, natural communities, and natural habitats
21 adversely as a function of proximity to these sources. Locating restoration as far from
22 these influences as possible minimizes their effect and maximizes the ability of the
23 restoration areas to provide their target ecological functions. Improving water quality
24 discharged from wastewater treatment plants will also help to minimize this
25 constraint (See Strategy #3.3).
26
- 27 11. **Proximity to high mercury loadings.** Methyl mercury requires a key ingredient –
28 mercury. Though mercury is quite widespread in the natural environment, there are
29 some known source areas of high mercury loadings. Locating restoration areas away
30 from these sources reduces the potential for generating methyl mercury. Also,
31 because of the inevitability of producing methyl mercury in certain restoration efforts,
32 projects should be designed to minimize its transport and availability to biota.
33
- 34 12. **High land values based on existing use.** Restoration of tidal marsh and aquatic
35 habitat necessitates a permanent land use change. Land acquisition costs are always a
36 significant component of restoration costs. High-value real estate will reduce the
37 amount of restoration area that can be acquired for a given amount of available funds.
38 Priority should be given to suitable lands owned or controlled by governments or non
39 profit organizations.
40
- 41 13. **Number of parcels per restoration area.** Restoration inherently needs to occur in
42 relatively large landscape blocks that can utilize natural landforms rather than
43 artificial structures (e.g., new levees) to protect adjacent properties flood protection
44 and the like. The more parcels located in a restoration area, the more complex and
45 costly the acquisition, planning and restoration process since a greater number of
46 landowners are likely to be involved.

14. **Infrastructure: roads, rail, pipelines, natural gas field, transmission lines.**

Infrastructure must be protected and accessible for maintenance and repair or relocated entirely for restoration to proceed. The greater the interference of infrastructure, the more complex and costly are the solutions.

15. **Proximity to known presence of harmful invasive species.** One of the greatest potentials for ecosystem restoration not to meet its intended outcomes is the role of harmful invasive species. Invasive species can colonize new habitat making it unavailable to target species and natural communities. They can also prey upon target species near restoration areas, preventing successful use of the new habitats. They can consume the productivity benefits, rendering those benefits unavailable to their intended recipients. Alongside minimizing suitability of newly restored lands for harmful invasive species and controlling their populations more generally as the primary means to address this constraint, locating restoration areas farthest from known invasive species populations will be essential to successful restoration outcomes. (See Strategy 3.3)

Table S6-1 shows the acreage of available lands throughout the Delta and Suisun Marsh according to existing elevations (Criterion A), demonstrating that there are substantial areas available for restoration projects, especially when they occur over decades.

Table S6-1. Total Area Available to Reach Ecosystem Targets, by Subregion, Delta and Suisun

Elevation Category	Restoration Location Groupings Based on Landform Division													TOTALS
	1) Suisun Marsh	2) Suisun-Cache Corridor	3) Cache Slough	4) Prospect	5) Yolo Bypass	6) Netherlands	7) East Delta, North	8) Sutter Island	9) Mokelumne/Cosumnes	10) East Delta, South	11) South Delta	12) Southwest Delta	13) Dutch Slough	
Elevation Range (ft NAVD88) Used in Analysis														
Upland (area above SLRA to Legal Delta boundary)	12+	12+				12+				10.5+	11+			
Sea Level Rise Accommodation (0-5 ft > MHHW)	7 to 12	7 to 12				7 to 12				5.5 to 10.5	6 to 11			
Intertidal (MLLW - MHHW)	1 to 7					3 to 7				2 to 5.5	2 to 6			
Shallow Subtidal (0-3 ft < MLLW)	-2 to 1					0 to 3				-1 to 2	-1 to 2			
Intermediate Subtidal (3-6 ft < MLLW)	-5 to -2					-3 to 0				-4 to -1	-4 to -1			
Deep Subtidal (deeper than 6ft < MLLW)	< -5					< -3				< -4	< -4			
Area Available to Reach Ecosystem Targets (acres, from USBR GIS² analysis August 2008)														TOTAL ACREAGE
Upland Area	19,705	TBD	31,619	53	29,512	12,017	4,438	150	5,425	16,900	8,525	3,402	39	193,300
Sea Level Rise Accommodation Area	8,482	TBD	9,717	110	16,234	10,371	10,678	550	4,905	7,227	23,351	2,451	242	94,311
Tidal Portion	54,119	0	14,203	1,632	9,183	28,847	15,252	1,898	9,328	16,832	46,205	7,131	924	205,555
Total Area (Upland, SLR, Tidal)	82,307	0	55,537	1,793	54,928	51,235	30,368	2,599	19,658	25,749	154,811	12,984	1,206	493,177
Area Detail for Tidal Portion														TOTAL ACREAGE
Intertidal	42,802	0	9,491	1,553	5,454	14,503	6,906	440	4,066	5,531	16,694	2,594	241	110,270
Shallow Subtidal	10,826	0	2,704	59	593	13,391	2,782	585	3,718	4,471	13,592	1,775	342	54,883
Intermediate Subtidal	491	0	1,930	20	1,625	935	2,860	862	1,492	5,737	10,047	1,576	234	27,800
Deep Subtidal	0	0	78	0	1,511	18	2,704	11	52	1,093	5,872	1,186	107	12,633
Total Area, Tidal Portion Detail	54,119	0	14,203	1,632	9,183	28,847	15,252	1,898	9,328	16,832	46,205	7,131	924	205,555

Notes:

- 1 All subtidal areas exclude existing tidal waterways; restoration opportunity areas already exclude the "deep Delta" or deeply subsided islands
- 2 All results based on DWR 2007 LiDAR 2m grid except for southeastern side of South Delta and far northern end of Yolo Bypass derived from 10m USGS I
- 3 Based on current sea level heights

1 **Strategy 3.2. Establish migratory corridors for fish, birds and other animals along selected**
2 **Delta river channels.**

3
4 Enhanced multi-purpose river corridors
5 connected with restored upstream habitat will
6 improve the survival rate of endangered
7 migratory species and popular sport fish,
8 increase recreational opportunities, and increase
9 the ability to manage the co-equal values
10 throughout the watershed. “Enhanced” river
11 corridors are managed for aquatic conditions
12 conducive to migratory success, are connected to
13 adjacent estuarine habitats where possible, and
14 have streamside vegetation where possible. In
15 addition, each of the Delta’s three major
16 migratory river systems – the Sacramento, San
17 Joaquin, and Mokelumne – should have
18 redundancy in migratory corridors to allow
19 migratory passage under a broad range of
20 conditions and in order to protect against
21 adverse localized conditions that can emerge.

22
23 Various factors now impair the migration and
24 survival of salmon, steelhead, and sturgeon
25 populations in the rivers flowing into or through
26 the Delta. These barriers to migratory success
27 can be minimized by:

- 28
- 29 1) Providing adequate flows at the right
- 30 time to support adult and juvenile
- 31 migrations,
- 32 2) Resolving conflicts between
- 33 conveyance and migration,
- 34 3) Establishing multiple (redundant)
- 35 migratory corridors for each river
- 36 system,
- 37 4) Restoring large areas of floodplain
- 38 and intertidal habitats along and adjacent to these corridors, and
- 39 5) Restoring riparian and other emergent vegetation habitats along each corridor in
- 40 areas away from large restoration areas.

41
42 Recovery of these fish populations would enhance sport fishing and other recreational
43 opportunities along these corridors. In addition, as described in Strategy 3, expanded flood
44 conveyance capacity on selected Delta river channels would allow re-operation of upstream
45 reservoirs, potentially increasing water supply yield from those facilities.

Vision recommendations met:

3, 9

Performance measures:

Number of functional migratory corridors per river system (Sacramento, San Joaquin, Mokelumne/Cosumnes) (+)

Amount of river miles connected to adjacent floodplain, tidal marsh, and shallow open water habitats (+)

Distribution of large habitat complexes along estuarine gradients and with extensive internal connectivity (+)

Incidents of migratory passage delays, blockages, or mortalities due to physical barriers, low dissolved oxygen, high temperatures, or toxics (-)

Dissolved oxygen concentrations in anadromous fish migratory corridors at all times (+)

Percentage of adult salmon, steelhead, and sturgeon surviving migration through Delta (+)

Percentage of juvenile salmon, steelhead, and sturgeon surviving migration through Delta (+)

1
2 Implementation will require close coordination and consistency among many parties, including
3 the Delta Conservancy, DFG, USFWS, NMFS, DWR, USBR, non-project water users, and other
4 restoration entities. As above, flow targets recommended here are based on the best available
5 information and are for interim use until relevant agencies can develop and adopt flow targets
6 through a comprehensive and transparent process.
7

8
9 As stated above, decision makers must move to sufficient specificity regarding proposed actions
10 to make informed decisions. These recommendations are based on available analyses and can be
11 refined by additional scientific review concurrent with public policy processes.
12

13 For each major river system, there exist preferred corridors within the Delta based on established
14 migratory patterns, availability of habitat today, projected likelihood of habitat in the future,
15 avoidance of conflicts with existing conveyance and possible future conveyance including
16 operations of gates and barriers.
17

- 18 • **Sacramento River** corridors are (1) Yolo Bypass – Cache Slough – lower Sacramento
19 River, (2) upper Sacramento River – Steamboat, Sutter, Miner, and lower Cache sloughs
20 – lower Sacramento River, and secondarily (3) Three Mile Slough
- 21 • **San Joaquin River** corridors are (1) mainstem San Joaquin River, (2) Old River, and
22 secondarily (3) Middle River
- 23 • **Mokelumne River** corridors are (1) North Fork Mokelumne River and (2) South Fork
24 Mokelumne River
25

26 In addition to these major river systems, some benefit may be gained for steelhead through
27 improvements to Marsh Creek and Putah Creek
28

29 The critical elements of this strategy are listed below, by river corridor and priority:
30

31 **1. Implement high priority improvements to physical habitats along selected**
32 **corridors by 2015.** Subject to further analysis in the CDEW Plan, this should
33 involve:
34

- 35 a. Implementing Yolo Bypass floodplain habitat improvements, without
36 reducing flood safety (see Strategy 3.1)
37
- 38 b. Expanding floodplains along the Mokelumne River upstream of the Delta
39
- 40 c. Restoring floodplains and tidal marshes at the Delta confluence (including
41 integration with flood protection improvements in McCormack-Williamson
42 and New Hope Tract area)
43
- 44 d. Restoring floodplain habitats along San Joaquin River upstream of the Delta,
45 and between Vernalis and Stockton, wherever possible
46

- 1 e. Restoring intertidal marsh throughout Cache Slough complex
- 2
- 3 f. Integrating lower San Joaquin River floodplain restoration with South Delta
- 4 tidal marsh restoration after conveyance conflicts are reduced
- 5
- 6 g. Restoring Prospect Island and other selected islands and tracts
- 7
- 8 h. Enhancing and restoring channel margin vegetated habitats along:
- 9 i. Key Sacramento River locations, including Sutter Slough, Steamboat
- 10 Slough, Miner Slough, Cache Slough between Miner Slough and the
- 11 Sacramento River, and the Sacramento River upstream of Steamboat
- 12 Slough
- 13 ii. Both forks of the Mokelumne River and along the San Joaquin River
- 14 downstream of its Mokelumne confluence
- 15 iii. San Joaquin River and Old River with priority applied to migratory
- 16 paths consistent with conveyance and operations
- 17 iv. Middle River if it is not dedicated to conveyance
- 18

19 **2. Implement medium-priority corridor improvements by 2020 concurrent with**
20 **conveyance changes.** Subject to further analysis in the CDEW Plan, this should
21 involve:

- 22
- 23 a. Enhancing and restoring channel margin vegetated habitats along the
- 24 Sacramento River downstream of Steamboat Slough
- 25
- 26 b. Enhancing and restoring channel margin vegetated habitats along Three Mile
- 27 Slough (unless it is cut off by barriers)
- 28

29 **3. Implement high-priority flow improvements by 2012.** These include:

- 30
- 31 a. Inundating the Yolo Bypass at least once every two years at levels similar to
- 32 current inundation extents (see Strategy 3.4) and altering Sacramento River
- 33 flows to meet water quality and passage flow needs
- 34
- 35 b. Reducing adverse effects of flow alterations from through-Delta conveyance
- 36 during migration periods on the Mokelumne River and tributaries, including
- 37 potential use of temporary or permanent gates and barriers as appropriate
- 38
- 39 c. Achieving net downstream flow at Jersey Point from February through June,
- 40 and one or two fall pulse flows at Vernalis, as described in Strategy 3.4.
- 41 Further evaluate the use of temporary barriers at the head of Old River to
- 42 direct migrants toward the best water quality and least entrainment risk
- 43

44 **4. Resolve high-priority conveyance-driven flow conflicts by 2012:**

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- a. Closing the Delta Cross Channel during migration periods, especially November through January.
 - b. Integrating Mokelumne River corridor improvements with all aspects of conveyance planning, including changes in through-Delta conveyance and location of an isolated facility
5. **Utilize the Central Valley Flood Protection Plan, beginning immediately, to identify areas of the lower San Joaquin River**, including through the Delta, where flood conveyance capacity can be expanded in a continuous reach (cross-referenced with strategy 5.2). Use existing bond funds to begin acquiring title or easement to floodplain lands immediately, especially in areas where urbanization threats are high.
6. **Utilize the National Heritage Area planning effort** (see Strategy 2.1), beginning immediately, to identify mechanisms to encourage recreational investments along the key river corridors subject to the improvements described above, and plan their implementation.

1 **Strategy 3.3. Promote viable, diverse**
2 **populations of native species by**
3 **reducing risks of entrainment and**
4 **predation.**

Vision recommendations met:

1, 3, 9

5
6 Numerous stressors to the Delta estuary
7 must be reduced to achieve the
8 revitalization and long-term sustainability
9 of the Delta’s ecosystems. Throughout
10 the watershed, harmful invasive species
11 and entrainment from improperly designed
12 diversions cause adverse effects to the
13 Delta ecosystem.

Performance measures:

- Number of new, uncontrolled harmful invasive species (-)
- Percentage of 1995-2000 average abundance and distribution of invasive clams (Corbula and Corbicula) (-)
- Percentage of 1990-2000 average abundance and distribution of Brazilian waterweed (Egeria) (-)
- Abundance of warm water centrarcid fish species (such as large mouth bass) (-)
- Proportion of population of resident and migratory species (as larvae, juveniles or adults) taken at exports particularly when abundances are low (-)
- Quantity of primary and secondary production taken at exports (-)
- Percentage of outmigrating juvenile salmonid population entrained at Delta diversions (-)
- Delta smelt and longfin smelt entrained at Delta diversions (-)

14
15 Invasive species adversely affect native
16 species through direct predation,
17 competition for food resources, and
18 altered predator-prey dynamics. Fish
19 entrainment occurs at the state and federal
20 export facilities, and at other municipal
21 and agricultural diversions within the
22 Delta. Entrainment effects are related to
23 the size of the diversions relative to the
24 channel from which they pump, the time
25 of year when operations are at highest
26 demand, spatial distribution of fish species
27 near channel edges or in the water column,
28 significantly greater population-level
29 effects when populations are small, and
30 the geographic location of the diversion
31 point.

32
33 Even if appropriate physical habitats and flow conditions are restored, Delta ecosystems may not
34 recover adequately unless these stressors are substantially reduced. Full implementation of
35 ongoing and new regulatory approaches, development of innovative strategies, and effective
36 monitoring will be necessary to execute this strategy properly. Critical elements of this strategy
37 include:

38
39 **a. Implement measures to control harmful invasive species at existing locations,**
40 **and minimize or preclude their colonization of new restoration areas to non-**
41 **significant levels, by 2012.** These measures should include:

- 42
43 i. Control existing populations by direct measures (i.e., chemical treatment,
44 mechanical removal, etc.) or by altering the habitat in ways that disfavor
45 unwanted species but not desired species.

- 1 ii. Minimize the potential of new invasives, including quagga mussel, zebra
2 mussel, and northern pike, by prioritizing restoration of habitats that they are
3 less likely to disturb (e.g., floodplains), and designing fish screens that will
4 retain their functionality in the presence of freshwater mussels.
5
- 6 iii. Reduce the likelihood of new invasives through a combination of education,
7 regulation and enforcement.
8
- 9 iv. Experiment to reverse the spread of freshwater invasives, using an adaptive
10 management experiment to reduce Delta outflow in summer or fall of
11 critically dry years.
12
- 13 v. Promote the restoration of floodplains, elevated side channels, or other
14 habitats that periodically dry out, in order to limit the impact of invasive
15 species on the seasonal use of such habitats by desirable species.
16

17 **b. Reduce entrainment and export effects on fish by instituting diversion**
18 **management measures by 2009, implementing near-term conveyance**
19 **improvements by 2015 (see Strategy 5.1), and relocating diversions (see**
20 **Strategies 3.4 and 3.5). As these conveyance and diversion improvements are carried**
21 **out, the following criteria should be used to reduce entrainment:**
22

- 23 i. Consolidate diversions to the extent possible and properly size and screen
24 diversions and operate screens to their specifications to reduce entrainment.
25 This includes in-Delta agricultural diversions as well as upstream diversions
26 that are appropriate for screening
27
- 28 ii. Reduce demand relative to capacity (see Strategies 4.1 and 4.2) to permit
29 greater flexibility in operations away from times of sensitivity
30
- 31 iii. Carefully manage exports during times of greatest sensitivity with resident
32 and migratory fish distribution
33
- 34 iv. Relocate diversion points to areas less likely to entrain fish and away from the
35 productivity generated by habitat restoration projects, keeping in mind the
36 potential for merely displacing rather than reducing an entrainment problem
37
38

1 **Strategy 3.4. Restore Delta flows and channels to support a healthy Delta estuary**

2
3 Freshwater flow conditions in the Delta must
4 change to revitalize the ecosystem and provide
5 conditions needed by estuary-dependent
6 species, including many presently at risk.
7 Higher and more variable flows do a better job
8 of providing habitat, triggering reproduction
9 and migration, transporting nutrients and
10 organisms, maintaining and improving water
11 quality, and promoting habitat complexity.
12 California’s vast network of reservoirs, canals
13 and pumps, as well as the major reconfiguration
14 of the Delta’s channel geometry and landscape
15 over several decades, have homogenized flow
16 conditions across seasons and reduced the total
17 water supplied to the ecosystem. These changes
18 have facilitated the spread of non-native
19 organisms and the decline of native species.
20 Variable conditions are widely believed to
21 benefit native species and to be detrimental to
22 many invasive species.

23
24 Current policies affecting flows are embedded
25 principally in the State Water Resources
26 Control Board’s (SWRCB) Water Quality
27 Control Plan, which requires protection of the
28 low salinity zone (as represented by X2), among
29 other standards. Significant changes to project
30 operations may arise in response to recent court orders and new information.

31
32 Delta outflows in February through June (as measured by the location of the two parts-per-
33 thousand salinity threshold, a.k.a. “X2”) have historically had a strong and statistically
34 significant correlation with the abundance and/or survival of numerous estuary-dependent
35 organisms in the Bay-Delta ecosystem. That relationship has been modified in recent years for
36 some species in part thought to be due to the effects of the introduced clam, *Corbula*. However,
37 for many aquatic species, the relationships are still statistically significant (see Sommer et al.
38 2007. The collapse of pelagic fishes in the Upper San Francisco Estuary. *Fisheries* 32(6):270-
39 277.)

40
41 For most species, higher flows affect survival and abundance in multiple ways, by increasing
42 habitat area, increasing food supply, and facilitating transport within the estuary. Increasing
43 spring inflows and outflows in most years, in particular, will increase the value of floodplain and
44 open water habitats in the Delta, as well as upstream riverine habitats.

Vision recommendations met:

1, 3, 7

Performance measures:

February to June Delta outflow meeting target as percent of unimpaired runoff (+, with greater percent increase at lower flows and lesser percent increase at higher flows)

Net downstream flow on San Joaquin River at Jersey Point Feb 1 to Jun 30 (+)

Number of 7-14 day duration fall flow pulses on San Joaquin River Vernalis reaching adopted target between Sep. and Nov. each year (+)

Number of months between Aug and Nov with Delta outflow reaching targets in below normal, above normal, and wet years (+)

1 Delta outflows in the fall months strongly affect habitat quality for estuary-dependent species
2 like delta smelt. Higher fall outflows should follow wet springs and lower fall outflows should
3 follow dry springs. Under natural conditions, wet winters and springs produced later-season
4 storms and larger snowpack that provided relatively greater outflows in their following summer
5 and fall months, the converse being the case for drier winters and springs. Native species life
6 history strategies adapted to these conditions. With modern water supply management, summer
7 and fall flows are partially disconnected to prior winter and spring conditions. Fall dam releases
8 to provide upcoming winter flood storage and to meet water demands have lead to fall flows
9 above natural. Due to the major loss of physical habitats, however, these artificial flows provide
10 important low salinity zone aquatic habitat by matching extent of open water to suitable
11 salinities. Restoring habitats in locations that in the fall would provide suitable low salinity zone
12 aquatic habitats without the same high level of fall Delta outflow would be an alternate
13 mechanism to meet ecological needs. In the late summer and fall of critically dry years (about
14 one year in ten) flow requirements that create more variable conditions should result in salinity
15 intrusions to the Delta and improved carryover storage in upstream reservoirs.

16
17 The San Joaquin River is hydrologically disconnected from the western delta and San Francisco
18 Bay at most times. Reconnecting it will revitalize a number of ecological processes at a
19 minimum: (1) improving larval survival of delta smelt by ensuring that some smelt spawned in
20 the south delta have access to their nursery grounds in the west delta, (2) better outmigration of
21 SJR salmon smolts by providing migratory cues and reduced stressors along their migratory
22 corridors, (3) improved productivity by facilitating the spread of zooplankton productivity that is
23 at times concentrated in the San Joaquin River near Stockton downstream to fish nursery areas,
24 and (4) improving delta water quality. Such reconnection (below flood flow levels) can only be
25 achieved through flow management in conjunction with the implementation of other actions
26 including channel reconfiguration (Strategy 3.2), changes in land use (Strategy 6.2), construction
27 of natural habitats to provide resting places for fish and enhance aquatic productivity (Strategy
28 3.1) and reductions in diversions from the south delta (Strategy 3.3). This action addresses only
29 flow issues but cannot succeed on its own.

30
31 As stated above, decision makers must move to sufficient specificity regarding proposed actions
32 to make informed decisions. These recommendations are based on available analyses and can be
33 refined by additional scientific review concurrent with public policy processes.

34
35
36 Achieving the flow targets described in this strategy broadly involves two approaches: (1)
37 releasing more water from storage to improve flow conditions; (2) altering how water exports are
38 conveyed to the export pumps; and/or (3) reducing the amount of water that is diverted in, from,
39 and upstream of the Delta. From an ecosystem perspective, flow targets are achieved far more
40 effectively through approaches that reduce the amount of water diverted in, from, and upstream
41 of the Delta, by providing alternate supplies, conservation, increasing efficiency, retiring
42 marginal agricultural lands, recycling, reuse, desalination, conjunctive use of surface and
43 groundwater supplies, regulatory re-allocation, and market mechanisms. A variety of policy tools
44 to support this transition exist, including agreements among willing parties.

45

1 This strategic plan advances additional flow targets, described below. These are interim targets,
2 based on the best available information developed through the ongoing efforts of the Interagency
3 Ecological Program’s Pelagic Organism Decline (POD) Working Group
4 (http://www.iep.ca.gov/AES/Pelagic_Organism_Decline.htm) and the CALFED ERP’s Delta
5 Conceptual Models (<http://www.delta.dfg.ca.gov/erpdeltaplan/>). These interim targets are to be
6 used to initiate policy processes and refined through the California Delta Ecosystem and Water
7 Plan (CDEW Plan), the SWRCB’s review of the Bay-Delta Plan, or other formal rule-making
8 processes. Implementation responsibility for the actions described within this strategy will reside
9 among several entities, most notably the CDEW Council, the SWRCB, the Department of Water
10 Resources (DWR), and the federal Bureau of Reclamation (Reclamation), all in consultation with
11 the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service
12 (USFWS), and the National Marine Fisheries Service (NMFS).

13
14 The critical elements of this strategy include:

- 15
16 a. **The SWRCB should adopt new requirements by 2012 to increase spring outflow**
17 **(in all but the wettest years) with implementation to commence no later than**
18 **2015.** With input from the CDEW Plan and other sources, the Board should revise the
19 Bay-Delta Water Quality Control Plan to include new spring Delta outflow objectives
20 by 2012. As an order of magnitude, scientists estimate that spring Delta outflow
21 should provide an approximately 10-50% increase in the percentage of unimpaired
22 runoff realized as outflow in most years, compared to the percentage experienced
23 during the 1990 – 1999 period or another sufficiently long reference period accepted
24 by the resource agencies, water quality regulatory agencies, water contractors, non-
25 governmental organizations, and other stakeholders. The largest percentage increases
26 will occur in dry and “average” years, while wet years generally will require no
27 increase. These variable percent increases allow greater water supply diversions
28 during wet winter and spring periods, in keeping with the co-equal values. Even with
29 shifting diversions to wet periods, it is important to retain in the CDEW Plan the
30 recognition that the magnitude and duration of very high flow events are of
31 significant ecological value. In the past, these flows were not captured nor diverted
32 due to limited storage and conveyance capacity. Improved storage and conveyance
33 capacity offer increased opportunity for reliable water supply while improving
34 ecosystem function.

