BLUE RIBBON TASK FORCE

Delta Vision Strategic Plan

October 2008

Governor Schwarzenegger:

The Sacramento-San Joaquin River Delta covers more than 1,300 square miles. Its more than 60 “islands”, together with its natural channels and sloughs are the home to 750 species of plants and wildlife as well as 55 species of fish.

The Delta is the hub of California’s water delivery system, taking runoff from about 40 percent of California’s landmass and moving that water to farms and more than two-thirds of the state’s population.

It is a crown jewel of California—and the nation. And it is in crisis.

As this Task Force said in its findings and recommendations in 2007, the crisis worsens each day. As it worsens, the threat of statewide economic and ecologic disaster increases. In 2008, a drought and international financial crisis have only further compounded the risks to the Delta and the state, necessitating action and change.

You asked us in Executive Order S-17-06 to develop a strategic plan to pull the Delta out of its ecological tailspin and devise a strategy to restore its environmental quality while ensuring a more reliable and stable water system.

The Delta has been the subject of decades of study and political deadlock. As a consequence, ecosystems have eroded, levees have deteriorated, fish populations have collapsed, and our system of delivering water has become ever more precarious.

The disparate interests with a stake in the Delta have attempted for years to reach agreement on the Delta’s future. Those efforts, most recently the CALFED process, have failed. This Task Force is keenly aware of that history and the peril California faces from continued failure.

Our first report charted a vision of a healthy future for the Delta. Of necessity, a healthy Delta cannot be addressed in isolation, which is why you asked us to consider a broad array of ecosystem, water, and land use policies in California.

This Delta Vision Strategic Plan describes the specific steps needed to achieve that vision.

Most importantly, the Task Force recommended two co-equal goals: Restore the Delta ecosystem and create a reliable water supply for California.

Co-equal means exactly that—harmonizing a desired Delta ecosystem and the necessary provision of water to Californians. Recent court decisions reinforce that one can’t be done without the other.

As with our Vision, the recommendations in this Plan are inextricably linked. There won’t ever be a sustainable and reliable water supply without a vibrant Delta ecosystem. And the reverse is also true.

To achieve a healthy Delta and a more reliable water system for Californians, policy makers must:

1. Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California.
2. Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals.
3. Restore the Delta ecosystem as the heart of a healthy estuary.
4. Promote statewide water conservation, efficiency, and sustainable use.
5. Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals.
6. Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments.
7. Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals.

Our specific recommendations to reach these goals follow within the Strategic Plan.

This Task Force began its work after decades of water and ecosystem policy deadlock.

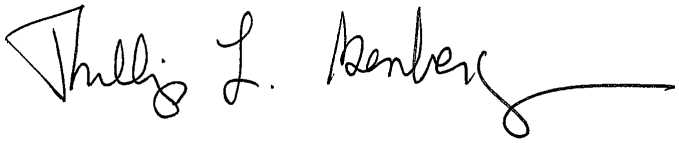
Over the years, local water agencies have pursued their own water solutions, some making remarkable progress. Federal and state agencies have offered fragmented but well-intended aid to the Delta ecosystem. California voters have approved several public works bonds, with major investments in clean drinking water, Delta levees, and a host of water projects and water efficiency measures.

Even so, disputes still flare over water storage facilities and habitat restoration. Consensus on improving the existing Delta water export system remains elusive.

Through our co-equal goals and the linked steps that go with it, the Task Force has tried to present a vision and strategies to break through our long years of water wars and begin to effectively address the future. The work of the Task Force benefited enormously from the contributions of dozens of stakeholders, including those who participated in the Stakeholder Coordination Group and many more who contributed as individuals or representatives of organizations. In addition, state and federal agency representatives, local government representatives, professional scientists and engineers, activists, and individual citizens contributed. Their level of interest and strength of opinions are testament to the statewide importance of the Delta to the state of California.

This Strategic Plan reports our recommendations in two parts. Part 1 serves as the main text of the Strategic Plan, providing the history and context of the Delta crisis and emphasizing the importance of immediate action. Part 1 also introduces the seven key goals and strategies of the Strategic Plan. Part 2 describes the strategies with the detail necessary to justify the recommended actions. An Executive Summary is also provided to concisely capture all major recommendations.

California must embrace a practical near-term and decades-long strategy that, with hard work and good will by all parties, creates a healthier, more sustainable future for the Delta and our state.



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Delta Vision Strategic Plan

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Arnold Schwarzenegger

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October 2008

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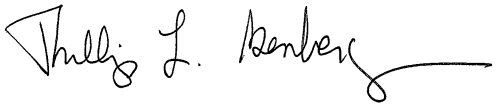
Statement of Adoption

The Delta Vision Strategic Plan was approved and adopted unanimously by the Blue Ribbon Task Force on October 17, 2008 in West Sacramento, California.