35
36 In order for these changes to be effective, wet period diversions would need to meet
37 some operational criteria, including:

- 38
39 a. Do not initiate diversions immediately with high flows, as many fish use
40 change in flows (or associated turbidity) to initiate movement
41 b. Allow in-stream flows in rivers and streams upstream of the Delta during
42 early-season high flow events, as many fish and ecological processes benefit
43 greatly from these early-season flow events
44 c. Operate diversions during daylight hours to the extent possible, as fish migrate
45 mostly at night time

1 d. Higher flows than necessary to meet regulatory requirements (e.g., X2) should
2 be provided, at least at critical times, as these larger flows provide significant
3 ecological benefits.
4

5 **b. The SWRCB should adopt new requirements by 2012 to reintroduce fall outflow**
6 **variability with implementation to commence no later than 2015.** In the period up
7 until Water Year 2000, estuarine habitat for smelt and striped bass occurred at greater
8 quantity and quality following wetter springs (Feyrer et al. 2008). Since 2000, fall
9 habitat quantity and quality has been consistently at levels previously only seen
10 during drought years and the previous substantial monthly variation has largely been
11 eliminated. This decline in fall habitat is an important predictor of reproductive
12 success of delta smelt and in some years seems to have exacerbated the impact of
13 other stressors in the Delta. Inflows to the Delta are largely unchanged over the last
14 30 years, but the export of upstream releases has greatly increased so that these flows
15 no longer support estuarine habitats in broad areas.
16

17 For the short term, with input from the CDEW Plan and other sources, the SWRCB
18 should revise the Bay-Delta Water Quality Control Plan to require fall outflows to
19 provide habitat equivalent to the pre-2000 period. As an order of magnitude estimate
20 with which to initiate policy discussions, scientists recommend that in the fall
21 following below normal, above normal, and wet years, the requirements should
22 provide two months between August and November with Delta outflows between 1.5
23 to 3 times those during the 1990s reference period and with overall averages of the
24 four months similar to the conditions of the reference period. In the long term, the
25 CDEW Council should organize the scientific assessment evaluate how changes in
26 delta geometry, habitat restoration, and stressor reduction will affect the level of fall
27 flows necessary to achieve the same amount of suitable habitats.
28

29 **c. The SWRCB should revise its Vernalis flow objectives and the export criteria for**
30 **the Central Valley Project (CVP) and the State Water Project (SWP) to provide**
31 **for net positive (i.e., downstream) San Joaquin River flows between February**
32 **and June by 2012 with implementation by 2015. The SWRCB noticed two**
33 **workshops in late 2008 on the Vernalis Adaptive Management Program. Those**
34 **workshops could lead to adjustments in the VAMP, due to expire in 2012 and**
35 **judged to be ineffective by the Department of Fish and Game.** The ecosystem goal
36 here is to improve the movement and migration of species and improve south Delta
37 water quality. Measures include the average total San Joaquin inflow, or amount of
38 SJR water flowing to the western Delta (from Vernalis to Jersey Point) or the fraction
39 of time net flows (appropriately averaged) are positive along the migratory path(s)
40 (for example 20% in the near term, 50% in the longer term as improvements are made
41 in channel configurations, and stressors and diversions from the south Delta are
42 reduced).
43

44 **d. Provide short-duration fall San Joaquin River pulse flows, with implementation**
45 **by 2015.** These pulse flows serve to provide up-migration cues to fall-run salmon and
46 to help improve south Delta water quality. As order of magnitude recommendations

1 with which to initiate policy processes, scientists conclude that the pulse flows are
2 needed between September and November. Each pulse flow should last 7 to 14 days.
3 One or two pulses should be provided. Pulse volumes, as measured at Vernalis,
4 should be in the range of 2,000 to 3,000 cubic feet per second. These pulse flows
5 should be timed to contribute to the broader fall Delta outflow described in Strategy
6 3.4. If desired benefits are not demonstrated, the standard should be revised by the
7 SWRCB in consultation with the CDEW Council.
8

- 9 e. **Reconfigure Delta waterway geometry to increase variability in estuarine**
10 **circulation patterns, by 2015.** These reconfigurations should be planned in
11 conjunction with near- and long-term conveyance modifications described in Strategy
12 4. These reconfigurations will include installing removable or operable flow barriers,
13 especially in channels of the south Delta, so that channel lengths are greater than tidal
14 excursion distances (see Figure 8). These modifications shall include facilities to
15 allow ongoing navigation. Results of ongoing Delta historical ecology research by
16 DFG could help guide specific modifications.
17

18 The purpose of reconfiguring portions of Delta channel geometry is to restore
19 variability to transport processes essential to improving ecosystem function. The
20 morphology of the channel network plus the volume of water that moves through it,
21 in both directions in estuaries, dictate how long water sits in one place (its residence
22 time), how far water travels on any given tidal cycle (its tidal excursion), and thus the
23 amount of mixing. The core estuarine attributes necessary for ecosystem
24 revitalization – environmental water quality, food web productivity, movement of
25 organisms, and support of estuarine habitats – derive from these mixing processes.
26 More complexity of the channel network and more flow variability lead to greater
27 diversity of residence times and mixing characteristics. See recent work from Jon
28 Burau at the USGS (e.g., draft DRERIP Delta Hydrodynamics Conceptual Model).
29

30 Humans have constructed numerous “connecting” waterways throughout the Delta
31 for shipping and water supply conveyance. Connecting what were naturally
32 disconnected waterways that produced significant heterogeneity in the aquatic
33 environment has radically altered flow geometry and homogenized the aquatic
34 environment, changing flow routes and residence times, adversely affecting fish, their
35 food resources, and water quality. Native species evolved under natural
36 heterogeneous conditions and likely a cause of their decline is the modern
37 homogeneity of the Delta’s remaining aquatic environments.
38
39
40

1 **Strategy 3.5. Achieve sufficient water**
2 **quality improvements to meet drinking**
3 **water, agriculture, and ecosystem long-**
4 **term goals.**

5
6 Managing water quality is critical to
7 advancing the co-equal values. For
8 municipal and agricultural water uses
9 salinity and organic carbon reduction are
10 critical. Contaminants such as agricultural
11 pesticides and nutrient loads, municipal
12 wastewater discharges, and other
13 constituents such as methyl mercury can
14 contribute to toxic conditions for fish and
15 the organisms they feed upon, and their
16 cumulative effects must be reduced. This
17 strategy uses a combination of source
18 control, with benefits for multiple
19 downstream uses, and relocation of intakes
20 where necessary to improve water quality.
21 Many of these actions, along with the
22 development and implementation of Total
23 Maximum Daily Loads (TMDLs), will also
24 reduce pollutants that are harmful to the
25 ecosystem.

26
27 The Central Valley Regional Water Quality
28 Control Board (CVRWQCB) has
29 assembled water quality information on the
30 numerous rivers, streams, and drains that
31 flow into the California Delta. Many have
32 had historical contamination problems, and
33 virtually all have current contaminations
34 problems. The main pollutant contributors
35 are old mining operations (mercury and
36 other heavy metals), agriculture (pesticides,
37 herbicides, nutrients, and leached
38 constituents such as selenium), urban and
39 stormwater discharges (pathogens);
40 wastewater treatment plant discharges
41 (ammonia, pathogens), unknown sources
42 (toxicity), or a combination of causes
43 (dissolved oxygen).

44
45 Records show that the CVRWQCB has taken more than 7,000 enforcement actions since 1990 to
46 address these contamination sources (reference: California Integrated Water Quality System

Vision recommendations met:

1, 3, 9

Performance measures:

- Percentage of time that contaminants or their precursors meet, or are better than, water quality targets (+)
- Pathogen concentrations at Delta drinking water intakes (-)
- Net levels of salinity in major groundwater aquifers (-)
- Number of nuisance growths of algae or aquatic plants in the Delta or water project facilities (-)
- Concentrations of contaminants in urban runoff and agricultural drainage flowing into the Delta (-)
- Salinity variability between fresh to brackish conditions during periods necessary to meet life history requirements of broad range of desirable aquatic species (+)
- Number of days per year water temperature exceeds life history requirements for broad range of desirable aquatic species (-)
- Number, duration, and areal extent of incidences during which dissolved oxygen levels drop below regulatory standards (-)
- Extent of areas listed as low dissolved oxygen impaired water bodies on RWQCB Section 303(d) list (-)
- Number, duration, and areal extent of incidences during which pH falls outside regulatory standards (-)
- Concentration of methyl mercury in Delta water and sentinel species compared to 2008 baseline and Water Quality Control Plan standards (-)
- Concentration of selenium in San Joaquin River, Delta waters and sentinel species compared to 2008 baseline and Water Quality Control Plan standards (-)
- Concentration of ammonia in Delta waters compared to 2008 baseline and Water Quality Control Plan standards (-)
- Number of new contaminants added to RWQCB Section 303(d) list (-)

1 data). Virtually all of these actions involve rivers and streams directly feeding into the Delta.
2 However, in spite of this enforcement history, pollution pressures have continued and, today,
3 virtually all of the rivers, streams and drains have significant water quality problems and pose a
4 real and continuing threat to the quality of water in the Delta. This represents a potential
5 environmental justice concern as well, as many rural, low-income areas are impacted. At the
6 same time, if the costs of making the needed improvements falls on low-income residents and
7 workers, this also represents an environmental justice concern. Working through these issues
8 requires additional attention.

9
10 Given current levels of population growth and climate change, Delta water quality will be further
11 degraded in the Delta unless significant steps are taken. Water conservation, pollution
12 prevention, stormwater infiltration, water re-use, improved wastewater treatment processes, and
13 water recycling are all required to improve the water quality in the Delta. The burden of dealing
14 with pollutants must include treatment at the source.

15
16 Relocating intake facilities or modifying the flow of water within the Delta to effectively draw
17 water from flowing Delta channels improves the quality of drinking water and agricultural export
18 supplies while reducing direct ecosystem impacts. For example, relocating the current Central
19 Valley Project (CVP) and State Water Project (SWP) south Delta intakes to the Sacramento
20 River near Hood would reduce bromide in exported water to approximately 5% of current levels
21 and would reduce take of Delta smelt.

22
23 Changes to Delta conveyance systems and the effects of climate change will have an impact on
24 the reliability and water quality for those with intakes located within the Delta. Investing in
25 additional alternative intakes for these users can provide further flexibility in helping change the
26 pattern of diversions to when and where least harmful to the environment.

- 27
28 a Require the CVRWQCB to immediately re-evaluate wastewater treatment plant
29 discharges into Delta waterways and upstream rivers and set discharge
30 requirements at levels that are fully protective of human health and meet
31 ecosystem needs. This process should involve formal consultation with the
32 California Department of Public Health for drinking water needs
33
34 b Require the CVRWQCB to adopt a long-term program to regulate discharges
35 from irrigated agricultural lands by 2010.
36
37 c Require the CVRWQCB to review the impacts of urban runoff on Delta water
38 quality and adopt a plan to reduce or eliminate those impacts by 2012.
39
40 d Relocate as many of the Delta drinking water intakes as feasible to channels
41 where water quality is higher and away from sensitive habitats. The North Bay
42 Aqueduct and the Contra Costa Water District intakes should be relocated in the
43 near term, with State and federal south Delta intakes relocated upon completion of
44 the current environmental planning processes. The cost of these actions must be
45 borne by those who benefit.
46

- 1 e Develop and implement Total Maximum Daily Load (TMDL) programs by 2012
2 for areas upstream of the Delta to reduce the loads of organic and inorganic
3 mercury entering the Delta from tributary watersheds. The mercury TMDL
4 program for the Delta itself should continue and other TMDLs developed as
5 necessary to meet known and future needs.
6
- 7 f Comprehensively monitor fish and wildlife health at suspected toxic sites,
8 beginning in 2009. As part of its governance authority, the CDEW Council should
9 build on the recent work of the U.S. Environmental Protection Agency (USEPA),
10 the CALFED Science Program and the State and Regional Water Boards to
11 develop a comprehensive monitoring program for fish and wildlife health at
12 suspected toxic sites. In particular, these programs should make a concerted effort
13 to study the overall health effects of the mixture of contaminants that
14 cumulatively impact Delta species, as opposed to examining contaminant-species
15 relationships one at a time.
16
17

1 **Strategy 4.1. Reduce urban, residential,**
2 **industrial and agricultural water**
3 **demand through improved water use**
4 **efficiency and other means.**

Vision recommendations met:
1, 4, 6

5
6 Paramount to the success of our Strategic
7 Plan will be a major shift over the next
8 half-century in water use expectations and
9 behaviors of our communities and our
10 farming economies. We must reduce the
11 consumptive needs in our communities and
12 more efficiently use water to produce the
13 crops that feed us and often provide
14 regional economic foundations.

Performance measures:
Water use per capita, relative to 2008
baseline, by hydrologic region (-)
Water use per unit industrial economic
output, relative to 2008 baseline, by
hydrologic region (-)
Water use per unit agricultural economic
output, relative to 2008 baseline, by
hydrologic region (-)

15
16 On average, California’s communities use
17 over 160 gallons per person per day – with
18 much of the population close to this value,
19 but with some regions tremendously
20 exceeding this rate. Though we enjoy the benefits of a generally temperate Mediterranean
21 climate, these rates often exceed the national average. Over the last decade, we have improved,
22 but we must do better. Governor Schwarzenegger has already established a target of reducing
23 California’s per capita water use by 20% by 2020, and has directed state agencies to develop a
24 more aggressive plan of conservation to achieve this target. But we should not stop there.
25 Further adoption of water saving devices and best management practices can have an immediate
26 effect on today’s demand, but the inclusion of this ethic into future planning for future residents
27 – who’s demand has yet to occur – will be just as important. Among other actions, forward
28 thinking that better links urban land-use and expectations with water supply planning at the local
29 level and recognizes the scarcity of this resource will ensure that the future residents of
30 California use water efficiently.

31
32 In agriculture, opportunities to improve the efficient use of water exist, but often they do not
33 currently result in water savings available for other uses. For most farming operations within the
34 Delta Watershed, diversions are made from surface water or groundwater to provide for
35 irrigation demands. Water not physically used by the plants generally returns to the groundwater
36 or surface water systems – though commonly of degraded quality (temperature and constituents)
37 and in quantities that at times hamper broader water management opportunities. Again, we must
38 do better. In regions that import Delta water supplies, opportunities to more closely match what
39 is applied with what the plant needs can result in real water savings. However, as a result of
40 increasing delivery costs and less reliable water supplies over the past decade, many easier
41 opportunities to use water more efficiently have already been adopted. That should not dissuade
42 efforts to do even more, especially as water prices are expected to continue to increase.

43
44 Over the long-term of decades, water prices for all uses should be expected to move closer
45 together. Large price differentials will be socially and politically difficult to maintain, water
46 exchanges will tend to equalize prices, and definitions of reasonable use can be expected to

1 require ever more efficient use. With emphasis on use of most productive lands and more
2 effective irrigation equipment and management, California can still be as, if not more, productive
3 with the crops we choose to grow and ensure that the state's agriculture contributes to the food
4 and fiber needs of the nation. Increased energy prices and policies to reduce the carbon footprint
5 of all activities, including food production, can be expected to shift some of California
6 agriculture to production intended for local and regional use.

7
8 Agriculture has much broader value than simply producing food and fiber. It shapes landscapes
9 and greatly influences ecosystems. Monocultures of irrigated agriculture have landscape and
10 ecosystem effects. Abandoning those agricultural uses would result in other landscapes and
11 ecosystems, including risks of harmful dust storms and weeds. That is an undesirable outcome.
12 Between these two extremes are a wide range of forms of land management that result in
13 continued agricultural production and desired ecosystem function. Policies to support evolution
14 in these adjustments should be a high priority.

15
16 Any change in agricultural practices will affect both farm workers as well as the communities in
17 which agriculture is a large factor. Some changes can result in short-term negative economic
18 impacts, but they are not necessarily negative in the longer-term, and always occur in the context
19 of societal wide economic changes.

20
21 Change in agriculture's water use comes with costs. In the past, efficiency improvements have
22 sometimes been rejected or delayed because they were not deemed cost-effective given the profit
23 potential of current crops and the relatively low-cost of water. Farmers have been unable to
24 justify the expense given these constraints. Avoiding efficiency improvements in the future,
25 however, may be unrealistic given projected increased costs for water.

26
27 This strategic plan requires accelerated investments by individuals, communities, industry and
28 farming to reduce both today's water demands and that of generations to come. The critical
29 elements include:

- 30
- 31 a **Enact legislation and require urban retail water purveyors to implement**
32 **measures to achieve a 20% reduction in urban per capita water use**
33 **throughout California by December 31, 2020 and target a 40% reduction,**
34 **especially in non-coastal areas, by 2050.** Reduction targets will be compared
35 against the most recent reporting available to DWR as of October 2008, which
36 will constitute the baseline conditions
 - 37
 - 38 b **Enact legislation to require urban and agricultural water purveyors to adopt**
39 **more aggressive tiered pricing and related mechanisms,** and remove potential
40 constraints to water purveyors' budgeting methods and authorities to allow
41 conditional-pricing changes during temporary drought or emergency conditions.
 - 42
 - 43 c **Broaden the scope and requirements embodied in California Water Code**
44 **§10910 et. seq. (commonly referred to as SB 610 Water Supply Assessments)**
45 **and related provisions under the California Environmental Quality Act**
46 **(CEQA) to (1) require a significant increase in the number of years of projected**

1 sufficient water supply and a significant decrease in the triggering thresholds, and
2 (2) provide opportunities such as: (a) requiring connection fees to vary based on
3 potential per-dwelling unit water demands to incentivize aggressive
4 implementation of low-water use fixtures as well as adaptation in landscaping
5 expectations and lot sizes, (b) recognition of fully funded localized conservation
6 projects, greywater systems and other extra-ordinary measures in existing
7 communities as sufficient water supplies for new developments,
8

9 **d Require all retail water purveyors to develop an integrated plan for response**
10 **to Delta water supply curtailments** from either (a) drought conditions which
11 reduce by 40 percent for two years the available water exported directly from the
12 Delta or from the Delta Watershed, and (b) one year loss of all surface water
13 imported into the region diverted directly from the Delta. These plans are to be
14 developed pursuant to guidance from the DWR and to be incorporated into
15 UWMPs submitted for 2015. Plans must address all feasible approaches for both
16 conserving water and increasing water supply under these conditions.
17

18 **e Require DWR to provide funding for new incentive-based programs to**
19 **promote the widespread and mainstream adoption of aggressive water**
20 **conservation.** These may include concepts such as (1) creating market
21 mechanisms for water quality improvements associated with reducing surface
22 return flows from farming operations, (2) developing “carbon credits” for water
23 utilities for reduced greenhouse gas emission associated with water conservation,
24 and (3) allowing local tax incentives for new communities that meet aggressive
25 conservation criteria.
26

27 **f Require the SWRCB to certify equipment and methods which significantly**
28 **reduce or eliminate any return flows to surface water and groundwater**
29 **systems as best management practices available to comply with the Irrigated**
30 **Lands Regulatory Program.** Certification of installation and operation of the
31 equipment and methods shall be completed by third party audits by firms and
32 organizations designated by the SWRCB, at the expense of those certified. This
33 equipment and these methods may apply at the farm level or water system
34 delivery level. Certification would also require annual reporting on water use to
35 the SWRCB. The SWRCB would adjust certification of equipment and methods
36 over time as understanding of relationships between irrigation methods and
37 degradation of surface and groundwater resources is improved.
38

39 **g Require preparation and submittal of an Agricultural Water Management**
40 **Plans (similar to the Act requiring UWMPs) to DWR every five years** by (1)
41 agricultural water districts using more than 3,000 acre-feet of groundwater and/or
42 surface water and (2) counties who provide the regulatory oversight for
43 individual agricultural groundwater users outside of recognized water districts.
44 The AWMPs should address projected agricultural water demands, availability of
45 supplies and implementation of Efficient Water Management Practices (EWMPs).
46 The first plans would be completed by 2011. DWR’s criteria would embody the

1 analysis currently required by members of the Agricultural Water Management
2 Council (AWMC). EWMPs, developed by DWR and the AWMC, should be
3 treated as the floor-level of conservation. Updating of the EWMPs shall occur at
4 least every 5 years.

5
6 h **Restrict access to state grants and loans** as well as approvals from DWR or the
7 SWRCB for water transfer activities to entities that have not completed urban and
8 agricultural water management plans per DWR criteria.

9
10 i **Require DWR to continue support for the California Urban Water**
11 **Conservation Council and the AWMC.** These organizations must continue to
12 provide leadership in water use efficiency in order to serve as surrogates for
13 regulatory action.

14
15 j **Require DWR and the SWRCB to significantly increase efforts to create and**
16 **promote public educational messaging throughout the state on water**
17 **conservation.** Educational campaigns should focus as much on changing the
18 expectations of our future generations regarding uses such as urban landscaping
19 as it should on changing the behaviors of existing water users.

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Strategy 4.2. Increase regional self-sufficiency through diversifying water supply portfolios while not impacting flows into the Delta

Throughout the state, the general concept of regional self-sufficiency is being embraced through Integrated Regional Water Management (IRWM) planning – a framework for actions to address the uncertainties presented to those providing our farms and communities with water. On their own or with the incentive of grant funding, many water management entities are working together to look for opportunities to optimize available water supplies, develop new local supplies, and manage demands in a more comprehensive manner – a manner that accommodates expected ranges in the reliability and quantity of specific supplies from various sources. These collaborative planning efforts must be elevated in their importance and function to ensure regions are adequately addressing risks and investing in strategies to manage an unpredictable future.

Resource flexibility – an inherent component of regional self-sufficiency – requires a diversified portfolio of water management strategies including: (1) creating new places to store supplies - either above or below ground during periods of surplus – for use when particular supply sources are constrained; (2) building new facilities to reclaim or desalt otherwise non-potable or poor quality supplies; (3) managing land uses to improve water quality, capture urban storm water, and control water demands; and (4) improving the efficiency of existing and future agricultural and urban uses of water.

By implementing more of these strategies throughout all regions of the State, the opportunity for the annual quantity of diverted Delta water supplies to reliably ebb and flow in unison with the need for and availability of water to sustain Delta ecosystem functions will be vastly improved.

Our Strategic Plan requires greater attention to IRWM planning and subsequent investments in diversified regional water supply portfolios¹. The critical elements of this strategy include:

Vision recommendations met:
1, 4, 6, 8

Performance measures:
Length of time, at average rates of use over a three-year period, that a given water district’s alternative and stored supplies will last if there is a catastrophic outage of the Delta (+)
Amount of water in accessible surface and ground water storage compared to 2008 baseline (+)
Amount of water exported from the Delta that is recycled or re-infiltrated (excluding water lost to direct consumption by crops and people, or evapotranspiration) compared to 2008 baseline (+)

¹ The concept of diversified regional water supply portfolios was extensively outlined in the California Water Plan Update: 2005. Integrated planning to address all potential supply and demand management strategies are strongly encouraged as a critical method to help

- 1 a **Modify the Water Recycling Act of 1991 to add a statewide target to recycle a**
2 **total of 1.5 million acre-feet of water annually by 2020.**² This increase would
3 be aided by encouraging local and regional land-use and water management
4 entities to require dual-plumbing when and where appropriate, addressing issues
5 associated with seasonal storage, harmonizing State and regional permitting
6 requirements, modifying land use planning practices, funding educational efforts
7 on the value of this water resource, and significantly increasing the State’s
8 committed funding for successful grant and loan programs.
9
- 10 b **Enact legislation to encourage local water agencies to at least triple the**
11 **current statewide plant capacity for generating new water supplies through**
12 **ocean and brackish water desalination by 2020**³. The State should continue
13 promoting research and implementation of coastal and brackish water desalination
14 projects. It is understood that the expansion of desalination must effectively
15 address the emissions impact of additional energy requirements (through the use
16 of renewable energy sources and offset programs), as well as the environmental
17 issues associated with water intakes and brine discharges.
18
- 19 c **Require the SWRCB to set goals for infiltration and direct use of urban**
20 **storm water runoff throughout the Delta watershed and export areas by**
21 **2015.** Integrate achieving the goals with access to state grant and loan programs.
22 Require local governments to include best management practices necessary to
23 achieve goals in their land use planning and decision making. Goals must also
24 acknowledge and provide resolution for concerns of water quality degradation
25 that could occur with urban stormwater recharge projects.
26
- 27 d **Require DWR to develop a model stormwater management ordinance for**
28 **urban areas throughout the Delta watershed.** The ordinance should primarily
29 focus on stormwater management associated with new urban development
30 projects that helps meet the goals to be set by the SWRCB
31
- 32 e **Require the SWRCB to ensure accurate and timely information is collected**
33 **and reported on all surface water diversions in California by 2012.** This
34 action will also repeal all exemptions from reporting to the SWRCB.
35
- 36 f **Require DWR, local water districts and counties to ensure accurate and**
37 **timely information is collected on all groundwater diversions in areas**
38 **upstream, within and that receive exports from the Delta watershed and that**
39 **such data is reported to the SWRCB.** Data will be collected through expansion
40 of DWR’s groundwater monitoring networks, reporting by local and regional

² The Water Reclamation Act of 1991 established a statewide goal to recycle a total of 700,000 acre-feet of water per year by 2000, and one million acre-feet of water by 2010. The California Water Plan Update 2005 stated California’s water agencies currently recycle about 500,000 acre-feet of wastewater annually

³ According to the California Water Plan Update: 2005, there currently are about 24 desalting plants operating in California that provide water for municipal purposes. The total capacity of these plants is approximately 79,000 acre-feet per year. These include 16 groundwater, one surface water, and seven seawater desalination plants

1 entities associated with Urban Water Management Plans and Groundwater
2 Management Plans. These information systems shall be fully operational by 2012.

3
4 **g Restrict access to state grants and loans as well as approvals from DWR or**
5 **the SWRCB for water transfer activities** to entities that are actively
6 implementing GMPs and IRWMPs and are providing all necessary reporting data
7 to DWR and the SWRCB.

8
9 **h Enact legislation encouraging groundwater banking, extraction and delivery**
10 **facilities for State and local surface water supplies.** Measures should address
11 immediate revisions of State and federal place-of-use restrictions, adoption of
12 statewide guidelines addressing injection permitting, and continuation of
13 successful DWR and SWRCB grant and loan programs.

14
15 **i Require water resource plans and land use plans to protect areas needed for**
16 **groundwater recharge and to enact standards for low-water use landscaping.**
17 Examples of such standards include “cash for grass” programs that pay
18 homeowners to remove lawns, as well as the landscaping standards being
19 introduced in Santa Ana, Marin County, and elsewhere around the state.

20
21 **j Require DWR and SWRCB to further improve water transfer procedures**
22 through the creation of an inter-agency team coupled with existing buyers and
23 sellers. These policies must incorporate reasonable use and public trust principles
24 of water rights laws in California and must not reduce or abrogate the
25 constitutional provision that recognizes that all waters are the interest of the
26 people of California and for the public welfare. DWR shall promote concepts
27 such as rotational fallowing as a mechanism to assure reinvestments of transfer
28 funds into local agricultural economies and evaluate opportunities to pre-approve
29 some transfers to create an available “option” pool for emergency needs.

30
31 **k Permit DWR, the SWRCB, and DFG to establish and fund the initial**
32 **development and testing of new market mechanisms to provide water users**
33 **and ecosystem managers with additional tools to adaptively manage instream**
34 **flows and diversions.** Example concepts could include (1) establishing an
35 endowment fund – paid for by water users – that would be used to purchase
36 additional water supplies, or “buy-down” demands in particular areas to augment
37 ecosystem flow objectives, (2) creating regulatory incentives for water users to
38 protect water assets in a voluntary Water Trust that would manage the supplies for
39 Delta ecosystem objectives, and (3) developing “demand reduction easement”
40 program – similar to a flood easement program – that might allow emergency
41 curtailment of diversions.
42

1 **Strategy 5.1. Expand conveyance,**
2 **storage and reservoir operation options**
3 **to meet long-term demands in light of**
4 **likely future changes in the Delta.**

Vision recommendations met:

1, 7, 8

Performance measures:

Likelihood of a catastrophic interruption of Delta conveyance system (-)

Amount of water in accessible surface and ground water storage compared to 2008 baseline (+)

5
6 Whether upstream, within, or exporting
7 from the Delta Watershed, the ability for
8 diverters to rely upon a sufficient and
9 predictable quantity of surface water is
10 inextricably linked to the ability to plan,
11 fund and implement a more diverse water
12 supply portfolio. As a critical source of
13 water for many, unpredictable constraints
14 on Delta diversions continue to result in
15 tensions between and among the various
16 users of this vital-to-all resource –
17 contributing to the continued deterioration
18 of Delta ecosystem functions and

19 unacceptable economic hardships. We believe these tensions can be reduced or even avoided
20 altogether if diverters were provided greater predictability under differing hydrologic and
21 ecologic conditions. This knowledge increases the ability to define and invest in appropriate
22 diversification of water supplies and management tools – including significant improvements in
23 water use efficiency, water recycling and conjunctive use. Lacking this predictability has
24 resulted in unsustainable short-term actions by water users such as stumping avocado trees and
25 letting crops wither. Predictability and reliability of a sufficient Delta supply across a range of
26 defined circumstances would help maximize the benefit of a diversified supply portfolio and
27 move us away from unsustainable short-term actions.

28
29 Issues of reliability and sustainability must be considered in the context of anticipated changes in
30 the Delta due to climate change and the increasing potential for seismic disruptions. Climate
31 change will lead to changes in the amount and timing of snowmelt (and therefore surface water
32 flows) as well as sea level rise. The potential for seismic events affecting the Delta, while not
33 experienced historically, are projected to increase over time after a relatively quiet seismic period
34 following the major Bay area earthquake of 1906, according to the Delta Risk Management
35 Study. While none of these events are certain, not planning for these events based on current and
36 emerging scientific studies would be an abrogation of public trust and sound planning and policy
37 practices.

38
39 The system must also be more robust to allow flexibility in the timing and quantities of
40 diversions to shift away from periods with highest impacts on ecological functions in and
41 upstream of the Delta, while reliably providing predictable and acceptable volumes of quality
42 water for diverted uses. This flexibility is paramount to achieving the strategies necessary for a
43 resilient ecosystem, as detailed in later strategies.

44

1 With improvements in regional self-sufficiency, water users and purveyors will better reflect
2 their willingness to make investments necessary to obtain desired reliability, including the
3 portion of their portfolio derived from surface water diversions from the Delta watershed.
4

5 Diverters who value and require higher reliability of Delta watershed supplies will need to fund
6 the necessary means to achieve it, including significant investments in storage, conveyance and
7 ancillary facilities to allow for reliability objectives to be achieved. Those users currently
8 diverting surface water from the Delta watershed who are willing to accept lower average
9 reliability of those supplies – possibly because they have other measures in their water supply
10 and demand portfolio – should see lower investment requirements.
11

12 The Delta Vision report calls for “dual conveyance” of water supplies through the Delta as its
13 “preferred direction.” Several important issues should be noted related this declaration. First,
14 following the lead of the Delta Vision Stakeholder Coordination Group, dual conveyance is a
15 rejection of an isolated conveyance facility alone. It recognizes the need to maintain flows
16 through the Delta while also accounting for likely future risks.
17

18 Second, it is a preliminary recommendation pending the results of analyses (through the
19 NEPA/CEQA processes) to substantiate that it achieves the joint objectives of water supply
20 reliability while maintaining sufficient flows (under most conditions) for the ecosystem, Delta
21 agriculture, recreation and other uses. “Under most conditions” recognizes that in achieving the
22 co-equal goals there will be short-term conditions that favor water supply reliability over
23 ecosystem and other Delta uses, as well as conditions that favor the ecosystem and other Delta
24 uses over water reliability.
25

26 Third, the term “dual conveyance” is used rather than “peripheral canal” in recognition that: (1)
27 with changes in land use since past discussions of a peripheral canal, most potential
28 configurations of a “canal” are likely to be located near the edges but ultimately go through, not
29 around Delta, and (2) the original discussions of flow and ways to operate the facility have been
30 taken into account, recognizing the need to equitably control decisions about how much water
31 flows through a “canal” and provide assurances, such as being operated consistent with the
32 proposed California Delta Ecosystem and Water Plan.
33

34 The work of the Task Force will be completed before the requisite studies to confirm the
35 feasibility and acceptability of dual conveyance. Based on the information at hand, however,
36 from highly regarded hydrologists and ecologists with extensive knowledge of the Delta, the
37 Task Force believes dual conveyance is the option most likely to meet the major goals of Delta
38 Vision. This is another reason the Task Force believes the governance structure proposed is
39 essential to ensure attainment of Delta Vision goals.
40

41 Consistent with this approach, our Strategic Plan proposes (1) construction of new facilities for
42 storage and conveyance – as necessary to meet the reliability goals for those dependent on this
43 resource; (2) significant shifting in surface water diversion timing for users upstream, within and
44 outside of the Delta watershed to accommodate Delta ecosystem functions; and (3) construction
45 of sizable infrastructure to transfer and store water from localized abundance of the wet periods
46 to the drier times and places – throughout the Delta watershed and in export areas.

1
2 Overall, the State to build storage, conveyance and ancillary facilities necessary to allow surface
3 diversions upstream, within and exported from the Delta watershed to be flexibly managed to
4 help meet Delta ecosystem flow objectives while striving to obtain long-term average diversion
5 quantities within historic levels.

6
7 Specific elements of this strategy include:

- 8
9 a. Direct the DWR in cooperation with the DFG to build upon the studies underway as part
10 of the Bay Delta Conservation Plan (BDCP) efforts and immediately begin a 1-year
11 investigation to improve our knowledge of storage and conveyance requirements to
12 obtain desired flexibility, as well as to document changes in annual surface diversion
13 quantities that could result from shifting diversion timing to wetter periods (both within
14 and between years) to achieve desired ecosystem flow objectives.
- 15
16 • By the end of 2010, using a defined set of economic, ecologic and water supply
17 attributes as primary indicators, make a decision regarding the size and location of
18 new storage and conveyance facilities and direct creation of a long-term action
19 plan to guide their design and construction. This decision may result in changes
20 to the desired ecosystem water flow objectives as a result of balancing the co-
21 equal goals given the recent knowledge obtained.
 - 22
23 • By October 2009, and if no fatal flaws are identified in preliminary evaluations,
24 obtain permits and ground-test the components of a “two-barrier” Middle River
25 Conveyance option, initially as a reversible experiment. In an open, transparent
26 manner, analyze and refine the Middle River Conveyance option, including
27 evaluation and appropriately staged implementation of fish screens, gates and
28 other “testable” components
 - 29
30 • The capacity of an isolated portion of a dual conveyance system must recognize
31 and accommodate risks of failure to the through-Delta portion from seismic
32 events and sea-level rise
 - 33
34 • Identify mechanisms and "connect" legal water users to improved through Delta
35 conveyance facilities including but not limited to Contra Costa Water District and
36 legal users in the south, central, and north Delta water agencies.
- 37
38 b. Export CVP and SWP contractors will pay for the capacity of a dual conveyance facility
39 (should it prove to be the preferred alternative) dedicated to their benefit, and will control
40 that capacity. At least 15 percent of the capacity will be dedicated to the California Delta
41 Conservancy to allow additional management of flows and diversions and paid for by
42 public funds (see Governance discussion).
- 43
44 c. By 2020, complete construction of 50% of the identified new surface and groundwater
45 storage and associated conveyance facilities to accommodate the significant storage
46 requirements associated with shifting diversion timing, and in anticipation of changes in

1 the precipitation characteristics resulting from climate change. By 2030 complete the
2 remaining 50% of needed facilities.

- 3
- 4 • Inform these decisions with completion of CALFED surface storage
- 5 investigations, which require the legislature and the administration to ensure
- 6 stable State and federal funding through FY 2010
- 7
- 8 • Construction, ownership and operation of significant new state or federal storage
- 9 facilities – surface and in-ground – will be completed through open and public
- 10 bidding processes. Public funding for new storage will correspond to public
- 11 benefit (e.g. control of the associated capacity and/or yield)
- 12
- 13 • Groundwater storage projects and associated conveyance facilities will be
- 14 governed by regional entities in compliance with local Groundwater Management
- 15 Planning requirements and applicable ordinances
- 16

- 17 d. Desired flexibility in the management of upstream surface diversions will require greater
- 18 ability to shift from surface diversion and delivery systems to groundwater extraction and
- 19 delivery systems under different hydrologic and ecologic conditions. Such actions are
- 20 equally beneficial to all surface water diverters from the Delta watershed as well as
- 21 public Delta ecosystem goals. Funding for needed conjunctive use facilities, both public
- 22 and from others reliant on the Delta as a conveyance system, must recognize this broad
- 23 benefit (i.e. the cost of diversion management should not be borne solely by upstream
- 24 diverters).
- 25
- 26 e. In wetter periods, Delta watershed surface diversions would be allowed to exceed,
- 27 sometimes significantly, historic diversion rates to enable storage of water supplies by
- 28 diverters seeking high levels of reliability of this resource for use during periods when
- 29 surface diversions must be constrained to meet Delta ecosystem flow objectives. This is
- 30 based on the assumption that adequate groundwater and surface storage facilities exist to
- 31 store these wet period flows.
- 32
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1 **Strategy 5.2. Integrate Central Valley flood management with water supply planning**

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The entire Central Valley is either upstream of the Delta or reliant on diverted Delta water for its supplies (see Figure 6). In a very real sense, the challenges of flood control and water supply reliability in the Delta are two sides of the same coin. Major multi-purpose reservoirs exist on many of the tributaries to the Delta to store surface water supplies, control floods, generate hydroelectricity and provide recreation. Within a given reservoir, water supply storage and flood control are competing priorities at certain times of year – more of one means less of the other. Therefore, it is very important that flood management operations be tailored as closely as possible to actual flood probabilities, without compromising safety, so that as much reservoir space as possible can be devoted to water supply storage.

Vision recommendations met:

1, 8, 9

Performance measures:

Additional annual yield from major reservoirs compared to current flood operation requirements (+)

Additional flood conveyance capacity on major rivers leading into the Delta, compared to 2008 baseline (+)

Percentage of precipitation in the Delta watershed that is infiltrated or directly used compared to 2008 baseline (+)

Present management practice focuses on maintaining a given capacity in the reservoir and not on the actual threat of flooding. Improved forecasting capabilities now allow reservoir managers to modernize flood control operations diagrams so that more water supply yield can be obtained without compromising flood safety. Expanding the flood conveyance capacity downstream of the reservoirs (e.g. available floodplains) also increases management flexibility by allowing more flood water to be released safely from the reservoir if necessary, thereby reducing the amount of space within the reservoir that must be reserved for flood storage. Expansion of the conveyance capacity downstream of the reservoirs must be continuous along the entire river, and the capacity of the most downstream area sets the upper limit for the entire system.

Increased infiltration of precipitation that falls on the Delta watershed has the triple benefit of reducing flood peaks, storing water for later use in groundwater aquifers, and potentially reducing the amount of water that has to be exported from the Delta at critical times. It can also improve the quality of water through the natural filtering capabilities of soils. Communities throughout the Central Valley should aggressively pursue stormwater harvesting or infiltration wherever possible. In urban areas, stormwater harvesting can help supply landscape irrigation and other uses, and infiltration zones can provide valuable open space amenities. Much of the upper watershed of the Delta is forests, which should be managed for the water holding capacity of their soils, particularly as climate change produces more rain and less snow in California.

The critical elements of this strategy include:

- 1 a. **Modernize flood control operation diagrams for all major California reservoirs for**
2 **which the U.S. Army Corps of Engineers has prescribed flood control regulations by**
3 **2012.** The modernization should account for existing technology advances, the
4 hydrologic changes that have occurred since the operations diagrams were created, and
5 the hydrologic changes likely to occur because of climate change. It should also account
6 for any planned increases in the flood conveyance capacity of the downstream rivers. At
7 a minimum, the operations criteria should be based on forecasts and not on existing
8 reservoir storage. The Department of Water Resources (DWR) should cooperate with the
9 USACE on both the update of the operations criteria and manuals and the environmental
10 documentation (EIS) required to accomplish the changes in operation.
11
- 12 b. **The Central Valley Flood Protection Plan (conducted by DWR) should immediately**
13 **create a flood bypass along the lower San Joaquin River.** Use existing bond funds to
14 begin acquiring title or easement to floodplain and bypass lands immediately, especially
15 in areas where urbanization threats are high. Identification of appropriate sites should be
16 completed, and these areas protected by easement or purchase, as quickly as possible.
17
- 18 c. **Beginning immediately, DWR should incentivize additional infiltration and storage**
19 **of runoff and floodwater upstream of the Delta** using both groundwater and floodplain
20 storage in the Sacramento Valley, San Joaquin Valley, and the Tulare Basin, as well as
21 opportune sites in the upper watersheds.
22
- 23 d. **By 2012, DWR should study, and if feasible implement, a plan to convey water from**
24 **storage reservoirs to groundwater infiltration sites** to expand storage resources and to
25 improve flood control capacities of the reservoirs.
26
- 27 e. **Over time, work with the U.S. Forest Service to revise the Forest Plans for the**
28 **National Forests in the Sierra Nevada to encourage greater infiltration.**

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Strategy 6.1. Match the level of protection provided by Delta levees and the uses of land and water enabled by those levees.

The levee system is central to all Delta uses and services, and levee investment will shape the future Delta.

New policies and priorities are needed to provide long-term support of state interests in ecosystem, water quality and supply, navigation, and recreation. Priorities for levee maintenance and upgrade should follow from the land uses and services to be protected over the long run. Thus priorities must engage from a comprehensive, geographically specific plan, such as is intended in the CDEW Plan. State funding should be directed primarily to levees that support State interests, especially ecosystem vitality, water quality and conveyance, and public use. Protection of some Delta interests will be more dependent on beneficiaries’ ability and willingness to pay. Thus, it is possible, perhaps even likely in the longer term, that islands or tracts that are in low-value private uses may convert to wetlands, open water, or flood-tolerant uses.

This Strategic Plan embodies the following principles:

1. The current configuration of islands and waterways is critical to many current uses and services dependent on the existing levee system. But some areas of the current levee system are not providing adequate protection, and the existing landscape will not be sustainable over the long run if anticipated changes from global warming and other risk factors occur.
2. A range of levee design types and standards should be used to respond to sea level rise, river flooding, subsidence, and seismic risk, and provide varying levels of protection relative to the uses and services at risk.
3. Application of the range of levee design types and standards should be keyed to the land uses and services protected, and to the levels of risk reduction deemed appropriate for each.
4. A range of environmental enhancements should be applied to fit site conditions and ecosystem goals.
5. The Delta should achieve full compatibility between levels of protection and land uses and services at risk.

Vision recommendations met:

9, 11, 12

Performance measures:

Index measuring compatibility between levee designs and land uses (+)

- 1 6. All beneficiaries of levee protection should pay their appropriate share of the costs.
- 2
- 3 7. Levee improvements and repairs should be based on economic feasibility and a broad
- 4 evaluation of services provided.
- 5
- 6 8. In the event of a levee failure prior to the finalization of a Delta-wide CDEW Plan,
- 7 response should consider not only immediate repair and pump-out, but other options.
- 8 These include *no action* pending considered evaluation of consequences, and *breach-*
- 9 *repair and rest*, pending benefit/cost analysis. Major actions and upgrades should await
- 10 completion of comprehensive planning.
- 11

12 **Recommended Actions:**

- 13
- 14 a. Immediately adopt the Delta Levee Classifications Table by Executive Order and
- 15 legislative enactment.
- 16 b. Require conformity with the Delta Levee Classifications Table in all Delta investments,
- 17 including infrastructure and land use.
- 18 c. As part of the CDEW planning, involve DPC, BCDC, SWRCB, CDFG and DWR and
- 19 local governments in setting levee configurations and priorities.
- 20 d. Require DWR to adopt a levee policy that will address seismic risk, climate change,
- 21 subsidence and sea level rise; and that is consistent with the Delta Levee Classifications
- 22 Table, by 2010.
- 23 e. Continue the levee subventions program pending long-term policies and funding
- 24 following the CDEW and related planning efforts.
- 25 f. Determine the target levels of protection, by 2010, that are necessary to achieve Delta
- 26 Vision goals. Set priorities for upgrading levees in the CDEW Plan, considering the role
- 27 of levees in achieving water quality and flow objectives, and ecosystem needs.
- 28 g. Rest authority for levee priorities and funding with the CDEW Council to ensure a
- 29 rational and cost effective relationship between levee investments and land use,
- 30 ecosystem, water flow and quality, conveyance, and Delta-as-place values.
- 31
- 32
- 33

1 **Strategy 6.2. Ensure appropriate land**
2 **uses in the Delta region**

Vision recommendations met:

2 10 11 12

3
4 Despite the existence of the Delta
5 Protection Act, and the Delta Protection
6 Commission (DPC), the Delta region as a
7 whole has continued to experience
8 development in locations that potentially
9 threaten state interests and heighten safety
10 risks in the region. Urban development on
11 certain lands outside of the primary zone
12 can increase flood risks for existing
13 inhabited areas and foreclose critical
14 ecosystem revitalization and climate
15 change adaptation opportunities.
16 Substantial population increases in the
17 region are projected for the coming
18 decades, meaning that urbanization
19 pressures in the secondary zone – and even
20 the primary zone – are likely to continue.

Performance measures:

Number of people living in legal Delta in areas with less than 200-year flood protection (-)

Number of structures in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)

Number of people living and working in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)

21
22 Land use policy in the Delta must also help ensure ecosystem vitality can be sustained as
23 climate change unfolds. There is a need to protect upland areas adjacent to restored intertidal
24 marshlands so as sea level rises the marshlands can naturally migrate landward and continue to
25 provide their important ecosystem functions. The lands subject to this strategy are located around
26 the entire perimeter of the Delta, with priority placed where intertidal marsh restoration is most
27 feasible in the shortest time (see strategy 3.1).

28
29 In September 2007, the CALFED Independent Science Board recommended that planning for
30 critical facilities and services use a sea level rise projection of 55 inches for the year 2100. This
31 considers more recent scientific information than was available when the California Climate
32 Action Team Report adopted 12 to 36 inches in 2006. Recognizing the great uncertainty in these
33 projections and that sea level rise will continue beyond the year 2100, Delta Vision is assuming
34 60 inches (5 feet) of projected sea level rise for purposes of long term planning.

35
36 As described in Strategy 15, the DPC should continue to be the primary region-wide land use
37 governance entity, although with an enhanced role. The DPC’s primary new role will be to:

- 38
39 • Exercise direct permit authority over development proposals in the primary zone (as
40 opposed to existing appeal authority);
41 • Ensure that its plans and regulations are consistent with CDEW policies and plans.
42 • Ensure the consistency of local government plans and decisions for the secondary zone
43 with the state interests articulated in the California Delta Ecosystem and Water (CDEW)
44 Plan (see Strategy 7.2 for description of the Plan).

45
46 Our strategic plan for Delta land use policy includes the following critical actions:

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46
1. **Beginning immediately, strengthen land use oversight for the Cosumnes/Mokelumne floodway, and the San Joaquin/South Delta lowlands**, both of which are outside the primary zone but are critical to enhancing the co-equal values of the Vision. Local governments shall adopt plans for these areas to ensure compatibility with this Strategic Plan. These local plans shall be submitted to the CDEW Council for certification, or to the DPC if prior to CDEW Council establishment. Pending certification, the DPC shall exert jurisdiction over such areas as if they were in the primary zone. Upon plan certification, authority shall lie with the local governments.
 - a. The **San Joaquin River/South Delta Floodplain** is the region extending north from the southern boundary of the legal Delta, including all of Pescadero Tract and Paradise Cut, and Reclamation Districts R-2075, R-2084, R-2085, R-2094, R-2095, the portion of R-1077 generally north of Bethany Road, and the portion of R-2058 north of I-205. The plans may be comprehensive, but state oversight would address:
 - i. Flood safety
 - ii. A natural floodway for the San Joaquin River sufficient to account for restored river flows, climate change, and sea-level rise
 - iii. Non-structural floodplain management
 - iv. Protection and enhancement of river and slough corridors and riparian vegetation
 - v. Fish passage and fish habitat restoration
 - vi. Flood tolerant land uses
 - vii. Reconciliation of existing flood-intolerant land uses
 - viii. Water diversion management
 - ix. Water quality
 - x. Recreation, boating, and waterway access.
 - b. The **Cosumnes River/ Mokelumne River** confluence is defined as the region generally east of I-5 running from the southern border of New Hope Tract and to the northern border of Glanville Tract to the eastern boundary of the legal Delta. State oversight would address:
 - i. Protection and enhancement of river corridors and riparian vegetation
 - ii. Flood-tolerant land uses
 - iii. Non-structural floodplain management
 - iv. Ecosystem restoration
 - v. Water quality
 2. **Beginning immediately, strengthen land use oversight for Bethel Island and the City of Isleton and its vicinity on Brannan-Andrus Island, both of which lie outside of the primary zone but where safety risks from flood and sea level rise have persisted for decades and can be expected to worsen.** By 2010, legislation should be enacted to require the respective local governments to adopt special plans that focus on risk reduction not only through emergency response, but through land use changes, including the options of flood proofing, levee upgrade, and/or relocation. The Local Plan shall

1 bring land uses into conformity with the CDEW Plan over time, taking action consistent
2 with existing land use entitlements of property owners. These plans shall be prepared
3 within three years and be submitted for certification to the DPC, or to the CDEW Council
4 upon its establishment. Pending certification of these plans, DPC Primary Zone authority
5 shall apply.
6

- 7 a. **Isleton/Brannan-Andrus Island** is defined as all of Brannan-Andrus Island not
8 currently in the primary zone. Oversight would address:
9 i. Protection of life and property under current conditions, and under sea
10 level rise
11 ii. Emergency services and access, under current conditions and multi-island
12 failure conditions
13 iii. Levee failure response
14 iv. Seismic safety
15 v. Benefit/cost analysis of levee upgrade options
16 vi. Implications of Brannan-Andrus levee failure for other islands, Delta
17 hydrodynamics, and salinity intrusion
18
- 19 b. **Bethel Island**, defined as the entire island. Oversight would address:
20 i. Protection of life and property under current conditions, and under sea
21 level rise
22 ii. Emergency services and access under current conditions and multi-island
23 failure
24 iii. Seismic safety
25 iv. Levee failure response
26 v. Benefit/cost analysis of levee upgrade options
27 vi. Implications of Bethel Island levee failure for other islands, Delta
28 hydrodynamics, and salinity intrusion
29
- 30 3. **Beginning immediately, the DPC and local governments should prepare local plans**
31 **for five at-risk locations within the primary zone:** Walnut Grove (including the
32 residential area on Grand Island), Locke, Clarksburg, Courtland, and Terminous. These
33 areas were developed prior to the Delta Protection Act and remain at high risk without
34 clear strategies for risk reduction and sustainability. These plans must:
35
- 36 a. Identify ways to reduce risk to life and property through land use policies, or
37 combination of land use regulations and levee upgrades, including options for
38 full-island upgrades, island partitions, or ring levees. Recognize that current
39 PL84-99 type levees are not sufficient.
40
- 41 b. Consider the towns' historic internal needs, the towns' historic growth rates, and
42 their architectural and cultural character.
43
- 44 c. Be submitted for review and potential incorporation in the CDEW Plan.
45
- 46 d. Include a rationale for the state's participation in levee upgrades.

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- e. Plans may include common planning issues such as economic development, historic preservation, public services, and infrastructure.
- 4. **Beginning immediately, the Department of Water Resources (DWR) should form a consortium with the landowner (Ironhouse Sanitary District)** to strategize a land use transition to recreation, terrestrial habitat, subsidence reversal, carbon sequestration, dredged material handling, and appropriate agriculture on Sherman, Twitchell, and Jersey Islands.
- 5. **By 2010, the CDEW Council, the DPC, and the Sacramento Area Council of Governments should develop a model land-use protection ordinance for protecting sea level rise buffer lands.** The model ordinance will provide cities and counties located around the Delta margins with language for protecting these lands. The specific language should reflect that only land uses incompatible with future ecosystem landward shifts should be precluded; many current land uses, including many forms of agriculture, are generally compatible with this protection.
- 6. **By 2020, the Delta Conservancy and related entities should acquire easements, purchase options, management agreements, and/or fee title in areas adjacent to the highest priority ecosystem restoration areas.** Land uses compatible with long-term open space buffer protection can continue on these properties.
- 7. **By 2040, the Delta Conservancy and related entities should acquire easements, purchase options, management agreements, and/or fee title in areas adjacent to all remaining ecosystem restoration areas.** Land uses compatible with long-term open space buffer protection can continue on these properties.

1 **Strategy 6.3. Achieve levels of emergency**
2 **protection consistent with federal and state**
3 **policies**

4
5 Our Vision recognized that the Delta faces
6 extraordinary risks in both the near term and
7 the long term. Earthquakes, river floods,
8 “sunny-day” levee failures, and continuing
9 subsidence and sea level rise all pose
10 substantial risks to people, property, and
11 infrastructure in the Delta. Emergency
12 response capabilities must be thoroughly
13 assessed and strengthened immediately.

14
15 In addition, the most cost-effective strategies
16 for the protection of critical infrastructure
17 systems, including highways, must also be
18 assessed and implemented immediately.

19 Service providers themselves are in the best
20 position to conduct assessment of the long-
21 term risk exposure facing these systems. Highways should be considered separately, since they
22 are directly managed by the state and are essential to emergency response efforts in the Delta.
23 These analyses must consider the full range of economic and life safety consequences of service
24 outages, the likelihood of such outages, and the proportionate share of the collective costs and
25 benefits achievable under co-location strategies. The analyses must consider these costs and
26 benefits over a time period commensurate with the expected lifespan of the infrastructure system
27 in question, not any shorter planning horizon dictated by financial or regulatory processes.

28
29 In concert with our strategy for improving the Delta levee system, we recommend a series of
30 actions to achieve levels of emergency protection and preparedness that are commensurate with
31 the risks the region faces.

- 32
33 1. **Complete a collaboratively prepared Delta-wide regional response plan by 2010**
34 which establishes mechanisms for regional coordination of life safety, evacuation, animal
35 control, and levee flood fighting functions where needed. The plan must be
36 comprehensive, incorporate existing organizations, and identify issues where regional
37 coordination or management of common emergency functions would enhance overall
38 response.

- 39
40 a. This collaboration must include the Delta Protection Commission (DPC), the
41 Department of Water Resources (DWR), the Governor’s Office of Emergency
42 Services, the Delta counties Flood Response Group, the U.S. Army Corps of
43 Engineers (USACE), the Department of Defense, the Department of
44 Transportation (U.S. Coast Guard), the regulated utilities, the railroads,
45 reclamation districts, and water purveyors both public and private. Final decision

Vision recommendations met:

9 12

Performance measures:

Mileage of designated state highways secured against catastrophic failure by adequate levee improvement, elevation, or other means (+)

Number of people who have received Delta Emergency Response Training (+)

1 making on final products will remain with those agencies having statutory
2 response authority within the Delta.

- 3
4 b. The entities with statutory emergency response responsibilities in the Delta must
5 conduct exercises together to determine where regional coordination gaps, if any,
6 still exist following completion of the regional plan.
7
8 c. The DPC should be a partner with the emergency response agencies, to provide
9 Delta-specific information and insights concerning the social aspects of
10 emergency response efforts, including identified gaps within existing plans and
11 response processes.
12

13 **2. Embark upon a comprehensive series of emergency management and preparation**
14 **actions, beginning immediately.** These agencies include DWR, the Governor’s Office
15 of Emergency Services, the Delta counties Flood Response Group, USACE, the
16 Department of Defense, the Department of Transportation (U.S. Coast Guard). The
17 actions, which should be jointly identified by these agencies, should include:
18

- 19 a. Establish unified command and multi-agency coordination systems where
20 appropriate to improve overall response.
21
22 b. Conduct an emergency disaster planning exercise in the Delta, involving all
23 appropriate federal, state and local agencies, to test multi-agency coordination
24 processes.
25
26 c. Establish clear criteria for issuance of mandatory evacuation orders. Further
27 establish a clear process for issuance of public advisories on levee conditions
28 below criteria for issuance of a mandatory evacuation order.
29
30 d. Implement the Inland Region Mass Evacuation Plan (already developed, but not
31 acted upon by the state), and coordinate local evacuation plans with its
32 procedures.
33
34 e. Continue emergency response exercises and drills with citizens as well as
35 emergency response personnel.
36
37 f. Stockpile and pre-position supplies, including caches for citizen emergency
38 response and flood fight supplies and materials for preventing levee failure, at
39 strategic locations in the Delta.
40
41 g. Earmark money and give spending authority for rapid response by providing from
42 flood bonds significant emergency funds which can be accessed by the State
43 Flood Operations Center or a local government in order to ensure that the
44 agency/jurisdiction closest to a developing threat to levee integrity, and best
45 placed and able to act effectively and rapidly, has the resources to stabilize the
46 situation. While reasonable control mechanisms must be put in place, agencies

1 capable of managing flood fight activities at all levels of government must be able
2 to act to stabilize a levee without recourse to time-consuming bureaucratic and
3 financial processes.
4

- 5 h. Eliminate historic bureaucratic, budgetary, and jurisdictional barriers to rapid
6 action by any level of government best places to respond effectively and rapidly
7 to a developing threat to levee integrity, or to opportunities to contain and reduce
8 the impact of flood flows following levee failure.
9
- 10 i. Sign contracts for barges along the West Coast to move people and supplies. In a
11 major event, California will likely need help from other states and any existing
12 mutual aid agreements should be assessed and improved as needed;
13
- 14 j. Ensure that adequate human labor resources to repair breaches will be available,
15 and sufficiently mobile in the Delta, after any potential disaster.
16
- 17 k. Set up a Boat Search and Rescue Marshal Program for rapid evacuation of
18 neighborhoods;
19
- 20 l. In deep floodplains where the 100-year flood elevation for the area exceeds first
21 floor heights of that building, change building codes to require exits to a
22 building's roof from the inside;
23
- 24 m. Paint lampposts on every block behind levees to show the 100-year flood or sea
25 level, to address human tendencies to underestimate risks and avoid disaster
26 preparation; and
27
- 28 n. Begin required school programs about emergency training.
29

30 **3. Complete a comprehensive analysis of the costs and benefits of highway protection**
31 **strategies, and adopt a policy based on its findings, by 2012.** The California
32 Department of Transportation should conduct a comparative analysis, beginning
33 immediately, of the costs and benefits of:
34

- 35 a. Reinforcement of levees protecting highways against seismic and other levee
36 failure threats;
37
- 38 b. Armoring or raising individual highways or segments;
39
- 40 c. Co-location of highways with adjacent infrastructure systems into fortified
41 corridors;
42
- 43 d. Relocation of highways to areas with lower flood risks both now and under
44 expected sea level rise conditions.
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4. **Complete a comprehensive analysis of the costs and benefits of infrastructure protection strategies, and adopt a policy based on its findings, by 2012.** A consortium of public utilities and other infrastructure service providers, convened by the California Public Utilities Commission and the California Energy Commission, should conduct a comparative analysis, beginning immediately, of the collective long-term costs and benefits of:
- a. Reinforcement of levees protecting infrastructure systems against seismic and other levee failure threats;
 - b. Co-location of adjacent infrastructure systems into fortified corridors;
 - c. Relocation of infrastructure systems to areas with lower flood risks both now and under expected sea level rise conditions.
 - d. Tunneling infrastructure systems below the Delta.

1 **Strategy 7.1: Create the California**
2 **Ecosystem and Water Council (replacing**
3 **the California Bay-Delta Authority), and**
4 **create a new Delta Conservancy to**
5 **implement ecosystem restoration projects**
6 **and enhance the roles of the Council.**

Vision recommendations met:
10 and 12

7
8 When viewing the current governance system
9 in the Delta three key points emerge: (1) state
10 interests are neither clearly expressed nor
11 effectively pursued; (2) there are hundreds of
12 federal, state and local governmental entities
13 with partial responsibility for aspects of the
14 Delta and its resources ; and (3) no one
15 governmental entity is responsible for
16 managing the broad range of important state
17 interests.

Performance measures:
To Be Determined

18
19 Based on these findings, our Vision called for a more effective governance structure in the
20 Delta that would "...ensure integrated action to implement this vision." (Delta Vision. 2007: 17).
21 That recommendation remains sound. Progress can only be made if there is a new system of
22 governance in the Delta. The new governance system must be capable of making difficult
23 decisions and implementing effective policies.

24
25 This will be difficult due to strong arguments over the proper goals to pursue, changes in the
26 natural environment, such as climate change and sea level rise, as well as threats to the Delta and
27 our water supply system on earthquakes, floods, levee failures and invasive species.
28 Continuation of the current system of governance --- really, a 'system' in name only ---
29 guarantees continued deadlock and inevitable litigation.

30
31 We propose the following governance structure:

- 32
- 33 • A new governance body, the **California Delta Ecosystem and Water Council**
34 (Council), which will replace the existing California Bay-Delta Authority. The Council
35 will:
 - 36 ○ Adopt a California Delta Ecosystem and Water (CDEW) Plan to achieve the goals
37 of our Vision and this Strategic Plan
 - 38 ○ Exercise authority to determine consistence with the adopted CDEW Plan when
39 reviewing actions of state agencies and to use provisions of the Coastal Zone
40 Management Act to address any inconsistencies in actions of federal agencies
 - 41 ○ Allocate funds to programs and projects consistent with its plan
 - 42
 - 43 • A new body, the **California Delta Conservancy**, created to implement the Delta
44 ecosystem restoration, consistent with our Vision, this Strategic Plan and the CDEW
45 Plan.
- 46

- Expanded authority for the existing **Delta Protection Commission**, including authority over historical areas in the Delta, and responsibility for management of the proposed National Heritage Area designation for the Delta:

Existing state agencies retain existing authorities. The Department of Water Resources, California Department of Fish & Game, State Water Resources Control Board and other state agencies will retain their existing authority. The ongoing effective exercise of their authorities in the following areas in support of the CDEW Plan is critical to the success of this recommended governance system:

- ✓ For the science and regulatory implementation of species protection laws, the California Department of Fish and Game and the federal United States Fish and Wildlife Service (USFWS) and NOAA's National Marine Fisheries Service (NMFS).
- ✓ For linkage of ecosystem policies and programs focused on the Delta with the larger Delta watershed, the Department of Fish and Game, in cooperation with USFWS and NMFS, through the CALFED Ecosystem Restoration Program and the successor programs to be established by the recommended Council
- ✓ For construction and ownership of water conveyance and storage facilities, the California Department of Water Resources and the United States Bureau of Reclamation.
- ✓ For application of water rights and water quality laws, the State Water Resources Control Board and regional water quality boards.
- ✓ For land use and resource management policies under the Delta Protection Act, the Delta Protection Council.
- ✓ For municipal functions, including police powers and service provision, which contribute to the value of the Delta as place, existing local governments.

The following action should be undertaken to create this structure:

- **The California Legislature should create a California Delta Ecosystem and Water (CDEW) Council to replace the Bay-Delta Authority and subsume CALFED programs.**

The Council should replace the Bay-Delta Authority and subsume programs of CALFED. Since some continuing federal funds are budgeted to CALFED, the Council would assume any remaining authority and program responsibility. Council operations should begin in July 2009.

The Council should have the following characteristics:

- Five to seven voting members, including a chair.
- Members should be appointed by the Governor and confirmed by the State Senate. No geographic, occupational or representational criteria are proposed for these appointments. Such an approach invites argument over categorization to be included in the original legislation and then arguments over whether or not an individual fits the categories. Instead, the criteria

1 used for appointment of the Delta Vision Blue Ribbon Task Force in
2 Executive Order S-17-06 are appropriate: “..members ..to include diverse
3 expertise and perspectives, policy and resource experts, strategic problem
4 solvers, and individuals having successfully resolved multi-interest
5 conflicts.”
6

- 7 • Members should be entitled to serve for five-year staggered terms.

8
9 ○ The Council should possess the following responsibilities and authorities:

- 10 • To develop and adopt a CDEW Plan, incorporating the plans of other
11 agencies where appropriate to meeting the charge to the Council (see
12 Strategy 7.2). The statute authorizing the CDEW Plan should require other
13 state agencies to exercise their authority to support implementation of the
14 Plan.
15
- 16 • To assume responsibility for implementation of any conservation or
17 habitat management developed for the Delta under state or federal
18 authority.
19
- 20 • To ensure federal and state consistency with the CDEW Plan.
21
- 22 • The Council shall be a designated Trustee Agency pursuant to Public
23 Resources Code Section 21000, et. seq.
24
- 25 • To determine the consistency of major water, road, railroad, utility and
26 levee infrastructure projects in the legal Delta with the Council’s adopted
27 Plan and to communicate that determination to the responsible agency.
28
- 29 • To oversee specific areas that lie outside the Delta Primary Zone which
30 are critical to meeting Delta Vision goals (see Strategy 14).
31
- 32 • To work with the Delta Science Program and the Delta Science and
33 Engineering Board on adaptive management.
34
- 35 • To receive and allocate funds raised under the CDEW Act or otherwise
36 provided to advance policies and programs related to the Delta. The
37 strategic finance plan is described in Strategy 7.4
38
- 39 • To address environmental justice in Delta decision-making processes by
40 requiring review of proposed actions against environmental justice criteria
41 defined in the CDEW Plan. The Council should adopt specific
42 environmental justice criteria in the formulation of the CDEW Plan, and
43 periodically review their status.
44
45

- 1 • To empanel a Public Advisory Group (PAG) of stakeholders to advise,
2 make formal recommendations to the Council, and to issue a public
3 biennial report on their activities
- 4 • To sue to ensure specific compliance with the CDEW Plan
- 5
- 6 • To establish policies and procedures that ensure that the day to day
7 operations of water export systems are consistent with the policies and
8 plan adopted by the Council
- 9
- 10 • To coordinate alternative approaches to dispute resolution (such as
11 arbitration, citizen juries) to reduce reliance on litigation and the courts
12
- 13 • **The California Legislature should create a California Delta Conservancy.**

14
15 California has no entity responsible for implementation and coordination of Delta
16 ecosystem enhancement and related revitalization projects. California has a long and
17 successful history with conservancies, and there is widespread agreement that such an
18 entity is appropriate for the Delta.

19
20 The California Delta Conservancy should have the following characteristics:

- 21 • It should be devoted solely to the statutory Delta and the Suisun Marsh.
- 22
- 23 • The governing structure of the Delta Conservancy should include 13 to 15
24 voting members (e.g., 5 appointed by the Governor, 1 by each House of
25 the Legislature and 6 local government representatives). The Conservancy
26 should be authorized to add either non-voting members of their Board, or
27 to create additional advisory bodies to ensure proper representation of
28 local concerns.
29

30
31 The California Delta Conservancy should possess the following responsibilities:

- 32
- 33 • Responsibility for state ecosystem-related and urban waterfront area
34 projects in the Delta, Suisun Marsh, and Local Plan areas.
- 35
- 36 • Ability to acquire, or place under its management, such land as is needed
37 to implement the CDEW Plan. It should have the power to enter into
38 contracts and to buy and sell land and other property.
- 39
- 40 • When offered, assume responsibility for lands currently in state, federal or
41 local ownership.
- 42
- 43 • Receive adequate funding from the State of California and/or the CDEW
44 Council
- 45

- 1 • Engage in programs and activities to support appropriate recreation and
2 ecosystem activities in the Delta, including activities to support the local
3 economy and designation of a National Heritage Area (NHA)(see Strategy
4 11), consistent with the CDEW Plan..
5
- 6 • Implement the CDEW Plan and other state and federal programs to create
7 incentives for mutually beneficial mixtures of traditional agriculture,
8 habitat and recreation, including agri-tourism, wildlife-friendly agriculture
9 practices, bird watching, and hunting.

10

- 11 • **The California Legislature should strengthen the Delta Protection Commission**
12 **(DPC).**

13

14 The Delta Protection Commission was created in 1992 and given appellate review of
15 proposed land uses in the Delta primary zone. The Delta Protection Act and the actions
16 of the DPC have protected the primary zone to date, but increased pressure for urban
17 growth outside the primary zone, coupled with the increased risk of catastrophic flood
18 from sea level rise and earthquakes strongly suggest there is a need to strengthen the
19 DPC. These changes must occur as soon as possible.

20

21 These changes should be made:

- 22
- 23 • The DPC’s Land Use and Resource Management Plan must be consistent
24 with the California Delta Ecosystem and Water (CDEW) Plan and should
25 also reflect relevant state legislation, such as the 2007 state floodplain
26 development laws.
- 27 • The DPC should carry out the land use planning and oversight described
28 in Strategy 14, including developing Local Plans for each at-risk
29 community.
- 30
- 31 • The DPC should permit all projects in the primary zone and have appellate
32 authority over all projects in the secondary zone.
- 33
- 34 • The DPC’s land acquisition authority should be transferred to the Delta
35 Conservancy.
- 36
- 37 • The DPC should ensure consistency of local government plans with its
38 Land Use and Resource Management Plan.
- 39
- 40 ○ The DPC should have the following characteristics:
- 41
- 42 • The composition of the DPC should include all Counties and Cities in the
43 legal Delta to better assess and coordinate local land use planning and
44 emergency response. Cities should vote on a weighed basis commensurate
45 with their populations.
- 46

- 1 • The composition of the DPC should include the Central Valley Flood
2 Prevention Board and the USACE to better assess and coordinate flood
3 protection issues.
- 4
- 5 ○ The DPC should possess the following responsibilities and authorities:
6
- 7 • The DPC’s Resource Management Plan must be consistent with the
8 California Delta Ecosystem and Water (CDEW) Plan (discussed below)
9 and should reflect relevant state legislation, such as the 2007 state
10 floodplain development laws.
- 11 • The DPC should carry out the land use planning and oversight described
12 in Strategy 6.2, including ensuring development of Local Plans for each
13 at-risk community.
- 14
- 15 • The DPC should permit all projects in the primary zone and have appellate
16 authority over all projects in the secondary zone.
- 17
- 18 • The DPC’s land acquisition authority should transfer to the Delta
19 Conservancy.
- 20
- 21 • The DPC should ensure consistency of local government plans and actions
22 as well as Local Plans with the CDEW Plan.

- 23
- 24 • **By September 1, 2009, the CDEW Council should create a Delta Science and**
25 **Engineering Program and a Delta Science and Engineering Board.**
- 26

27 California must maintain a strong and consistent investment in science and engineering
28 relevant to the Delta. Moreover, there needs to be a more direct link between scientific
29 investigation and real-world management and policy needs. To achieve this, the Council
30 must have access to both a permanent Science and Engineering Program staff and to an
31 independent Science and Engineering Board that reviews and advises upon Council
32 actions.

- 33
- 34 ○ The Delta Science and Engineering Board should have the following
35 characteristics:
36
- 37 • It should consist of between 12 and 20 individuals.
- 38
- 39 • All individuals should have relevant natural science, social science,
40 engineering, and policy expertise.
- 41
- 42 • The individuals should be appointed by the Council.
- 43
- 44 • The term of appointment should be 5 years with a maximum reappointment of
45 one term.

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- There should be a lead scientists appointed by the CDEW Council with a rotating appointment every 3 years.
- The Science and Engineering Program should have the following responsibilities and authorities:
 - Researching critical scientific processes relevant to the Delta Vision’s goals, including both the processes of the physical Delta and processes elsewhere in the state with particular relevance to Delta management.
 - Developing scientific and engineering materials to support adaptive management policy making – including the capacity to respond in “real time” to questions arising in the development or implementation of policies and early detection of status and trends – and to drive achievement of performance measures.
 - Organizing, assessing and synthesizing the best available science and engineering in response to requests from policy makers and the CDEW Council and to make recommendations on actions supported by that assessment when possible and appropriate.
 - Reviewing all major projects undertaken to advance the goals of Delta Vision.
 - Developing independent science and engineering reviews of agency or consultant work products upon the request of the Council, the Conservancy, or other State Agencies.
 - Establishing communication channels to effectively communicate science and engineering results to broader and more diverse audiences, coordinating with the Public Advisory Group and developing discussion papers and interactive lectures.
 - Receiving funding so as to continue efficient and timely technical review for effective policy-making.

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Strategy 7.2: Create a California Delta Ecosystem and Water Plan to ensure flexibility and consistency of action among state, federal and local entities.

The California Delta Ecosystem and Water Plan (CDEW Plan) is an integrated resources management plan with adaptive management components. It will provide the management level guidance within which the two co-equal goals of ecosystem function and reliable water supply are achieved and the value of the Delta as a place ensured. The absence of an effective plan has been a fundamental omission from past Delta policy efforts. The CALFED Record of Decision included most elements of such a plan but failed to be implemented for three reasons: those in charge had no authority to ensure its implementation, those that were implementing it had no accountability and in the end, there was no money.

Without a cohesive plan, agencies and stakeholders have been working in a vacuum, developing policies and programs that lack context and integration with other critical resources and actions in the Delta.

The CDEW Plan should be developed and implemented to become recognized as the California Delta’s component of the Coastal Zone Management Act (CZMA).

The critical elements of the CDEW Plan development and implementation are:

- **Develop a binding CDEW Plan to achieve the goals of Delta Vision, especially the co-equal goals of ecosystem function and reliable water supply and the value of the Delta as a place. This plan will build upon, and integrate, other plans. Those other plans include, but are not limited to: the Ecosystem Restoration Program being developed by the Department of Fish and Game, the Land Use and Resource Management Plan developed by the Delta Protection Commission, any local Habitat Conservation Plan within the Delta, the Suisun Marsh plan under development, sections of the California Water Plan that address reliable water supply being developed by the Department of Water Resources and the Conservation Program resulting from the BDCP. Those responsible for implementing these other plans shall do so in a manner to facilitate of achieving the adopted CDEW Plan.**

Vision recommendations met:

10 12

Performance measures:
Length of time before negative trends in the performance of other indices are reversed (-)
Number of preemptive or corrective actions on agency decisions taken each year by the CDEW Council to ensure consistency with CDEW Plan (-)
Percentage of financial investments in Delta ecosystem enhancement that are not consistent with CDEW Plan (-)
Percentage of financial investments in water infrastructure and regional self-sufficiency programs that are not consistent with CDEW Plan (-)
Percentage of financial investments in Delta levees and highways that are not consistent with CDEW Plan (-)
Number of times that state funding for local investments is withheld due to non-compliance with CDEW Plan (-)

1
2 Existing governance in the Delta lacks a cohesive and integrated structure. The CDEW
3 Plan is the document that will provide guidance for governing bodies and governance
4 decisions. The CDEW Plan will be adopted by the CDEW Council. Development of the
5 CDEW Plan will begin with engaging existing plans and planning, working to achieve an
6 integrated plan for Council adoption. Legislation establishing the Council and the CDEW
7 Plan should provide for resolution of any conflicts between other plans and planning and
8 the CDEW Plan. Developing an integrated CDEW Plan should be required within a set
9 time period of less than five years, and the Council should be authorized to adopt interim
10 Plans until completion of the full Plan and to make decisions and allocate funds on the
11 basis of an adopted interim Plan.
12

13 Approving a legally binding Plan and overseeing its implementation over decades will
14 allow the Council to ensure consistency of action among existing state, federal and local
15 agencies and achieve the level of flexibility appropriate to the Delta’s management
16 challenges. The CDEW Plan will provide guidance and a framework for the functions of
17 the Council, the Delta Protection Commission (DPC), and the Delta Conservancy, as well
18 as other state, federal and local agencies actively engaged in Delta resource management.
19 Local governments and other state and federal agencies will continue planning, decision
20 making and operations appropriate to their authorities. The statute creating the CDEW
21 Plan authority should require that they exercise their authority in manners that support
22 implementation of the CDEW Plan, the approach used in some similar contexts, such as
23 the Tahoe Regional Plan. The goal of the CDEW Plan is consistency in effort among all
24 these entities.
25

26 **Institutionalize adaptation through the Plan:** The Delta is characterized not only by
27 complexity, but also by uncertainty. Recognizing both uncertainty in knowledge and
28 uncertainty about outcomes of policies and programs has very specific implications for
29 future Delta management. One of those implications is that adaptive management must
30 be at the center of Delta governance and decision making and the creating and updating
31 the Plan offers a structure within which to institutionalize adaptation.
32

33 There are two kinds of uncertainty in the Delta ecosystem: lack of understanding cause
34 and effect relationships and unexpected change. Equally important is the uncertainty
35 about the effectiveness of policy tools.
36

37 Adaptive management is defined by the federal government as follows:
38

39 “Adaptive management is a type of natural resource management in which
40 decisions are made as part of an ongoing science-based process. Adaptive
41 management involves testing, monitoring, and evaluating applied strategies, and
42 incorporating new knowledge into management approaches that are based on
43 scientific findings and the needs of society. Results are used to modify
44 management policy, strategies, and practices.”
45

1 Importantly, adaptive management is not a series of after-the-fact reactions to changes in
2 ecosystem performance. Rather, adaptive management requires decision making which
3 recognizes the probability of less than desired results and makes decisions based on the
4 best available science and best available policy tools. Adaptive management equally
5 commits to observing, analyzing and understanding the results of those prior actions.
6 Finally, adaptive management requires the political, managerial and operational capacity
7 to design and implement improved actions.

8
9 This cycle is repeated, incorporating over time, changes in the underlying systems,
10 advances in scientific understanding, new policy tools, and changing policy decisions. To
11 gain the advantages of local knowledge and increased stakeholder commitment to not
12 only particular decisions, but also to the iterative character of adaptive management,
13 considerable attention must be given to effectively incorporating stakeholders over long
14 periods of time. As authority for making and/or implementing relevant policies is often
15 fragmented among several state, federal and local agencies, similar attention must be
16 given to effectively linking multiple agencies over long periods of time.

17
18 The CDEW plan recommended here has the advantages of integrating the actions of
19 many relevant agencies and also of being regularly revised on five year cycles. These
20 regular reviews and updates also provide a schedule of review activities in which to gain
21 the value of stakeholder participation. This rhythm of review cycles also requires
22 organizing scientific understanding and program assessment to a point where they can
23 inform policy making.

24
25 In this context, the CDEW Plan must:

- 26
27 ○ Incorporate any plan developed under species protection laws that impacts Delta
28 resources.
- 29
30 ○ Incorporate any legal requirement for water flow and water quality in the Delta.
- 31
32 ○ Define specific state land use interests in and around the Delta, especially those
33 that impact the ecosystem, water supply reliability and flood concerns and work
34 through the DPC to protect the specified state interests.
- 35
36 ○ Provide guidelines and procedures for adaptive management (See Strategy 9).
- 37
38 ○ Provide financial, legal, and political mechanisms for ensuring adaptability and
39 resiliency in governing the Delta.
- 40
41 ○ Incorporate and build upon the recommendations of this Strategic Plan.
- 42
43 ○ Articulate a detailed finance plan that identifies project costs, benefits, and
44 payment mechanisms.
- 45

- 1 ○ Include a plan for data collection, management, monitoring, analysis and
2 interpretation to support policy making and management decision making.
3
- 4 ○ Serve as the foundational document for a programmatic EIS/EIR as well as any
5 projects undertaken requiring California Environmental Quality Act (CEQA)
6 and/or National Environmental Policy Act (NEPA) permits.
7
- 8 ▪ **We recommend the California Legislature and the CDEW Council should carry out
9 the following actions to develop and adopt the CDEW Plan:**
10
- 11 ○ By May 2009, the California Legislature should adopt the Delta Vision Strategic
12 Plan as the Interim CDEW Plan, as consistent with California’s Coastal
13 Management Plan (CMP) under the CZMA.
14
- 15 ○ By August 2009, the CDEW Council, in coordination with the Attorney General,
16 should develop a legal and procedural outline for adopting the CDEW Plan in the
17 context of California’s CMP under the CZMA
18
- 19 ○ By August 2009, the CDEW Council in coordination with the Attorney General
20 should prepare a list of all applicable legal requirements in the Delta that must be
21 incorporated into the CDEW Plan. This list will include federal and state
22 Endangered Species Acts management actions and plans, among other legal
23 requirements.
24
- 25 ○ By September 2009, the CDEW Council should begin process of developing the
26 CDEW Plan in line with the procedural and substantive requirements of the
27 CZMA as well as California law. These requirements include active coordination
28 in plan development with stakeholders as well as state and federal agencies. A
29 beginning point in this process must be assessing existing plans and planning
30 efforts for consistency with the goals of Delta Vision and incorporating those
31 responsible for those plans into developing the CDEW Plan. Effective
32 participation of local, state and federal agencies in development of the CDEW
33 Plan will be critical to achieving the appropriate integration of their
34 responsibilities and capacities.
35
- 36 ○ The CDEW Plan should be actively coordinated with the CDEW Council’s Public
37 Advisory Group (PAG) to not only ensure stakeholder participation but to
38 actively address environmental justice concerns consistent with the CDEW
39 Council’s adopted environmental justice policies (see Strategy 15).
40
- 41 ○ By December 2010, the CDEW Council should adopt CDEW Plan. If the
42 complete Plan is not ready for adoption, the Council may adopt an interim plan.
43 Activities not covered in the adopted interim plan shall be guided by the adopted
44 Delta Vision Strategic Plan until the full CDEW Plan is adopted.
45

- 1 ○ By December 2010, SWRCB should identify any inconsistencies in the State
2 Water Resources Control Board's (SWRCB) Water Quality Control Plans in light
3 of CDEW Plan recommendations and actions and develop a plan to address those
4 inconsistencies within a reasonable time or inform the Council in writing of why
5 it cannot address the inconsistencies and propose alternative action.
6
- 7 ○ The CDEW Council will review and if required, amend the CDEW Plan every
8 five years or upon a shorter time period at the direction of the Governor.
9
- 10 ■ **The CDEW Plan must achieve governance consistency among various agencies.** The
11 California Legislature should enact legislation that:
12
- 13 ○ Empowers the CDEW Council to link funding distribution to accomplishment of
14 identified tasks. (See Strategy 17).
15
- 16 ○ Authorizes the CDEW Council to link specified actions in the CDEW Plan to
17 other specified actions to ensure simultaneous achievement.
18
- 19 ○ Requires annual assessments of progress and consistency with the CDEW Plan
20 allowing for modifications of budgets and priorities where lack of progress or
21 inconsistency with the CDEW Plan is apparent.
22
- 23 ○ Compels annual reports to the Legislature and the Governor tracking the
24 effectiveness of the CDEW Plan against the performance measures as well as the
25 consistency of agency action with the CDEW Plan.
26
- 27 ○ Requires outside audits of progress and consistency and allows for legislative
28 response to inadequacies.
29
- 30 ○ Grants the DPC the authority to review and approve local plans for consistency
31 with the CDEW Plan.
32
- 33 ○ The CZMA requires approval by the Secretary of Commerce (or his or her
34 designee) for the CDEW Plan, and the CDEW Council should have consistency
35 review determination of federal action in the context of the CDEW Plan. The
36 CZMA has an appeal process through mediation to resolve disputes between
37 federal agencies and an "inconsistency" determination.
38
- 39 ○ Federal legislative language could require consistency with the CDEW Plan in
40 cases where federal appropriations will be made for actions within areas subject to
41 the CDEW Plan.
42
- 43 ○ Federal legislation could require annual reporting to Congress on actions taken in
44 the Delta by federal agencies and their consistency with the CDEW Plan under
45 the legal requirements of the CZMA.
46

- 1 ○ The CDEW Council should seek the leadership of the Governor of California and
2 the President of the United States in ensuring consistency of action under the
3 CDEW Plan.
- 4
- 5 ▪ **The CDEW Council should remedy inconsistent actions by federal, state, or local**
6 **agencies in the Delta with the CDEW Plan, through the following mechanisms:**
7
- 8 ○ Use of CZMA’s mediation components for federal inconsistent action, in which
9 the proponent of the perceived inconsistent project has the burden of proving
10 consistency with the CDEW Plan.
- 11
- 12 ○ Where state and local agencies are involved, the CDEW Council should
13
- 14 ▪ Have the authority to issue cease-and-desist orders with specific
15 authorization to seek injunctive relief; and
16 ▪ Enlist the Attorney General to bring an enforcement action on behalf of
17 the People of the State of California against agencies or individuals acting
18 inconsistently with the CDEW Plan.
- 19
- 20
- 21

1 **Strategy 7.3. Finance the activities called**
2 **for in the California Delta Ecosystem and**
3 **Water (CDEW) Plan from multiple**
4 **sources.**

5
6 Successful governance of the Delta will
7 depend on a coherent, effective and reliable
8 financing structure. That system will include
9 financing to pay capital costs, revenue
10 generation, procedures for expenditure as
11 approved by the CDEW Council, and
12 obligations placed upon recipients of benefits
13 from those expenditures.

14
15 Financing will require a flexible approach.
16 We do not yet know all the benefits, costs,
17 obligations, and risks that will be involved,
18 and must therefore move forward with a
19 certain level of uncertainty. Commitments to
20 transparency, cost effectiveness, incentives
21 and criteria for efficiency will expedite financing processes in the face of uncertainty. New
22 participants will be identified and new funding sources developed. We must also maximize the
23 availability and use of federal funding, and access all currently available bond funding.
24

25 **The following principles should guide design of financing:**

- 26
27 1. A wide range of financing instruments should be employed: effective and equitable
28 financing for activities as extensive and expensive as those proposed in this Strategic
29 Plan should rely on multiple revenue streams rather than a single source. “Layering” of
30 revenue sources better allows matching revenues collected to perceived value and actual
31 beneficiaries. For example, as part of the management of the co-equal values, there
32 should be a per-acre-foot fee levied on water diversions within the Delta watershed, and a
33 separate fee on any water conveyed through or around the Delta.
34
35 2. Clear linkages should be established between commitments to help finance the program
36 and the implementation of actions that generate corresponding value in a sustainable
37 system that includes a revitalized ecosystem and reliable water supplies.
38
39 3. Private beneficiaries should be assigned proportional shares of revenue obligations and of
40 risks and liabilities, while the public of California should be responsible for activities of
41 broader benefit.
42
43 4. Revenues should be received by and allocated by the CDEW Council to ensure consistent
44 action to implement its policies. These funds should not be diverted to other purposes and
45 should be protected by a provision stating that if any funds devoted to CDEW Plan
activities are used for other purposes, no water shall be conveyed through the Delta for

Vision recommendations met:

9 10 12

Performance measures:

Finance tools deployed efficiently (+)

Projects and programs implemented with
reliable finding (+)

Percentage of required Delta revenues collected
in a timely manner (+)

Correspondence of expenditures by agencies
and others with CDEW Plan (+)

1 the State Water Project (SWP). This is required both to protect revenues against diversion
2 in tight budget years and also to ensure that all elements of the plan advance together.
3

- 4 5. No public payment for water required for ecosystem revitalization is anticipated in this
5 finance plan; the legal and fiscal arguments against such inclusion are persuasive.
6
7 6. Access to state funding for any purpose related to implementation of the CDEW Plan
8 must be contingent upon a project contractor or a water right holder demonstrating full
9 compliance with all aspects of California resources laws and policies, including:
10 a. possessing a legal right to divert, store, convey, and use water;
11 b. satisfying all applicable water quality and ecosystem regulations determined to
12 protect the resources and values of the state; and
13 c. complying with provisions of the CDEW Plan and the decisions of the Council
14
15 7. Federal, state, and local agencies that conduct activities that are inconsistent with the
16 CDEW Plan will have funding derived from the CDEW Council reduced or terminated.
17

18 **Substantial capital investments and continuing support will be required to implement the**
19 **recommendations of Delta Vision.** No independent estimate of those costs has been undertaken
20 in Delta Vision. However, as many of the recommendations of this Strategic Plan parallel those
21 developed in other processes, some information on probable capital costs over the next 10-15
22 years is available.
23

- 24 ■ The range of estimated costs for alternative conveyance provided by DWR (May 2008) is
25 \$4.2 billion for an eastern alignment to \$7.2 billion for a western alignment. DWR
26 estimated through-Delta improvements to cost from \$1.2 to \$9.6 billion depending on the
27 seismic robustness. The earlier Delta Risk Management Study (DRMS) analyses
28 projected much larger costs: \$26 billion for alternative conveyance and \$32 billion for
29 armored through Delta conveyance.
30
- 31 ■ A late 2007 summary of cost estimates of proposed Delta ecosystem revitalization
32 projects undertaken totaled to \$2.5 billion.
33
- 34 ■ The other large capital cost is levee improvements, where the upper estimate provided by
35 DRMS is \$20 billion. Four billion is used here as a preliminary estimate.
36

37 These estimates suggest that capital expenditures required for the Delta in the next 10-15 years
38 will range from \$12 to \$24 billion, with a high estimate of \$80 billion. These estimates do not
39 include additional costs that may be associated with additional water use efficiency and wet-
40 period diversion shifts. This large cost estimate range will be refined as policy choices are made
41 regarding conveyance, ecosystem revitalization and levees. Bond funds are available for some of
42 these capital investments and water contractors are prepared to pay the capital costs of alternative
43 conveyance. No attempt has yet been made to estimate annual operating costs.
44

1 **Seek new participants and new revenue sources.** We should opportunistically identify new
2 types of benefits and beneficiaries to increase sources and amounts of revenues. Examples
3 where actions will create new benefits include:
4

- 5 • Delta conveyance: Economic benefits of salinity reductions have been quantified, but
6 benefits of reduced concentrations of other important water quality constituents, such as
7 disinfection by-product precursors, have not. Additional understanding and development
8 of water quality benefits is needed to identify beneficiaries and the form of benefits.
9
- 10 • Levee improvements: New benefits and beneficiaries may include navigation, recreation,
11 fish and wildlife and environmental enhancement. These benefits might justify an
12 expanded federal role.
13
- 14 • Ecosystem restoration: Revenues could be generated through conservation and
15 mitigation banking, and by sequestering carbon and reducing carbon emissions. Reduced
16 energy use through conservation might also be used to claim CO2 offsets.
17

18 **Revenues to support core activities.** Stable revenues will be required to fund the core policy
19 making and management activities required to achieve the co-equal values and enhance the value
20 of the Delta as a place. These core activities include the work of the Council itself, associated
21 science and engineering, adaptive management processes, performance monitoring and reporting
22 and oversight of program implementation to determine consistency with the CDEW Plan. These
23 core activities cannot be successful if dependent on bond funds or other irregular revenue
24 sources. Ecosystem revitalization, improvements in conveyance, levee projects and specific
25 activities to support the Delta as place are critical, but will be addressed on a project or program
26 basis.
27

28 Consistent with the adopted Delta Vision, the funding for core activities should recognize the
29 contributions of water uses throughout the Delta watershed to the ecosystem functioning of the
30 Delta. The funding should also reflect the challenges and added benefit of conveyance of water
31 through or around the Delta. For these reasons, two separate fees are proposed: (a) a per-acre-
32 foot fee should be levied on water storage and diversions within the Delta watershed, and (b) a
33 separate fee should be levied on water conveyed through or around the Delta. The fees would be
34 set by the CDEW Council under authority provided in the creation of the Council.
35

36 **New Sources of Revenue**

37
38 **Mitigation and Conservation Banking.** Mitigation and conservation banking could provide
39 important funds to help ecosystem restoration. A conservation bank generally protects threatened
40 and endangered species habitat. Credits are established for the specific sensitive species that
41 occur on the site. Conservation banks must be approved by the State and federal wildlife
42 agencies. Mitigation banking is the same concept as conservation banking, but is specifically for
43 wetland restoration, creation, and enhancement undertaken to compensate for unavoidable
44 wetland losses.
45

1 **Carbon Offsets.** Established carbon markets are readily available and are increasingly accepted
2 by State and federal authorities. On the Chicago Climate Exchange (CCX), contracts
3 representing tonnage of CO2 equivalent are traded. Conversion of farmed Delta islands with peat
4 soils to natural wetlands could provide two types of offsets. The Delta subsides at a rate of 1 to 3
5 inches a year, mostly in the form of carbon dioxide releases, and the additional CO2 sequestered
6 by cattails or Tules might both be sold as carbon offsets. The future carbon price is very
7 uncertain but it appears that CO2 offsets might repay a significant share of Delta island
8 acquisition and wetland restoration costs.
9

10 **Private and voluntary contributions.** Contributions from landowners can help pay costs of
11 ecosystem projects. Landowners can sometimes reduce their estate taxes by donations of fee
12 simple or land easements. Recent and ongoing changes to estate tax laws may substantially
13 change the incentive to provide donations.
14

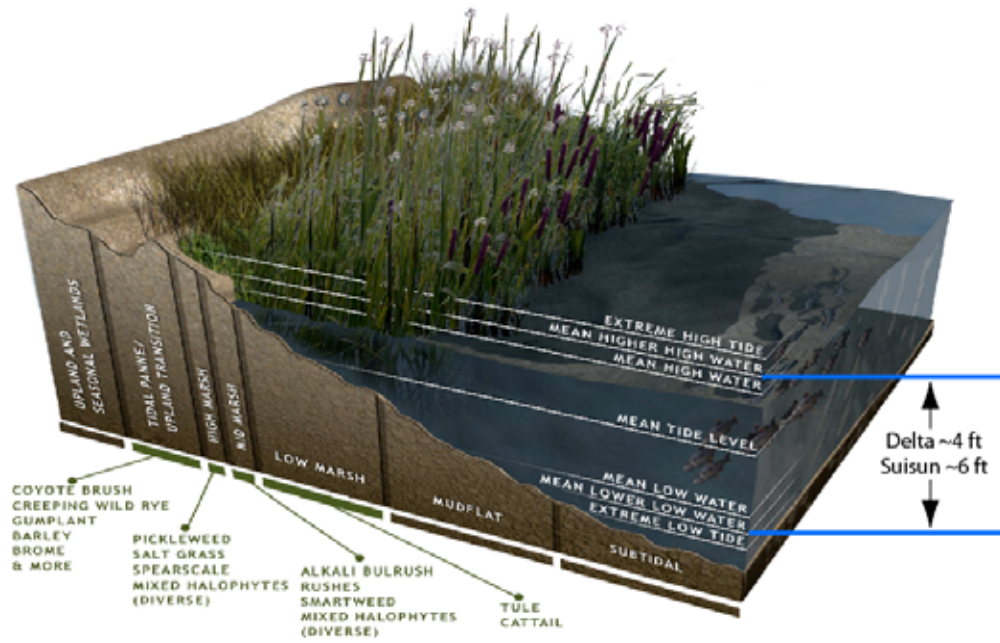
15 **Recommended Actions:**
16

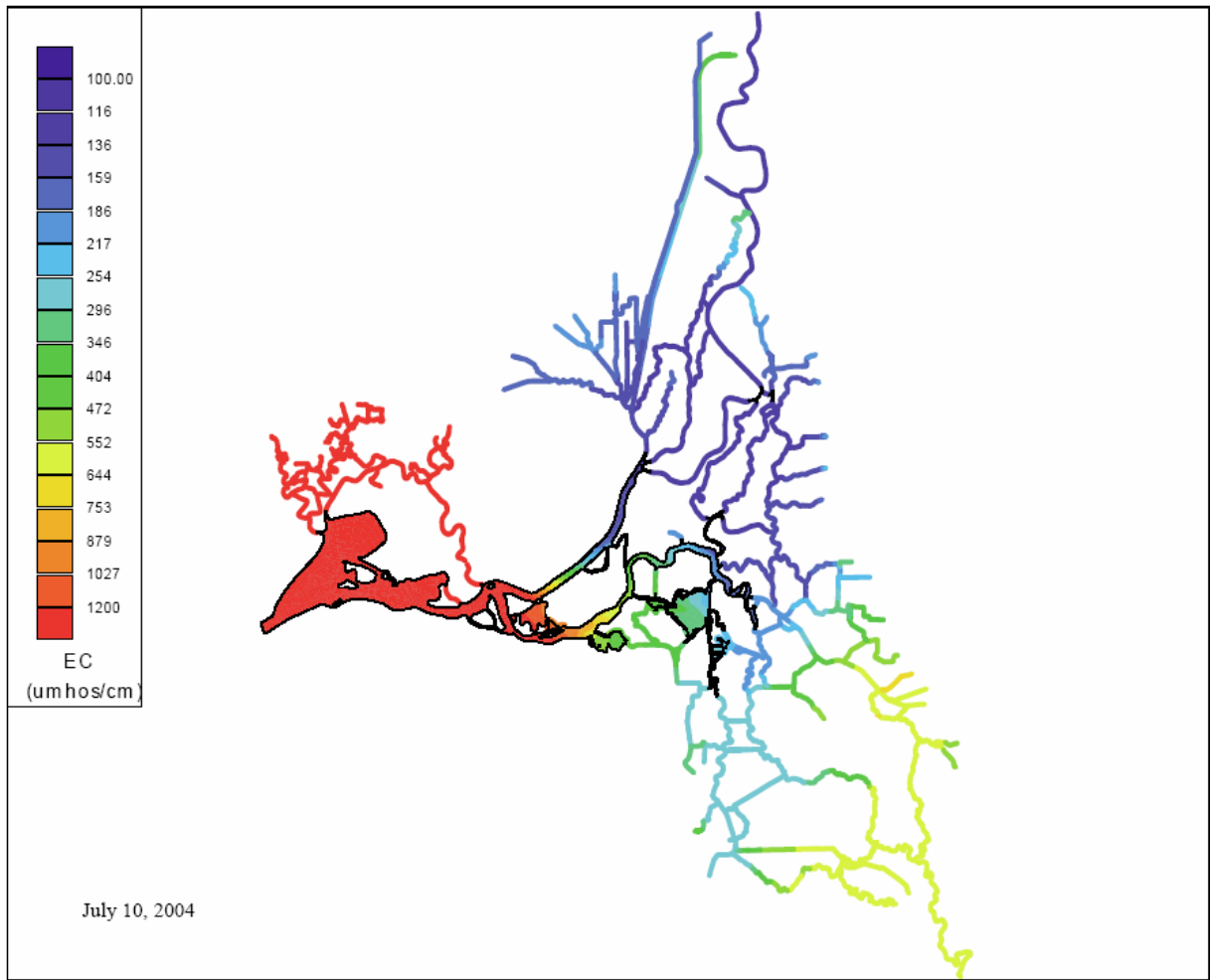
- 17 1. Incorporate language requiring integrated action consistent with an adopted CDEW Plan
18 in any Delta-related bond or any other financing instrument. Similar provisions should
19 be included in any related contracts.
- 20 2. For specific projects, require local interests to develop a finance plan to pay for the local
21 share of a capital project. Local cost shares should be related to benefits received and
22 cost of services provided. Require a completed finance plan as a precondition for the
23 design and construction phases of a major capital project.
- 24 3. Require beneficiaries (public and private) of CDEW Council financing to support and
25 conform to the following conditions:
26
 - 27 • California State government organizations must make an affirmative
28 determination that relevant actions support the adopted CDEW Plan.
 - 29
 - 30 • Ensure full transparency in all fiscal arrangements.
 - 31
 - 32 • Condition access to and participation in any Delta related program on compliance
33 with all existing policies and programs.
 - 34
 - 35 • Use bond control language and contract provisions to ensure policy consistency.
 - 36
 - 37 • Use life-cycle costing and benefit-cost calculations to inform decision making.
 - 38
 - 39 • Require full allocation of costs and risks, in proportion to benefits received.
 - 40
 - 41 • Allow no subsidized use of California resources.
 - 42
 - 43 • Structure water rates to encourage conservation by greater use of variable rates,
44 tiered rates and connection fees.
45

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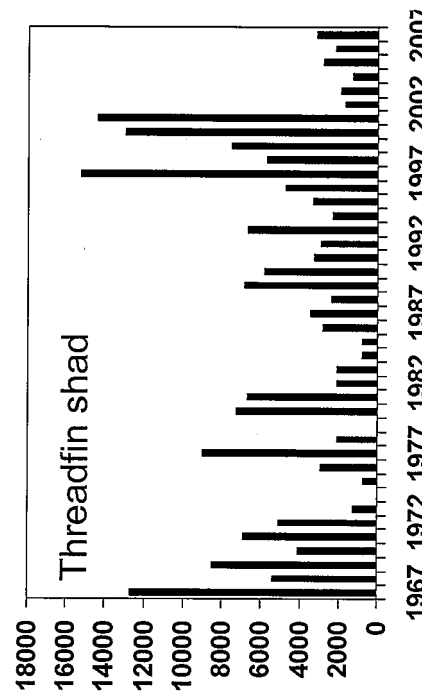
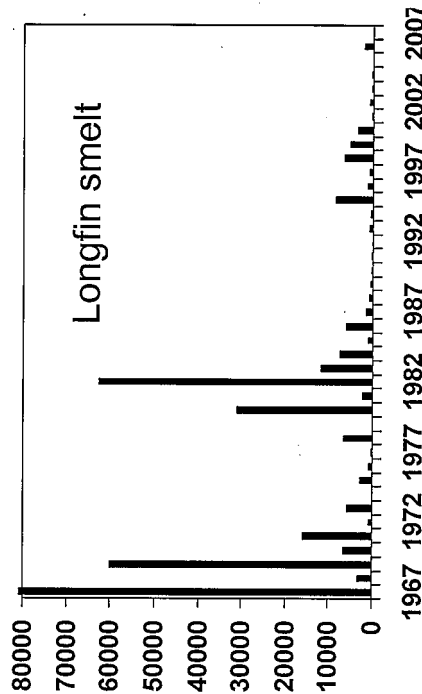
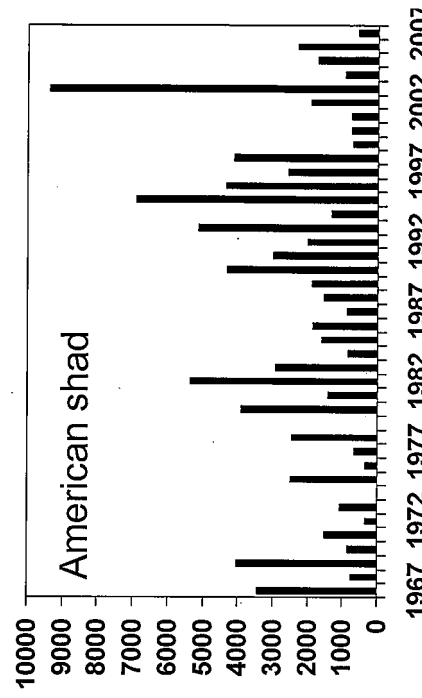
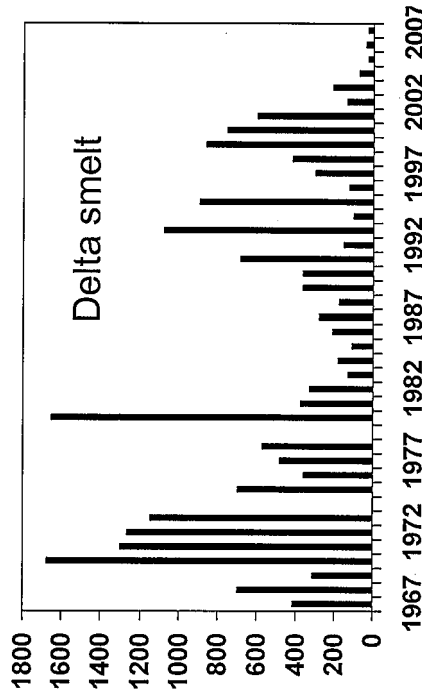
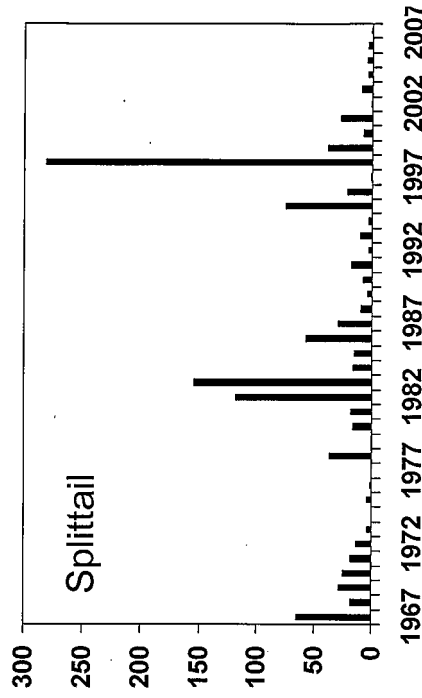
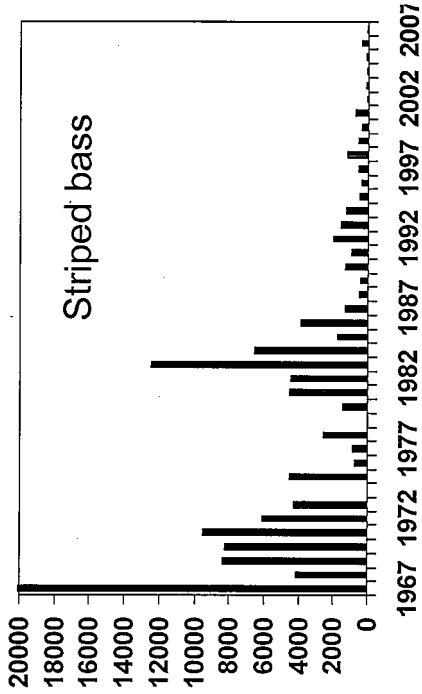
- Use bidding to inform investment decisions and allocate uses.
- Develop and implement processes to achieve timely decisions and accelerate implementation.
- Develop a comprehensive funding plan for capital projects anticipated over the next 30 years, including operation and maintenance of new infrastructure and beneficiaries of each project.
- Establish a mechanism to identify unassigned project costs (capital and O&M) and negotiate with identified beneficiaries to pay the remaining costs of the project.
- On an on-going basis, any bond and/or appropriation of state funds should link expenditures and results in ecosystem revitalization and improving water supply reliability to a shared calendar.

Sectional view of typical tidal marsh in the Delta/Suisun region
(courtesy of Stuart Siegel, Wetlands and Water Resources, Inc., from Moffat and Nichol)










Modeled Delta salinity, July 10, 2004 (courtesy of Resource Management Associates). This figure shows a typical summer salinity pattern for the Delta. Seawater intrusion is evident in the western Delta and very fresh water of the Sacramento can be seen coming in from the north. Lower quality water from the San Joaquin River is entering the southeastern part of the Delta. The combined influence of Sacramento River inflow and export pumping at the Banks and Tracy pumping plants is thought to be the cause of the “freshwater corridor” extending across the central Delta from north to south.



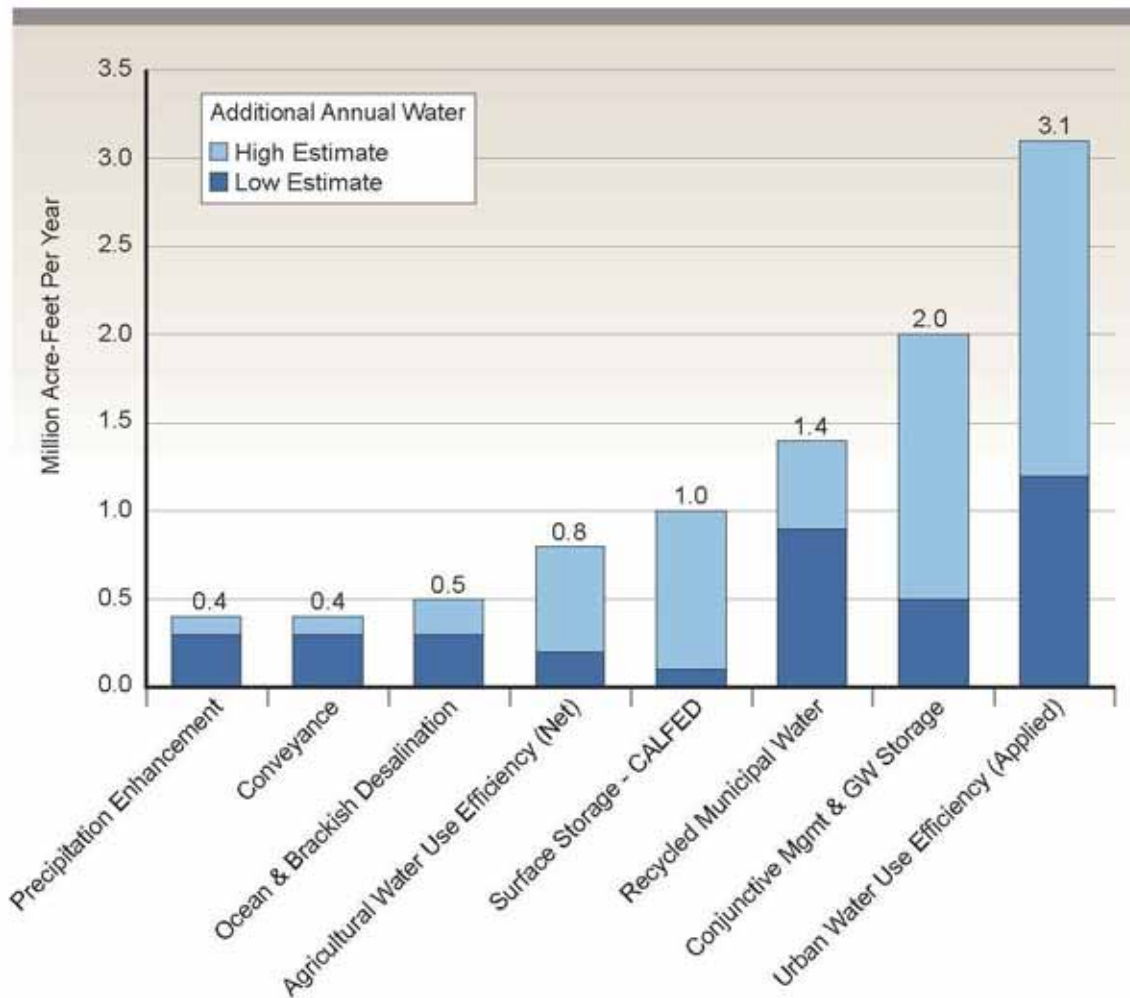
Statewide Upstream and Export Diversion from the Delta Watershed (Water Year 2000)

-  Boundary of Delta Watershed (equal to Sacramento and San Joaquin Hydrologic Regions as defined by DWR)
-  Annual Magnitude of Regional Diversion from within the Delta Watershed (1,000 af) (dashed arrow represents return flows after diversion)
-  Annual Magnitude of Water Directly Diverted from the Delta (1,000 af)
-  Annual Magnitude of Water Diverted from a Delta Tributary (1,000 af)
-  Annual Magnitude of Significant Transfers and Imports Outside the Delta Watershed



Regional Diversion or Export Group Description

- 1 Sacramento River Diversions (from Keswick to Knights Landing)
- 2 Feather, Yuba and Bear Rivers
- 3 Northern Delta (Yolo, Sacramento, and Placer Counties)
- 4 North Bay Aqueduct and Putah South Canal
- 5 Eastern Delta (Mokelumne and Calaveras)
- 6 San Joaquin River, Eastside of San Joaquin Valley Rivers and Madera Canal
- 7 SFPUD Hetch Hetchy Aqueduct and EBMUD
- 8 Friant-Kern Canal (CVP)
- 9 Contra Costa Canal
- 10 SWP and CVP Export Facilities
- 10a South Bay Aqueduct Contractors
- 10b San Felipe Unit Contractors
- 10c San Joaquin River Contractors
- 10d Central Coast Contractors
- 10e Tulare Basin Contractors
- 10f South Lahontan and South Coast Contractors
- 11 Los Angeles Aqueduct
- 12 Colorado River Aqueducts and All American Canal
- 13 Colorado River Aqueduct



This graph shows the potential range of more water demand reduction and supply augmentation each year for eight resource management strategies. Low estimates are shown in the lower (dark blue) section of each bar. The water supply benefits of the resource management strategies are not additive. As presented here, urban water use efficiency includes reduction in both consumptive and nonconsumptive uses (or applied water), whereas agricultural water use efficiency only includes reduction in consumptive uses (or net water).

Source: California Department of Water Resources, California Water Plan Update, 2005, v.3.

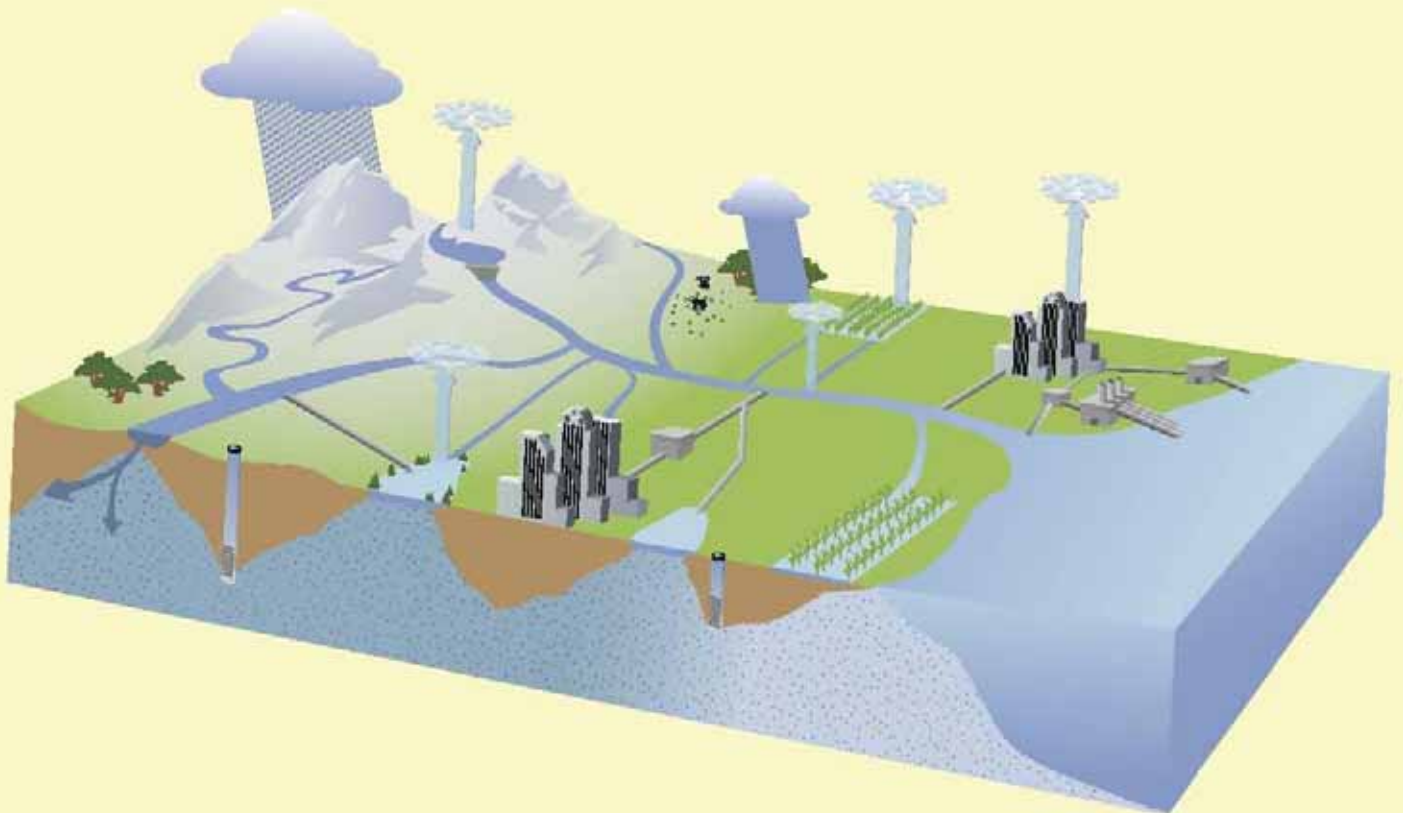
California Water Supplies and Uses (MAF)

	1998 (171% of normal) ^a	2000 (97% of normal) ^a	2001 (72% of normal) ^a
Total supply (precipitation & imports)	336.9	194.7	145.5
Total uses, outflows, & evaporation	331.5	200.4	159.9
Net storage changes in state	5.5	-5.7	-14.3
Distribution of dedicated supply (includes reuse) to various applied water uses			
Urban uses	7.8 (8%)	8.9 (11%)	8.6 (13%)
Agricultural uses	27.3 (29%)	34.2 (41%)	33.7 (52%)
Environmental water ^b	59.4 (63%)	39.4 (48%)	22.5 (35%)
Total dedicated supply	94.5	82.5	64.8

MAF = million acre-feet

a. Percent of normal precipitation. Water year 1998 represents a wet year; 2000, average water year; 2001, drier water year.

b. Environmental water includes instream flows, wild and scenic flows, required Delta outflow, and managed wetlands water use. Some environmental water is reused by agricultural and urban water users.



Key components of the illustrated flow diagram are shown as characteristic elements of the hydrologic cycle. Volume 3 Regional Reports has flow diagrams for statewide water summary (in Chapter 1) and for regional water summaries in their respective chapters.

Delta Levee Types Summary – Applications, Descriptions, and Costs (in order of increasing strength)

Land Use/ Levee Use	Levee Class	Levee Descriptive Name	Present Occur- rence (miles)	Upgrade Needed (miles)	Description/Design Basis	Application Notes	Technical Characteristics ^a	Cost per Mile (Millions of 2005 \$)			
								Basic Cost ^b	Vegeta- tion	Add for Ecosystem Friendly ^c	Foot of Sea Level Rise ^d
Wetlands	W-1	Wetlands - Interior	Unknown, includes much of Suisun & Cache/Yolo	New or Upgrade, Unknown	<ul style="list-style-type: none"> Economical; no design standard. Used to manage water flow and drainage in areas that can tolerate flooding. 	<ul style="list-style-type: none"> Used for habitat and some agricultural (pasture, rice, some annual crops) – e.g., Suisun Marsh & Yolo 	Typical height is less than 5 feet. Crest width is 8 feet or less. No seismic capability. Expect frequent failure.	0.1	Included	N/A	N/A
Wetlands	W-2	Wetlands - Exterior	Unknown, Includes Suisun Bay & Sloughs 100+/-	New or Upgrade, Unknown	<ul style="list-style-type: none"> Economical; no design standard. Used for limited protection of areas that can tolerate flooding. 	<ul style="list-style-type: none"> Used to opportunistically protect habitat and some agricultural – e.g., Suisun Marsh. 	Typical height is less than 8 feet. Crest width is 12 feet or less. Exterior & interior slopes, assume 2H:1 V No seismic capability. Freeboard varies; expect frequent failure.	For new levee is 0.2 to 0.3, Upgrade is less.	Included	N/A	0.05
Agriculture, Infra-structure	A-1, I-1	Hazard Mitigation Plan (HMP)	366 project plus 28 non-project	In Delta = 100+/- ?Policy? Suisun Bay Edge?	<ul style="list-style-type: none"> Qualifies levee maintaining agency to receive FEMA Disaster Assistance for levee repair if a Delta levee fails. Based on agreement among FEMA, State, and Delta Reclamation Districts after 1983 and 1986 floods. 	<ul style="list-style-type: none"> Agriculture, habitat Not adequate for long-term flood protection 	16 foot crest width All-weather patrol road. Steep exterior slope (1.5H:1V) Steep interior slope (2H:1V) Marginal static stability (FS = 1.1+/-) No seismic capability Freeboard = 1.0 foot (for water level with 1% annual frequency or 100-year flood)	Upgrade from existing 0.45. New levee (Suisun) would be more.	Included	N/A	0.1
Agriculture, Infra-structure	A-2, I-2	Public Law 84-99 (Delta Specific)	366 project plus 28 non-project	?Policy? Nearly all Delta except urban or seismic? 400 to 600	<ul style="list-style-type: none"> Qualifies levees for Corps of Engineers Emergency Assistance and Rehabilitation. For new projects, include upgrades to meet DWR Bulletin 192-82 agricultural design. For infrastructure – non-seismic design (flood control, navigation, highways, railroads, pipelines, electrical and gas facilities). 	<ul style="list-style-type: none"> Not adequate long-term for populated areas. Used for agriculture (including permanent crops), infrastructure, and water conveyance. Would also meet HMP requirements. This is the Calif fed base level protection. 	16 foot crest width All-weather patrol road Exterior slope (2H:1V) Interior slope (2H:1V to 5H:1V), based on levee height and depth of peat. Static stability (FS = 1.25) Levee toe drain 30 feet landward. Essentially no seismic capability. Freeboard = 1.5 feet (for 1% annual frequency or 100-year flood).	Upgrade – For 10 ft of peat 1.3 to 1.8. For thicker peat, up to 3.5. Per MBK 0.7 to 2.0.	Included	N/A	0.2
Populated Areas (more than 1,000 people)	U-1	Populated Area (per FEMA National Flood Insurance Program)	Before FEMA remap, 110+/- After remap, 50+/-	?Policy? For areas with existing population >1,000 = 200+/-	<ul style="list-style-type: none"> FEMA Flood Insurance Remapping qualifies protected area for removal from 100-year floodplain and release from flood insurance requirement. Provides protection from 100-year water level, with 3 feet of freeboard; is anticipated to require stronger embankments and less seepage than before remapping. New upgrades will be to 200-year protection per State law and other DWR Bulletin 192-82 urban design criteria (see U-2 below). 	<ul style="list-style-type: none"> Substantial populations. Dense to high-density urban, critical (compact) infrastructure. Qualifies levees for Corps emergency assistance and rehabilitation. Would also meet HMP requirements. 	16 foot crest width. All-weather patrol road. Toe drain. Exterior Slope (2H:1V) Interior Slope (varies, stability/seepage, 3 H:1V to 5H:1V). Static stability (FS = 1.4 to 1.9). Seepage exit gradient <= 0.5. (FS and Seepage per Corps documents) Very little seismic capability. Freeboard = 3.0+ feet (for 1% annual frequency or 100-year flood).	For 10 ft peat, 9.1 For special local conditions may be 4.0 or less	Included	Add: 1.0 to 2.0	Change to setback: 2.0 Add to setback: 0.5 to 1.0

Notes:

^a These are the most significant differences. ^b All cost estimates are from the DRMS "Levee Optimization Group."

^c Basic cost is cost to upgrade from prevalent non-compliant type – e.g., nearly HMP to ready HMP, HMP to PL 84-99, etc; assumes peat thickness of 10 feet; costs are higher for thicker peat. These costs assume barrier is a levee. If a floodwall is needed, costs go higher.

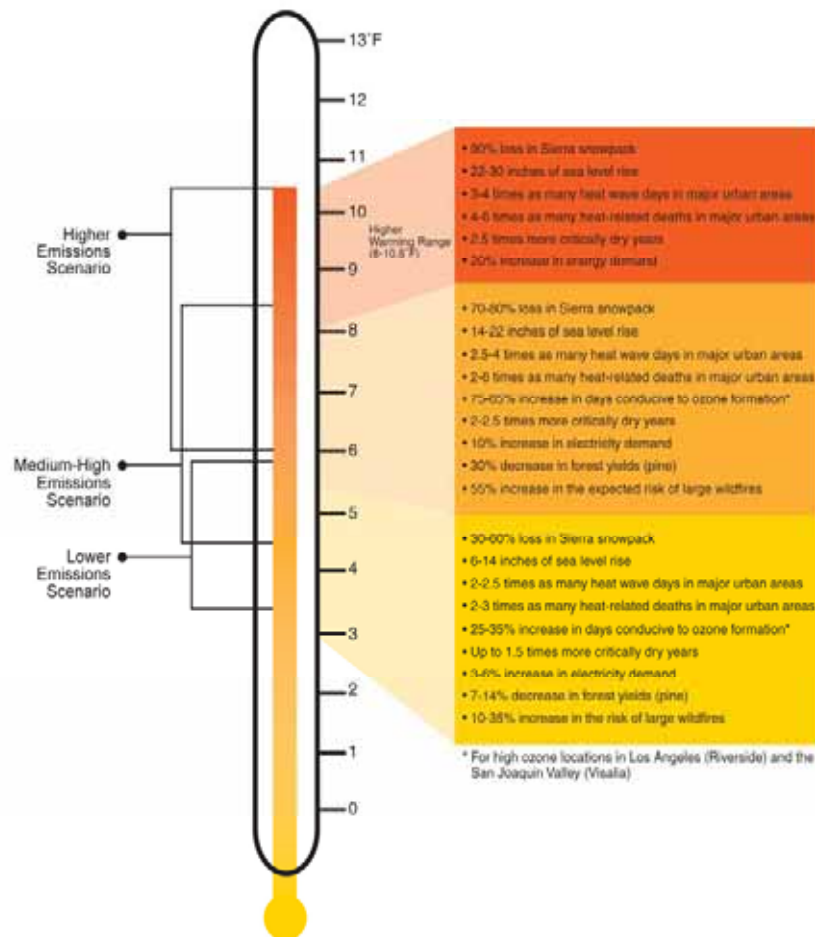
^d Additional cost (if any) to upgrade to an ecosystem friendly configuration, including such components as landscaping soils, tidal zones, flood plain areas, and plantings.

^e Additional cost to add one foot to levee crest elevation in anticipation of sea level rise, without decreasing static factor of safety.

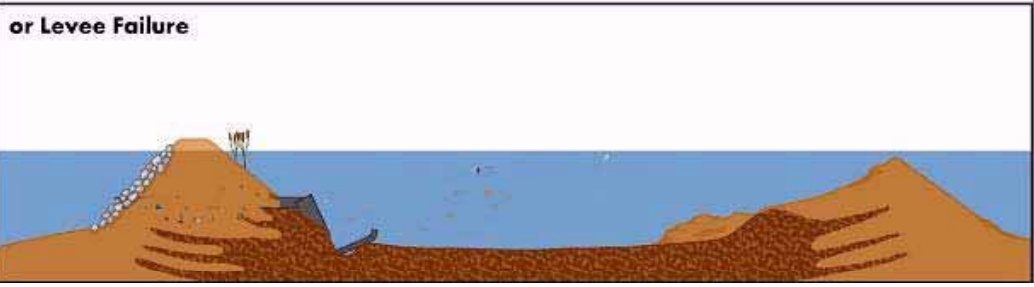
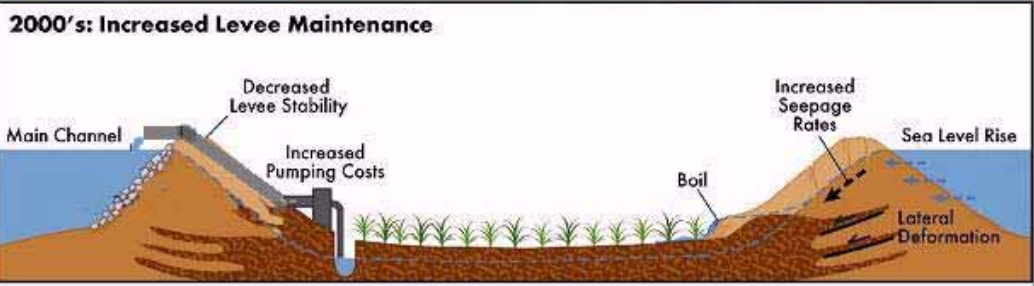
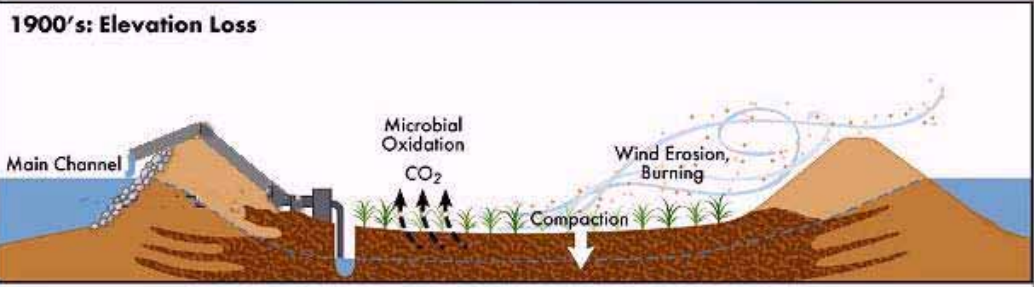
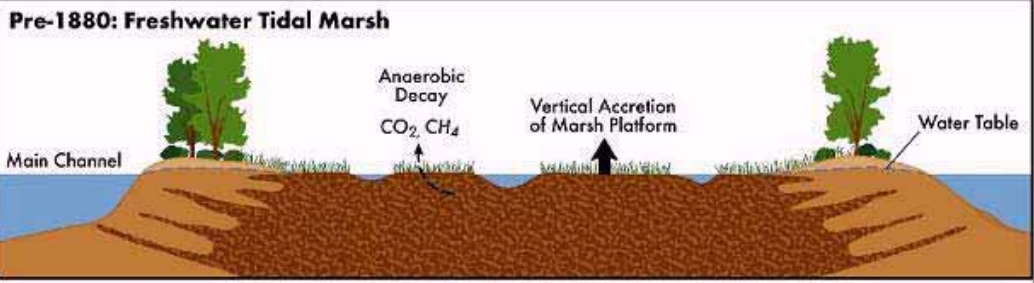
Delta Levee Types Summary – Applications, Descriptions, and Costs (in order of increasing strength) (continued)

Land Use/Levee Use	Levee Class	Levee Descriptive Name	Present Occurrence (miles)	Upgrade Needed (miles)	Description/Design Basis	Application Notes	Technical Characteristics ^a	Cost per Mile (Millions of 2005 \$)			Foot of Sea Level Rise ^d	
								Basic Cost ^b	Vegetation	Cost for Ecosystem Friendly ^c		Bench
Populated Areas (>1,000)	U-2	DWR Urban & 200 Year	None	200 +/-	On top of Corps PL 84-99 and FEMA FIP, meet all DWR Bulletin 192-82 and the state law requirement for 200 year design	Like U-1 but improved design and higher level of protection	Freeboard = 3.0+ feet (for 0.5% annual frequency or 200-year flood).	Less than 1.0 more than for U-1	Included	Add 1.0 to 2.0	New setback 2.0 Add to setback 0.5 to 1.0	0.2
Populated Areas (>1,000 or historic)	U-3	Delta Towns	None	6 towns @ 3 to 5 = 20 to 30	On top of U-2 (above), consider extra flood protection and seismic design because of life safety due to deep flooding.	Like U-2 but will occur in the Primary Zone, often with deep peat and loose sand.	May require ring levees, floodwalls or other special features due to space constraints. Tend to be close to existing levee and water.	Widely variable based on situation	Included	N/A	N/A	0.2 plus more, depending on design
Infra-structure	I-3a	Seismic Fail/Repair	None	Depends on Policy or Scenario	-- Don't treat, or minimally treat, soft foundation and existing embankment; add mass to existing embankment so it doesn't slump to a below-water-line crest elevation and one has a platform for repairs after an earthquake. (Ray Seed idea for through-Delta conveyance.)	-- This design would be used only for levees along a through-Delta water conveyance. In any other circumstance where a seismic design is indicated (urban or infrastructure), one would address the foundation at increased cost to achieve better seismic performance.	16 foot crest width All-weather patrol road: toe drain Exterior Slope (3H:1V and 5H:1V) Interior Slope (3H:1V and 10H:1V) Static stability (FS = 1.8 to 2.1) May slump up to 5 feet in design earthquake (200-year earthquake). Some breaches expected. Freeboard = 3.0+ feet (for 1% annual frequency or 100-year flood)	For 10 ft peat 21.1 For thicker peat, up to 28.1	Included	Bench is Included: Up to 2.9 additional for ecosystem features	Setback is Included: Up to 2.9 additional for ecosystem features	0.2
Infra-structure, Populated Areas (>1,000)	I-3b U-4b	Seismic No Fail, Minimal Slump	None	Depends on Policy or Scenario	-- Seismically resistant design -- No fail/minimal slump. -- Treat soft foundation, provide engineered embankment. -- Water Contractors require this for through Delta water conveyance, per Dennis Majors.	-- Satisfy HMP, Corps, NFIP. -- Use for high-density urban, highly critical infrastructure, or water conveyance. -- Qualifies protected area for removal from 100-year floodplain. -- Qualifies for FEMA disaster assistance -- Qualifies for Corps emergency assistance and levee rehabilitation.	16 foot crest width All-weather patrol road: toe drain Exterior Slope (3H:1V and 5H:1V) Interior Slope (3H:1V and 10H:1V) Dynamic stability (FS = 1.8 to 2.1) Static stability (FS = 1.8 to 2.1) Foundation and levee prepared, treated or compacted to resist liquefaction. May slump up to 1 foot in design earthquake (200-year earthquake). Freeboard = 3.0+ feet (for 1% annual frequency or 100-year flood)	For 10 ft peat 21.1 to 38.0 For thicker peat, up to 63.5.	Included	Bench is Included: Up to 3.1 additional for ecosystem features	Setback is Included: Up to 3.1 additional for ecosystem features	0.2
Infra-structure, Populated Areas (>1,000)	I-3c U-4c	Seismic Super Levee	None	20 +/-	-- Has good foundation, engineered embankment, wide crest, houses on levee. -- Stewart Tract "River Islands" & Bethel Islands "Coves" Projects. -- For Infrastructure, raised infrastructure corridor.	-- Same notes as above for Seismically Resistant. -- Used for new, high budget, urban and subdivision development.	Wide crest (as much as 200 feet). All weather road(s) on crest. Other design factors similar to seismically resistant above. Cost estimates do not cover deep peat, extensive loose sand layers, levees over 20 feet, or non-local borrow.	6 to 12 -- little peat & sand, short levee height (10 to 20 ft), use of local borrow	Included	Add: 1.0 to 2.0	Change to setback: 2.0 Add to setback 0.5 to 1.0	0.4

Notes: These are the most significant differences. ^{b4}All cost estimates are from the DRMS "Levee Optimization Group."
^b Basic cost is cost to upgrade from prevalent non-compliant type – e.g., nearly HMP, HMP to PL 84-99, etc; assumes peat thickness of 10 feet; costs are higher for thicker peat. These costs assume barrier is a levee. If a floodwall is needed, costs go higher.
^c Additional cost (if any) to upgrade to an ecosystem friendly configuration, including such components as landscaping soils, tidal zones, flood plain areas, and plantings.
^d Additional cost to add one foot to levee crest elevation in anticipation of sea level rise, without decreasing static factor of safety.



Summary of Projected Global Warming Impact, 2070–2099 (as compared with 1961–1990) Three climate change scenarios all show a trend for less winter snowpack (California Climate Change Center, 2006)



LEVEE DECISION TREE

Decision Steps

Decision Steps	Agriculture/Conservation	Agriculture/Critical Ecology	Water Management	Housing	Critical Infrastructure
1. Land and Water Use	Low				
2. Level of Protection					High
3. Seismic Threat	None/Unimportant	Yes	No		Yes
4. Sea Level Rise	Incremental with Change				Assured Protection
5. Upgrade or New	Upgrade	New	Upgrade		New
6. Foundation/Soil	Good	Bad	Good		Bad
7. Material Available	Local	Import	Local		Import
8. Height	Short	Tall		Short	Tall
9. Eco/Setback	No	Yes		No	Yes

Approximate cost in millions per mile

\$0.6 \$2.4

\$11

\$17

\$22

\$34

?

The levee decision tree must be followed to determine which type of levee should go where, and the potential range of costs for a new or upgraded Delta levee. The first step is to determine the land uses or functions to be protected and the acceptable risk level. Subsequent factors depend on geography and site conditions. Applying rough estimates for a single levee type to the entire Delta can lead to grossly over- or underestimated true needs and costs.

Conceptual outcomes to Delta change

	No preparation	Preparation
Small externally driven changes	Status quo (problematic)	Controlled transformation (reduced risks)
Large externally driven changes	Uncontrolled transformation (potentially disastrous)	Managed transformation (large avoided costs)

Glossary of Delta and Suisun Initiatives
Delta Vision Blue Ribbon Task Force Meeting
August 21-22, 2008

Bay-Delta Conservation Plan (BDCP)

The Bay-Delta Conservation Plan is being developed to allow for projects to proceed that restore and protect water supply, water quality, and ecosystem health within a stable regulatory framework. When finished, this proposed comprehensive regional conservation plan will address compliance with federal and California endangered species laws and regulations covering activities by various Potentially Regulated Entities (PREs) in the Statutory Delta. The process for planning is outlined in the BDCP Planning Agreement, dated October 6, 2006. BDCP planning goals are:

- Provide for the conservation and management of Covered Species within the Planning Area;
- Preserve, restore, and enhance aquatic, riparian and associated terrestrial natural communities and ecosystems that support Covered Species within the Planning Area through conservation partnerships;
- Allow for projects to proceed that restore and protect water supply, water quality, and ecosystem health within a stable regulatory framework;
- Provide a means to implement Covered Activities in a manner that complies with applicable State and federal fish and wildlife protection laws, including CESA and FESA, and other environmental laws, including CEQA and NEPA;
- Provide a basis for permits necessary to lawfully take Covered Species;
- Provide a comprehensive means to coordinate and standardize mitigation and compensation requirements for Covered Activities within the Planning Area;
- Provide a less costly, more efficient project review process which results in greater conservation values than project-by-project, species-by-species review; and
- Provide clear expectations and regulatory assurances regarding Covered Activities occurring within the Planning Area.

CALFED Ecosystem Restoration Program Conservation Strategy (ERP)

This document will describe the ERP's strategy to achieve the recovery of at-risk species and the rehabilitation and restoration of natural processes and functions within the Bay-Delta estuary and its watershed.

The *End of Stage 1 Evaluation*, produced by the Department of Fish and Game, qualitatively assesses actions that were deemed technically, economically, and politically feasible to implement in the first seven years of the Ecosystem Restoration Program. The report describes the status of fulfilling these Stage 1 program priorities and implementation of restoration activities. Information is summarized by program elements, ecological management zones, and regional summaries. This report is part of the overall ERP assessment and is meant to compliment the more quantitative ERP *Milestone Assessment*.

Glossary of Delta and Suisun Initiatives
DV Blue Ribbon Task Force Meeting, August 21-22, 2008

The *Milestone Assessment*, produced by the Department of Fish and Game, quantitatively evaluates how well the ERP has achieved a discrete set of conservation actions embodied in 119 milestones. The milestones were intended to be carried out during the CALFED Program's Stage 1 (the first 7 years of the 30-year program) and were developed to ensure ESA, NCCPA, and CESA compliance. The *Milestone Assessment* provides a status for each milestone, states what was done to achieve designated actions, and discusses recommendations for meeting milestones in the future. This report is part of the overall ERP assessment and is meant to compliment the more qualitative ERP End of Stage 1 Evaluation. A summary of EWA operations and the effects of the EWA on targeted species are discussed as well.

CALFED Stage 2 Planning

As the CALFED Program completes Stage 1, a direction needs to be established for continuation of the Program. As envisioned by the ROD, CALFED agencies are currently evaluating alternative approaches for Delta conveyance, primarily by participating in the Delta Vision and BDCP processes that include consideration of alternative conveyance approaches for the Delta. Similarly, the agencies are participating in DRMS to assesses the major risks to the Delta resources from floods, seepage, subsidence, and earthquakes and develop recommendations to manage the risk. As such, it is premature to set a specific future direction at this time. However, it is expected that many of CALFED's Stage 1 actions will continue in the future. Further, recommendations from the initiatives may lead to some revision or refinement of Delta actions identified in the ROD or development of new Delta actions.

CALFED State of Bay-Delta Science, 2008 (SBDS)

The SBDS is an iterative effort to compile, synthesize and communicate the current scientific understanding of the Bay-Delta ecosystem and provide relevant scientific context to inform resource management and decision making. The first edition will focus on the key issues relevant to CALFED Program Stage 2 decisions and the Delta Vision process and will incorporate the most current understanding of system function and a description of ecosystem services as well as describing the drivers or demands and the influence of management action on these services and the system of the whole.

CALFED Surface Storage Investigations (SSI) (Department of Water Resources and US Bureau of Reclamation)

SSI was formulated to evaluate the five surface storage projects identified in the CALFED Bay-Delta Program Record of Decision (August 28, 2000). The goal of the Storage Program is to increase water supply reliability, improve water quality, and support ecosystem restoration through expanded storage capacity and increased operational flexibility. Additional surface storage will provide flexibility to the State's water management system, which can be operated to contribute to the long-term sustainability of the Delta ecosystem, maintaining water quality and supply reliability, and preventing and planning for catastrophic

failure of the Delta system. With additional capacity and integrated operations, water diversion and deliveries can also be timed in ways that will allow for better response to the effects of earthquakes, floods, and climate change.

The Department of Water Resources and U.S. Bureau of Reclamation, with input from stakeholders and assistance from local water agencies, are conducting the planning and feasibility studies. The five surface storage investigations are:

- Shasta Lake Water Resources Investigation (SLWRI)
- North-of-the-Delta Offstream Storage (NODOS)
- In-Delta Storage Project (IDSP)
- Los Vaqueros Reservoir Expansion (LVE)
- Upper San Joaquin River Basin Storage Investigation (USJRBSI)

California Water Plan Update 2009

The *California Water Plan* provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

Contra Costa County General Plan (2005-2020)

The Contra Costa County Board of Supervisors adopted a comprehensive General Plan (1990-2005) in January 1991 following an extensive public outreach and participation process initiated in 1986. This comprehensively updated General Plan superseded the County's prior General Plan (and each of the previously adopted elements), and consolidated several area specific General Plans into one plan document. The Contra Costa County General Plan was reconsolidated by the Board of Supervisors in July 1996 to reflect General Plan Amendments from 1991 to 1995 and to correct minor errors and omissions discovered in the original 1991 General Plan text. This first County General Plan Reconsolidation covered the period from 1995 through 2010. A second General Plan Reconsolidation was approved by the Board of Supervisors in January 2005 to reflect General Plan Amendments adopted between 1995 and 2004, to revise text and maps to reflect the 1999 incorporation of the City of Oakley, formerly an unincorporated community that was covered under the County General Plan, and to consolidate a newly adopted Housing Element into the General Plan. The second County General Plan Reconsolidation was adopted in January 2005 and covers the period from 2005 through 2020.

Delta Protection Commission, Governor's Office of Emergency Services, and Five Delta Counties' Emergency Planning and Response Collaborative Process

The Delta Protection Commission facilitated a summit meeting in 2006 of the five Delta counties to discuss and agree upon a coordinated effort at Delta-wide

emergency planning especially to ensure that societal issues were included as well as common assumptions and approaches between the many planning efforts underway. The Commission moved forward in the fall of 2007 to work with the Governor's Office of Emergency Services and the Center for Collaborative Policy, CSUS, to develop a process including all local, state, (including the California Department of Water Resources) and federal agencies involved with emergency response in the Delta to ultimately achieve a coordinated regional emergency response framework plan. This plan is envisioned to be the integrating "overlay" and linking tool to provide one common framework of emergency response planning that supports and strengthens existing and future jurisdictional plans in the Delta. Societal issues associated with a catastrophic emergency in the Delta are to be focused on to ensure there is Delta-wide coordination in the planning and response to issues such as: regional mass care and shelter, large scale evacuation, public warning, public information, interoperable communication and so forth.

Delta Protection Commission Management Plan Update (MPU)

The Delta Protection Act of 1992 required the Delta Protection Commission to prepare, adopt, review, and maintain a comprehensive long-term resource management plan for land uses within the Sacramento-San Joaquin Delta. The plan covers an area called the Primary Zone which includes approximately 500,000 acres of waterways, levees and farmed lands extending over portions of five counties: Solano, Yolo, Sacramento, San Joaquin and Contra Costa. The goals of the Plan are to "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; assure orderly, balanced conservation and development of Delta land resources and improve flood protection by structural and nonstructural means to ensure an increased level of public health and safety." Provisions of the Act preclude the Plan from denying a landowner the right to continue agricultural use. The Act also specifically prohibits eminent domain unless requested by the landowner. The Plan has eight policy areas, including (1) Environment, (2) Utilities and Infrastructure, (3) Land Use and Development, (4) Water and Levees, (5) Agriculture, (6) Recreation and Access, (7) Marine Patrol, and (8) Boater Education and Safety Programs. Since preparation of the original plan in 1995, a number of issues (like climate change and flood management) and initiatives (like Delta Vision) have prompted new interest in updating the Plan and revisiting the overall structure of Delta governance.

Delta Regional Ecosystem Restoration Implementation Plan (DRERIP)

DRERIP is one of four regional plans intended to guide the implementation of the CALFED Bay-Delta Program's Ecosystem Restoration Program (ERP) element. The DRERIP will refine the planning foundation specific to the Delta, refine existing Delta specific restoration actions and provide Delta specific implementation guidance, program tracking, performance evaluation and adaptive

management feedback. Conceptual models and other DRERIP work products could be used in developing the Delta Vision.

Delta Risk Management Strategy (DRMS)

The Delta Risk Management Strategy (DRMS) goals and objectives are:

Phase 1: Evaluate the risk and consequences to the State (e.g., water export disruption and economic impact) and the Delta (e.g., levees, infrastructure, and ecosystem) associated with the failure of Delta levees and other assets considering their exposure to all hazards (seismic, flood, subsidence, seepage, sea level rise, etc.) under present as well-as for 50-,100-, and 200-years from now. The evaluation shall assess the total risk as well as the disaggregated risk for individual islands.

Phase 2: Propose risk criterion for consideration of alternative risk management strategies and for use in management of the Delta and the implementation of risk informed policies. Develop a Delta Risk Management Strategy, including a prioritized list of actions to reduce and manage the risks or consequences associated with Delta levee failures.

Delta Vision (DV)

The initiative resulting from legislation and Governor Schwarzenegger's Executive Order S-17-06 to integrate the many but separate Delta planning efforts, using a collaborative and inclusive public process, to develop and articulate findings and recommendations for durable and sustainable management of the Delta. The Delta Vision will be the basis of a Delta Strategic Plan that will include recommendations for regional management arrangements among elected officials, government agencies, stakeholders, academia and affected California communities.

Department of Fish and Game (DFG) California Longfin Smelt Petition

The Bay Institute, Center for Biological Diversity, and Natural Resources Defense Council submitted a petition seeking action by the California Fish and Game Commission (Commission) to list the longfin smelt (*Spirinchus thaleichthys*) as threatened or endangered under the California Endangered Species Act (CESA; Fish and Game Code Sections 2050-2115). The petition also sought action by the Commission to list the longfin smelt on an emergency basis. The Commission rejected the emergency request to list longfin smelt as an endangered species opting instead to evaluate the petition through standard rulemaking procedures. As part of their consideration of the petition, the Commission categorized longfin smelt a 'candidate species' under the CESA. Pursuant to the provisions of Section 2074.6 of the Fish and Game Code, the Department of Fish and Game (DFG) must complete a status review of the species and provide a written report to the Fish and Game Commission that indicates --- based upon the best scientific information available --- whether or not listing the longfin smelt as threatened or endangered under CESA is warranted.

East Contra Costa County HCP/NCCP

The East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (“Plan”) is intended to provide regional conservation and development guidelines to protect natural resources while improving and streamlining the permit process for endangered species and wetland regulations. The Plan will allow Contra Costa County, the Contra Costa County Flood Control and Water Conservation District, the East Bay Regional Park District and the Cities of Brentwood, Clayton, Oakley, and Pittsburg (collectively, the Permittees) to control endangered species permitting for activities and projects in the region that they perform or approve. The Plan also provides for comprehensive species, wetlands, and ecosystem conservation and contributes to the recovery of endangered species in northern California. The Plan avoids project-by-project permitting that is generally costly and time consuming for applicants and often results in uncoordinated and biologically ineffective mitigation.

The Plan was developed by a team of scientists and planners with input from independent panels of science reviewers and stakeholders. Within the 174,018 acre inventory area, the Plan will provide permits for between 8,670 and 11,853 acres of development and will permit impacts on an additional 1,126 acres from rural infrastructure projects. The Preserve System to be acquired under the Plan will encompass 23,800 to 30,300 acres of land that will be managed for the benefit of 28 species as well as the natural communities that they, and hundreds of other species, depend upon. By proactively addressing the long-term conservation needs, the Plan strengthens local control over land use and provides greater flexibility in meeting other needs such as housing, transportation, and economic growth in the area.

Suggested by the wildlife agencies in 1998, work on the Plan officially got underway in October of 2001. The Final Plan was released in October 2006 and approved by all participating local, state and federal agencies by August 2007. Implementation of the Plan is now underway and will continue for the 30 year life of the Plan and associated permits.

FloodSAFE California

FloodSAFE California is a multi-faceted, strategic program to improve public safety through integrated flood management. The FloodSAFE vision is a sustainable, integrated flood management and emergency response system throughout California that improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding. The program builds upon the State's ongoing flood management work, especially progress made since Governor Arnold Schwarzenegger called for improved maintenance, system rehabilitation, effective emergency response, and sustainable funding.

Interagency Ecological Program (IEP), including Pelagic Organism Decline (POD) and other special studies

The Interagency Ecological Program (IEP) for Monitoring and Research in the Bay Delta represents a consortium of nine federal and state agencies. The program was initiated in 1970 to provide ecological information for use in management of the Sacramento/San Joaquin Delta and San Francisco Estuary. IEP coordinates and conducts monitoring and focused scientific investigations and communicates the findings to high level management and policy leaders of the state and federal governments. Recent abundance indices calculated by IEP suggest marked declines since 2000 in four pelagic fishes in the upper San Francisco Estuary (the Delta and Suisun Bay). In response to these changes, the IEP formed a Pelagic Organism Decline (POD) work team in 2005 to evaluate potential causes. More than 50 individual special studies were undertaken to investigate potential underlying causes of the POD. The most recent progress report (2007 Synthesis of Results) was published in January 2008. Many POD studies are still in progress. Highlights of new work will be presented in another progress report expected by January 2009.

The Great California Delta Trail System

Recognizing the unique natural resources of the Sacramento-San Joaquin Delta, the growing demands for public access to these resources, and the increasing recognition of the importance of outdoor recreation in addressing childhood obesity, the California Legislature passed, and the Governor signed, Senate Bill 1556 (Senator Torlakson) supporting the creation of a Delta trail network. The vision is for the trail to link the San Francisco Bay Trail system and planned Sacramento River trails in Yolo and Sacramento counties to present and future trail ways around and in the Delta, including Delta shorelines in Contra Costa, San Joaquin, Solano, Sacramento, and Yolo counties. The Delta Protection Commission will facilitate the feasibility and planning process, which will include a Stakeholder Advisory Group and Technical Advisory Group. A consulting team, consisting of Valley Vision and Alta Planning and Design, has been selected through an RFP process to assist the Commission. A large grant proposal has been submitted to Caltrans for Delta trail planning.

Lower Yolo Bypass Planning Forum

The Lower Yolo Bypass is the most downstream portion of the Yolo Bypass (Bypass), a massive levied floodway located west of the Sacramento River and within Yolo and Solano counties. The Bypass provides flood conveyance for the cumulative high flows from several northern California waterways to the Sacramento-San Joaquin River Delta (Delta). In addition to flood conveyance, the Bypass provides critical habitat to a variety of species including numerous bird species and threatened and endangered fish such as the Delta Smelt and Sacramento Splittail. The Bypass also provides recreation opportunities, including widespread hunting and fishing use.

To address these issues (and with generous funding support from the California Department of Fish and Game), the Delta Protection Commission and the Yolo Basin Foundation are co-sponsoring The Lower Yolo Bypass Planning Forum. The Forum will seek to achieve what no single affected stakeholder and

associated agency / organization has achieved to date; the collaborative creation of a mutually beneficial, mutually agreed on, long- range management strategy for the Lower Bypass. The Forum Group will be comprised of representatives from national, state, and local government agencies, as well as private land owners and recreation enthusiasts. Participation is completely voluntary and based on the assumption that all interest groups will be given equal weight in the decision/recommendation making process.

Operation Criteria and Plan Consultation (OCAP)

The Operations Criteria and Plan (OCAP) ESA consultation addresses ongoing Central Valley and State Water Project operations and future changes. The U.S. Bureau of Reclamation formally consulted on several new actions, such as Freeport diversion project, municipal and industrial shortage policy, the Trinity ROD flows, the DMC/California Aqueduct Intertie. There was also early consultation (on actions that are not anticipated to be implemented in the immediate future) on the operation of South Delta Improvement Project (SDIP) with assumptions for a long-term Environmental Water Account (EWA). Additional consultation under ESA will be required prior to implementing any actions addressed in the early consultation. The OCAP consultation is not a decision making process, but rather analyzes the effects of proposed operation on listed species. It involves issuing a Biological Assessment (BA) followed by the U.S. National Marine Fisheries Service and U.S. Fish and Wildlife Service issuing (or revising) Biological Opinions (BO) on Delta smelt, salmon, and steelhead. Decisions on implementing new actions are made in separate project-specific planning/environmental compliance processes.

PPIC/UC Davis “Comparing Futures for the Sacramento-San Joaquin Delta” Report

This project is a follow-up to the Public Policy Institute of California/UC Davis report *Envisioning Futures for the Sacramento-San Joaquin Delta*, released in February 2007. The project will: (i) compare promising Delta solutions in terms of ecosystem, water quality, and economic outcomes under different scenarios of climate change, (ii) assess the regulatory implications of different management alternatives, and (iii) provide a framework and tools for choosing among alternatives under uncertainty. Analytical tools and information resources include hydrodynamic modeling of water management scenarios, hydro-economic models of water delivery quantity and quality costs and benefits, and interviews and workshops with experts on the Delta ecosystem, water quality management, and the regulatory environment. Products will include a short report for a policy audience and several technical appendices. The target publication date is June 2008. Some intermediate results may be available earlier for discussion.

Sacramento County General Plan Update

This project consists of the adoption of an updated General Plan for the County of Sacramento (Control Number 02-0105). This Plan is intended to guide the growth and development of the County through the year 2030, and supports the Sacramento Area Council of Governments’ Blueprint Vision for regional land use

and transportation. The County's existing General Plan was adopted by the Board of Supervisors in 1993 and is approaching its time horizon of 2010.

After conducting extensive public outreach and coordinating with various agencies, organizations and jurisdictions at the federal, state, and local level, the County unveiled the Public Review Draft of the General Plan on November 8, 2006. The Board of Supervisors then held additional public workshops to review the key themes of the General Plan, to receive and consider additional input from the public and other stakeholders, and to make changes to the draft General Plan. On May 30, 2007, the Board adopted a Resolution (No. 2007-0698) to transmit the Draft General Plan to the Department of Environmental Review and Assessment (DERA) to begin the environmental analysis of the Draft Plan.

**San Francisco Bay Conservation and Development Commission (SF BCDC)
Bay Plan Updates**

The Bay Plan was completed and adopted by the San Francisco Bay Conservation and Development Commission in 1968 and submitted to the Legislature and Governor in 1969. In 1969, the Legislature acted upon the Commission's recommendations in the Bay Plan and revised the McAteer-Petris Act by designating the Commission as the agency responsible for maintaining and carrying out the provisions of the Act and the Bay Plan for the protection of the Bay and its great natural resources and the development of the Bay and its shoreline to their highest potential with a minimum of Bay fill. To keep pace with changing conditions and to incorporate new information concerning the Bay, the McAteer-Petris Act specifies that the Commission should make a continuing review of the Bay Plan and may amend or make other changes to the Bay Plan provided the changes are consistent with provision of the Act. Since its adoption by the Commission in 1968, the Bay Plan has been amended periodically and the Commission continues to systematically review the Plan to keep it current.

San Francisco Estuary Project (SFEP) 2007 Comprehensive Conservation and Monitoring Plan (CCMP)

The San Francisco Estuary Project recently completed an update to its 1993 Comprehensive Conservation and Management Plan (CCMP). In August 2007, the Estuary Project's Implementation Committee adopted the revised CCMP and forwarded it to its Executive Council for review and expected concurrence. The 2007 CCMP was based on input from more than 80 representatives from federal and state agencies, local governments, environmental groups, business and industry, academia, and the public. The 2007 CCMP contains 201 actions pertinent to the protection and restoration of San Francisco Bay and the Sacramento-San Joaquin Delta. It seeks to achieve high standards of water quality, including restoration and maintenance of a balanced indigenous population of fish, shellfish and wildlife, and recreational activities in the estuary, and assure that the designated uses of the estuary are protected.

The Estuary Project is one of 28 programs created by Congress in the Clean Water Act's Section 320: the National Estuary Program established to protect and improve the water quality and natural resources of estuaries

nationwide. The Estuary Project was formed in 1987 as a cooperative federal/state/local program to promote effective management of the San Francisco Bay-Delta Estuary. It is financed by federal appropriations and funds from the state and local entities.

San Joaquin County General Plan Update

San Joaquin County is just beginning the comprehensive update of the General Plan for the unincorporated areas of the County. It is anticipated that the process will take three to five years. The current General Plan was adopted in 1992 and is effective through 2010. The General Plan expresses the long-range public policy to guide the use of private and public lands in regards to development and resource management. The Housing Element will be updated in 2009 and will be incorporated into the updated General Plan. The General Plan will include required elements addressing land use, circulation, safety, noise, open space, and conservation, and will, also, address agriculture and climate change.

San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP)

The key purpose of the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP or Plan), is to provide a strategy for balancing the need to conserve Open Space and the need to convert Open Space to non-Open Space uses while protecting the region's agricultural economy; preserving landowner property rights; providing for the long-term management of plant, fish and wildlife species, especially those that are currently listed, or may be listed in the future, under the Federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA); providing and maintaining multiple-use Open Spaces which contribute to the quality of life of the residents of San Joaquin County; and accommodating a growing population while minimizing costs to Project Proponents and society at large.

Solano Habitat Conservation Plan

In March 1999, the United States Fish and Wildlife Service (USFWS), in accordance with Section 7 of the Federal Endangered Species Act (ESA) of 1973 (as amended), issued a Biological Opinion (BO) regarding the Solano Project Water Service Contract Renewal between the United States Bureau of Reclamation and the Solano County Water Agency (SCWA). In the BO, USFWS asked SCWA to consider undertaking a Habitat Conservation Plan to address impacts to endangered species by the Solano Project, SCWA agreed to do so. The Solano Project is the Reclamation project that makes water available to SCWA and its contractors. The 25-year contract between the United States Bureau of Reclamation and SCWA provides for continued delivery of Solano Project water for agricultural, municipal, and industrial purposes throughout the SCWA contract service area.

The purpose of the Solano HCP is to promote the conservation of biological diversity and the preservation of endangered species and their habitats consistent with the recognition of private property rights; provide for a healthy

economic environment for the citizens, agriculture, and industries; and allow for the on-going maintenance and operation of public and private facilities in Solano County. The Solano HCP is a county-wide Conservation Plan, covering 580,000 acres, 71 species, four Natural Communities, and has fourteen Plan Participants. The Draft Solano HCP describes the measures, monitoring, and adaptive management necessary to conserve the important biological resources of Solano County.

Solano County General Plan Update

A comprehensive update to the Solano County General Plan to guide both development and conservation within the unincorporated county through 2030. The program will update the Land Use Element, Circulation Element, Conservation Element, Open Space Element, Noise Element and Safety Element. These General Plan elements and along with the existing Housing Element and Park and Recreation Element will be consolidated into a new single comprehensive General Plan document. The new General Plan will be organized by topics rather than by separate individual elements.

South Sacramento Habitat Conservation Plan (HCP)

The South Sacramento Habitat Conservation Plan (SSHCP) is a regional approach to addressing issues related to urban development, habitat conservation, open space protection and agricultural protection. The SSHCP will consolidate environmental efforts to protect and enhance wetland (primarily vernal pools), aquatic, and upland habitats to provide ecologically viable conservation areas. It will also minimize regulatory hurdles and streamline the permitting process for projects that engage in development or covered activities.

The SSHCP Study Area encompasses approximately 341,249 acres within south Sacramento County and includes the cities of Elk Grove, Galt and Rancho Cordova. The geographical boundaries of the Study Area are U.S. Highway 50 to the north, Interstate 5 to the west, the Sacramento County line with El Dorado and Amador Counties to the east, and San Joaquin County to the south. The Study Area excludes the City of Sacramento, the City of Folsom and Folsom's Sphere of Influence, the Sacramento-San Joaquin Delta, and the Sacramento County community of Rancho Murieta.

State Water Resources Control Board (SWRCB) Bay-Delta Strategic Workplan

On December 4, 2007, the State Water Board adopted Resolution 2007-0079 outlining regulatory actions the State Water Board, Central Valley Regional Water Board, and San Francisco Bay Regional Water Board will take, or will consider taking, to address Bay-Delta issues related to water supply, species protection, and water quality improvements. The resolution directs Water Board staff to develop a strategic workplan that prioritizes and describes the scope of Bay-Delta activities. Staff will present a workplan to the Water Board for its adoption in July 2008.

Suisun Marsh Charter Implementation Plan (SMP)

The SMP and its accompanying Programmatic Environmental Impact Statement/Report (PEIS/EIR) will develop, analyze, and evaluate potential environmental benefits and impacts resulting from various actions necessary in the Suisun Marsh to preserve and enhance managed seasonal wetlands, implement a comprehensive levee protection/improvement program, and protect ecosystem and drinking water quality, while restoring habitat for tidal marsh-dependent sensitive species, consistent with the California Bay-Delta Program's strategic goals and objectives.

US Army Corps of Engineers (USACE) Delta Dredged Sediment Long-Term Management Strategy (LTMS)

The five initial participating agencies (USACE, U.S. Environmental Protection Agency, California Department of Water Resources, California Bay-Delta Authority, and Central Valley Regional Water Board) agreed to examine the sediment issues and needs within the Delta. The participating agencies drafted a three-part project purpose statement:

- The Delta Dredged Sediment LTMS development process will examine and coordinate dredging needs and sediment management in the Delta to assist in maintaining and improving channel function (navigation, water conveyance, flood control, and recreation), levee rehabilitation, and ecosystem restoration.
- Agencies and stakeholders will work cooperatively to develop a sediment management plan (SMP or LTMS) that is based on sound science and protective of the ecosystem, water supply, and water quality functions of the Delta.
- As part of this effort, the sediment management plan will consider regulatory process improvements for dredging and dredged material management so that project evaluation is coordinated, efficient, timely, and protective of Delta resources.

USACE Delta Islands and Levees Feasibility Study

Given the serious need to reconstruct Delta levees, the USACE developed action strategies to address levee improvements and assigned priorities that could be carried out under the CALFED Act (PL 108-361, 2004) through 2010. This is known as the short-term CALFED Levee Stability Program. The long-term strategy for the Delta levees will be developed as part of the Sacramento-San Joaquin Delta Islands and Levees Feasibility Study. This study will assess existing and future flood risks in the Delta area, as well as ecosystem restoration, recreation, and water supply needs, and develop a comprehensive vision and roadmap for future Federal participation in the Delta. The plan, in conjunction with California Department of Water Resources' Delta Risk Management Study, will address remaining levee stability work beyond the \$90 million Federal effort authorized in the CALFED Act.

See USACE CALFED Levee Stability Program.

USACE CALFED Levee Stability Program

Given the serious need to reconstruct Delta levees, the USACE developed action strategies to address levee improvements and assigned priorities that could be carried out through 2010 under the CALFED Act (PL 108-361, 2004), which authorizes the appropriations of a total of \$90 million from FY 2005 through FY 2010 for the Federal share of levee project categories (see below). These strategies are known as the short-term CALFED Levee Stability Program, whose purpose is to move quickly to implement high priority levee reconstruction projects within the Section 205 Small Flood Control Projects funding limit (\$7 million per project and assuming that cost-sharing is 65 percent Federal and 35 percent non-Federal). The long-term strategy for the Delta levees will be developed as part of the Sacramento-San Joaquin Delta Islands and Levees Feasibility Study.

Project categories in the CALFED Act include (1) reconstructing Delta levees to base level protection; (2) further enhancing the stability of levees that have State-wide importance; (3) developing best management practices to control subsidence; (4) developing a Delta levee emergency management and response plan to enhance emergency and readiness response; (5) developing a DRMS after assessment of the consequences of potential Delta levee failures; (6) reconstructing Delta levees using dredged materials to the maximum extent practicable; (7) coordinating levee projects with existing levee and water resources projects; and (8) evaluating and rehabilitating the Suisun Marsh levees, if appropriate.

US Fish and Wildlife Service (FWS) Delta Native Fishes Recovery Plan

This recovery plan is intended to fulfill one of the primary purposes under section 2 of the Endangered Species Act of 1973 – to provide a means for the conservation of ecosystems upon which endangered and threatened species depend. Accordingly, the purpose and scope of this recovery plan is to outline a strategy for the conservation and restoration of Sacramento-San Joaquin Delta native fishes through the development of recovery measures that address the unique biological capabilities and needs of the species and the specific threats to their existence. Addressing the Delta ecosystem as a whole is a difficult proposition, considering its biotic and physical complexity and the fact that it has been, and continues to be, highly altered by human activities (Moyle, P.B., and B. Herbold, 1989. Status of the Delta smelt, *Hypomesus transpacificus*. Report submitted to Office of Endangered Species, US FWS, January 1989). The fish fauna of the Delta is in a state of general decline. Of the forty or so fish species in the present assemblage, approximately half are introduced, with the introduced species tending to be the most abundant while native species become an increasingly minor part of the assemblage (Moyle 2002, Inland Fishes of California, University of California Press, p 35). The most practical way to develop recovery or restoration recommendations that would take into account the complexity of the Delta ecosystem is to work with a selected group of fishes. Species addressed in this plan include: delta smelt, longfin smelt, Sacramento splittail, and Sacramento perch.

The basic objective of the Delta Native Fishes Recovery Plan is to establish self-sustaining populations of the species of concern that will persist indefinitely. The basic strategy for recovery is to manage the estuary in such a way that it is better habitat for aquatic life in general and for the fish species of concern in particular. Restoration of the Delta ecosystem may also include efforts to reestablish the extirpated Sacramento perch.

US FWS Longfin Smelt Petition

The Bay Institute, Center for Biological Diversity, and Natural Resources Defense Council formally request that the U.S. Fish and Wildlife Service (USFWS) list the San Francisco Bay-Delta population of longfin smelt (*Spirinchus thaleichthys*) as an endangered species under the federal Endangered Species Act, 16 U.S.C. §§1531-1544 (ESA). Petitioners further request that the USFWS review whether the population warrants emergency listing, and if so, that the USFWS use its authorities under 16 U.S.C. §1533(b)(7) to list the population as endangered on an emergency basis. In the alternative, petitioners request that the USFWS list this longfin smelt population as a threatened species under the ESA. The petitioners also request that critical habitat be designated concurrent with the listing, as required by 16 U.S.C. 1533(b)(6)(C).

This petition is filed pursuant to the authorities of 5 U.S.C. §553(e), 16 U.S.C. §1533(b)(7) and 50 C.F.R. part 424.14. The USFWS has jurisdiction over this petition. This petition sets in motion a specific administrative process as defined by §1533(b)(3) and 50 C.F.R. §424.14(b), placing mandatory response requirements on the USFWS and very specific time constraints upon those responses.

US National Marine Fisheries Service Central Valley Salmonids Recovery Plan

The NOAA Fisheries Technical Recovery Team (TRT) met for three years and Phase I of the recovery planning process is complete. The TRT produced three papers on 1) current and historical population distributions 2) population viability, and 3) research and monitoring needs. These papers, as well as other recovery planning information can be accessed through linkages on NOAA Fisheries Recovery Planning webpage at <http://swr.nmfs.noaa.gov/recovery>.

Phase II of recovery planning is well underway, initiated in summer 2006 with a series of public workshops to educate attendees about the recovery planning process and collect threats information for winter and spring-run Chinook salmon and Central Valley steelhead. NOAA Fisheries is in the process of completing a threats assessment document that serves as the foundation of the recovery plan, along with the TRT products. Concurrent with completing the preliminary threats assessment, a second series of public workshops were held in May 2007, building on the (preliminary) prioritized threats information to start developing recovery actions that are responsive to these threats. Drafting of the recovery plan, including the input from all public workshops, is underway. NOAA Fisheries' intent is to provide a draft recovery plan and threats assessment for public and peer review in early to mid-2008. It is also NOAA Fisheries' intent to continue to hold public workshops to introduce the draft recovery plan not only

to solicit public comments but also to facilitate implementation of recovery actions.

Yolo County General Plan Update

The Yolo County General Plan provides the comprehensive long-term plan for the physical development of the unincorporated area of the County. The General Plan was last comprehensively updated in 1983 based on the County's original General Plan from 1958. While the County's fundamental land use goals (such as promoting agriculture and directing urban growth to the cities) have not changed, the economic circumstances facing the County have changed dramatically since the early 80's. There have also been significant demographic changes, for example the fact that increasingly many of the citizens living in our rural areas have no ties to agriculture. The agricultural sector has changed as well, with new regulations, economic forces, environmental issues, and crop patterns emerging regularly. The General Plan update allows the County to examine these issues in a comprehensive manner.

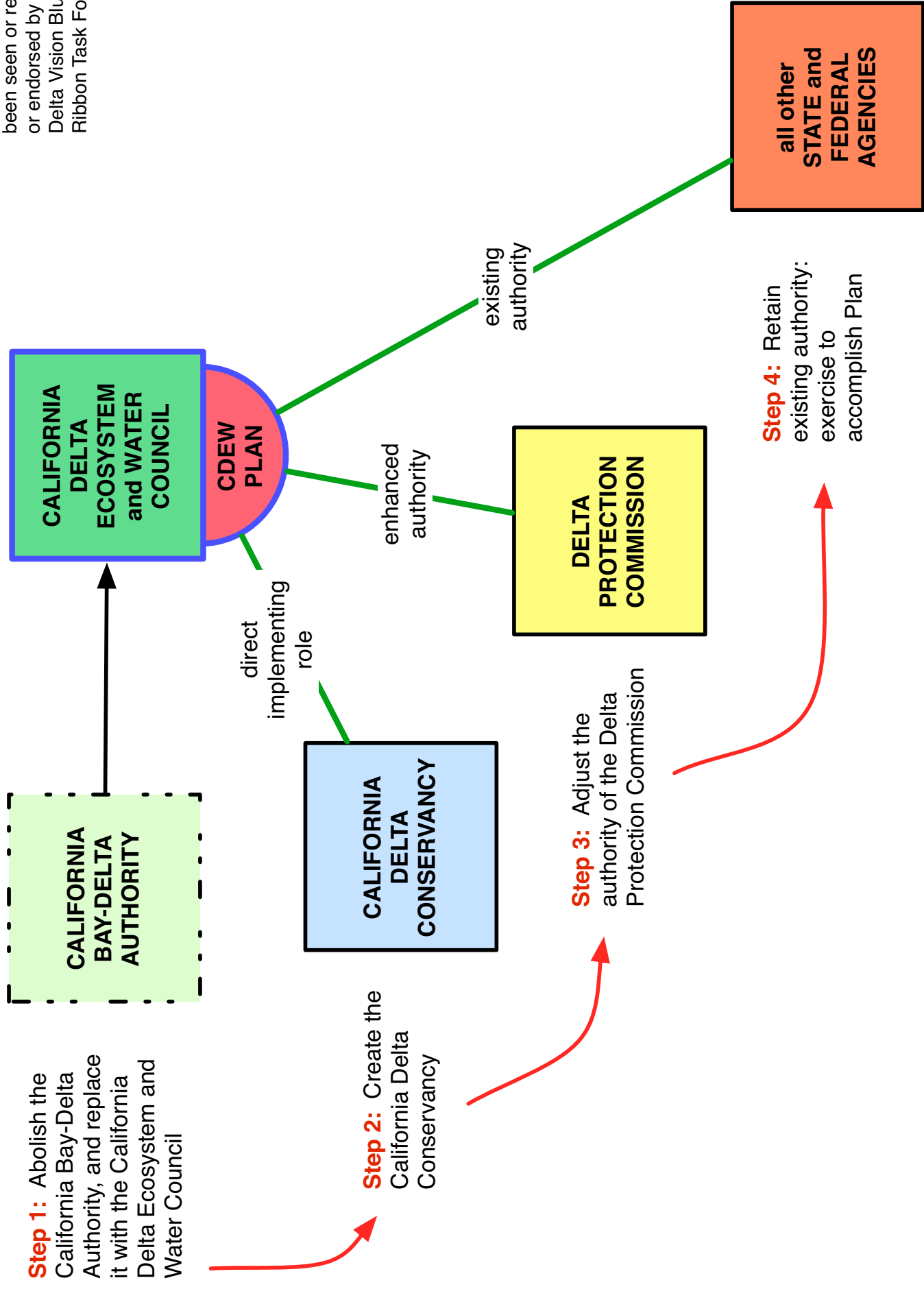
Yolo Natural Heritage Program

The Yolo County NCCP/HCP Joint Powers Agency ("JPA") was formed in August 2002 for the purposes of acquiring Swainson's hawk habitat conservation easements and to serve as the lead agency for the preparation of a county-wide Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP), now known as the Yolo Natural Heritage Program. The JPA governing Board is composed of representatives from member Agencies, which include two members of the Yolo County Board of Supervisors, one member each from the City Councils of Davis, Woodland, West Sacramento and Winters, and one ex-officio member from UC Davis.

The Yolo Natural Heritage Program is a county-wide Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) for the 653,629 acre planning area that provides habitat for many special status and at risk species found within five dominant habitats/natural communities. The Yolo Natural Heritage Program will describe the measures that will be undertaken to conserve important biological resources, obtain permits for urban growth and public infrastructure projects, and continue Yolo County's rich agricultural heritage.

Fourth Staff Draft Governance Structure

This diagram is a draft work product of Delta Vision staff and has not been seen or reviewed or endorsed by the Delta Vision Blue Ribbon Task Force.



Step 1: Abolish the California Bay-Delta Authority, and replace it with the California Delta Ecosystem and Water Council

Step 2: Create the California Delta Conservancy

Step 3: Adjust the authority of the Delta Protection Commission

Step 4: Retain existing authority: exercise to accomplish Plan

Appendix Table 1. Indicators and Performance Measures

Table 1 lists the performance measures are proposed for each indicator. These indicators and their components will be tracked, along with the status of strategy implementation, and reported to policy makers and the public through a Delta Vision Report Card, which will be issued by an independent and objective board on a regular basis. The Report Card will provide essential feedback to the Council regarding Vision realization and individual strategy success. The Report Card will indicate if implemented strategies are working, or it may signal to policy makers that a course adjustment is necessary.

Note that Goal 1 is represented by a roll-up of all indicators and performance measures, so is not listed here. These are interim measures, to be refined by the Delta Science and Engineering Board and the CDEW Council before July 2009.

Goal	Indicator	Sub-indicators	Performance Measures
2	Delta Recognition and Value	Recognition and legal status	1. Application steps completed for special designations (+)
		Economic vitality	2. Gross regional product from recreation and tourism (+) 3. Gross regional product from sustainable agriculture (+) 4. Expenditures by public agencies for land acquisition, management, and maintenance (+)
		Public benefit	5. Acres of land providing public benefits of habitat, flood conveyance, subsidence reversal, or carbon sequestration (+)
3	Estuary Health	Habitat extent and function	1. Acres of restored tidal marsh, Delta (not accounting for sea level rise) (+)
			2. Acres of restored tidal marsh, Suisun (not accounting for sea level rise) (+)
			3. Acres of restored shallow open water habitat in the Delta (+)
			4. Acres of active floodplain (+)
			5. Acres of seasonal wetlands and grasslands (+)
			6. Acres of fall open water habitat between 0.5-6 parts per thousand salinity (+)
			7. Number and geographic distribution of large habitat complexes incorporating two or more interconnected habitat types (+)
			8. Number of functional migratory corridors per river system (Sacramento, San Joaquin, Mokelumne/Cosumnes) (+)
			9. Amount of river miles connected to adjacent floodplain, tidal marsh, and shallow open water habitats (+)
			10. Distribution of large habitat complexes along estuarine gradients and with extensive internal connectivity (+)
			11. Incidents of migratory passage delays, blockages, or mortalities due to physical barriers, low dissolved oxygen, high temperatures, or toxics (-)
			12. Dissolved oxygen concentrations in anadromous fish migratory corridors at all times (+)
			13. Percentage of adult salmon, steelhead, and sturgeon surviving migration through Delta (+)
			14. Percentage of juvenile salmon, steelhead, and sturgeon surviving migration through Delta (+)
			15. February to June Delta outflow as percent of unimpaired runoff

Goal	Indicator	Sub-indicators	Performance Measures
			(+), with greater percent increase at lower flows and lesser percent increase at higher flows)
			16. Net downstream flow on San Joaquin River at Jersey Point Feb 1 to Jun 30 (+)
			17. Number of 7-14 day duration fall flow pulses on San Joaquin River at 2,000-3,000 cfs at Vernalis between Sep. and Nov. each year (+)
			18. Number of months between Aug and Nov with Delta outflow at 1.5 to 3 times 1990s conditions in below normal, above normal, and wet years (+)
		Native and migratory species populations	19. Percent of aquatic food web support by diatoms (+)
			20. Number of new, uncontrolled harmful invasive species (-)
			21. Percentage of 1995-2000 average abundance and distribution of invasive clams (<i>Corbula</i> and <i>Corbicula</i>) (-)
			22. Percentage of 1990-2000 average abundance and distribution of Brazilian waterweed (<i>Egeria</i>) (-)
			23. Abundance of warm water centrarcid fish species (such as large mouth bass) (-)
			24. Proportion of population of resident and migratory species (as larvae, juveniles or adults) taken at exports particularly when abundances are low (-)
			25. Quantity of primary and secondary production taken at exports (-)
			26. Percentage of outmigrating juvenile salmonid population entrained at Delta diversions (-)
			27. Numbers of Delta and longfin smelt entrained at Delta diversions (-)
4	Water Sustainability	Water use efficiency and demand	1. Water use per capita, relative to 2008 baseline, by hydrologic region (-)
			2. Water use per unit industrial economic output, relative to 2008 baseline, by hydrologic region (-)
			3. Water use per unit agricultural economic output, relative to 2008 baseline, by hydrologic region (-)
			4. Amount of water exported from the Delta that is recycled or re-infiltrated (excluding water lost to direct consumption by crops and people, or evapotranspiration) compared to 2008 baseline (+)
		Water supply sustainability	5. Length of time, at average rates of use over a three-year period, that a given water district's alternative and stored supplies will last if there is a catastrophic outage of the Delta (+)
			6. Amount of water in accessible surface and ground water storage compared to 2008 baseline (+)
5	Water Supply Reliability	Water reliability for ecosystem and human uses	1. Likelihood of a catastrophic interruption of Delta conveyance system (-)
			2. February to June Delta outflow as percent of unimpaired runoff (+), with greater percent increase at lower flows and lesser percent increase at higher flows)
			3. Net downstream flow on San Joaquin River at Jersey Point Feb 1 to Jun 30 (+)
			4. Number of 7-14 day duration fall flow pulses on San Joaquin River at 2,000-3,000 cfs at Vernalis between Sep. and Nov. each year (+)
			5. Number of months between Aug and Nov with Delta outflow at 1.5 to 3 times 1990s conditions in below normal, above

Goal	Indicator	Sub-indicators	Performance Measures
			normal, and wet years (+)
		Storage and conveyance capacity	6. Amount of water in accessible surface and ground water storage compared to 2008 baseline (+) 7. Additional annual yield from major reservoirs compared to current flood operation requirements (+) 8. Additional flood conveyance capacity on major rivers leading into the Delta, compared to 2008 baseline (+) 9. Percentage of precipitation in the Delta watershed that is infiltrated or directly used compared to 2008 baseline (+)
		Water quality	10. Percentage of time that contaminants or their precursors meet, or are better than, water quality targets (+) 11. Pathogen concentrations at Delta drinking water intakes (-) 12. Net levels of salinity in major groundwater aquifers (-) 13. Number of nuisance growths of algae or aquatic plants in the Delta or water project facilities (-) 14. Concentrations of contaminants in urban runoff and agricultural drainage flowing into the Delta (-) 15. Salinity variability between fresh to brackish conditions during periods necessary to meet life history requirements of broad range of desirable aquatic species (+) 16. Number of days per year water temperature exceeds life history requirements for broad range of desirable aquatic species (-) 17. Number, duration, and areal extent of incidences during which dissolved oxygen levels drop below regulatory standards (-) 18. Extent of areas listed as low dissolved oxygen impaired water bodies on RWQCB Section 303(d) list (-) 19. Number, duration, and areal extent of incidences during which pH falls outside regulatory standards (-) 20. Concentration of methyl mercury in Delta water and sentinel species compared to 2008 baseline and Water Quality Control Plan standards (-) 21. Concentration of selenium in San Joaquin River, Delta waters and sentinel species compared to 2008 baseline and Water Quality Control Plan standards (-) 22. Concentration of ammonia in Delta waters compared to 2008 baseline and Water Quality Control Plan standards (-) 23. Number of new contaminants added to RWQCB Section 303(d) list (-)
6	Delta Risk	Levee design	1. Index measuring compatibility between levee designs and land uses (+)
		Appropriate land use	2. Number of people living in legal Delta in areas with less than 200-year flood protection (-) 3. Number of structures in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-) 4. Number of people living and working in deep floodplains (more than 10 feet below sea level or river flood stage) that are not protected by 200-year levees (-)
		Emergency preparedness	5. Mileage of designated state highways secured against catastrophic failure by adequate levee improvement, elevation, or other means (+) 6. Number of people who have received Delta Emergency Response Training (+)

Goal	Indicator	Sub-indicators	Performance Measures
7	Government Effectiveness	Performance	TBD
		Consistency	TBD
		Funding security	TBD