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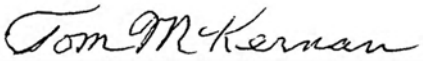

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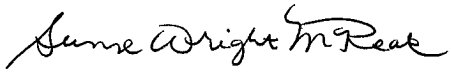

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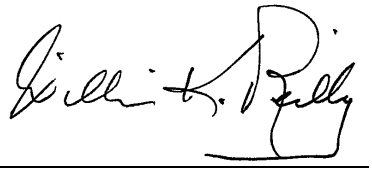

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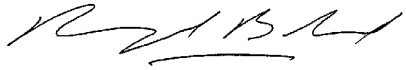

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Executive Summary

When it was created by Governor Schwarzenegger's Executive Order S-17-06 in 2006, the charge of the Delta Vision Blue Ribbon Task Force (Task Force) was nothing less than to create a vision to repair the ecological damage to the Sacramento-San Joaquin River Delta (Delta), and then prepare a strategic plan which would sustain the Delta in future decades while ensuring a reliable water supply for the two-thirds of California's population who depend in whole or in part on water from the Delta.

The Delta is both unique and essential.

Unique in that, at 1,300 square miles, it is the largest estuary on the west coast of North and South America—a complex, interconnected ecosystem that is home to 55 species of fish and 750 species of plants and wildlife. It's an agricultural and recreational center.

The Delta is essential because its rivers and the miles of natural and man-made sloughs and channels are the linchpin in how water is moved around California. Twenty-five million Californians—nearly two-thirds of the state population—depend on the Delta for at least some of their water supply. Three million agricultural acres are irrigated with water that flows through the Delta. Three highways, three railroad lines, five high-voltage power lines and hundreds of gas lines crisscross the Delta region.

Without water conveyed through the Delta, several counties adjacent to the Delta would be immediately at risk. Soon, some Central Valley farms would lie fallow, cities west and south of the Delta would wither, and California's economy would run dry. Several threatened and endangered species unique to the Delta would not survive. The simple truth is, truly, that stark.

Both the Task Force's Vision for the Delta and the following Strategic Plan are based on two co-equal goals: Restore the Delta ecosystem and create a more reliable water supply for California.

They are *co-equal* goals because one objective can't be achieved without the other. Recent court rulings reinforce that fact.

As the Task Force's November 2007 Vision bluntly put it: The Delta is in crisis. The crisis worsens each day, posing a higher and higher risk that California's water delivery system will collapse.

The Delta is in an ecological tailspin. Invasive species, water pumping facilities, urban growth, and urban and agricultural pollution are degrading water quality and threatening multiple fish species with extinction.

Urban development is reducing wildlife habitat today and foreclosing future opportunities to improve the ecosystem—and Delta water conveyance. The threat of catastrophic failure from earthquake, flood, sea level rise, and land subsidence is painfully real and growing.

Risks to people, property, and state interests in the Delta have grown to intolerable levels. New levee policies, future-looking land use decisions, and far better emergency preparedness are needed immediately.

Compounding the crisis is that the current governance structure for water and the Delta has failed. More than 200 federal, state, and local government agencies have some jurisdiction in the Delta. Everyone is involved but no one is charge. Moreover, existing fragmentation of policies and projects guarantees continued failure in restoring the Delta ecosystem and in ensuring reliable water supplies for California.

Executive Order S-17-06 creating Delta Vision identified these same threats and inadequacies, directing the Task Force to recommend "public policy changes…recommendations on institutional changes…oversight, land use and implementation authorities." Comments received by Delta Vision suggest not all perceive the seriousness of these problems or the urgency of action conveyed by the Executive Order and recognized by the Task Force. Resistance to change in policies and institutions is deep among affected interests. This Task Force believes the time is past for denial of crises and illusory hopes that past practices or institutions can meet the challenges of the future.

A key strategy in achieving the Task Force's co-equal goals is creation of a new governance structure with needed legal authority and competencies to achieve the co-equal goals.

The Delta also needs to be recognized for its uniqueness—and its importance to California and its economy. Essential to achieving the co-equal goals is officially designating the Delta's special status, supporting its agriculture, and planning for a vibrant regional economy of the future.

Accomplishing the co-equal goals also requires creation of a reliable water delivery system. As a central protection of that reliability, the Task Force recommends, subject to further analysis, a two-channel approach—improving the existing channel through the Delta and a second channel designed for conveyance—to carry water to export pumps. Increased storage capacity, surface and ground, plus changed operations are also required to improve water supply reliability. Concurrently, Californians need to become less dependent on water supply from the Delta, both to reduce risk from a failed Delta conveyance system and to reduce risks to the ecosystem. A revitalized Delta ecosystem will require reduced diversions at critical times.

Healing the Delta and creating a sustainable water supply also require a broad range of linked actions. Like the Task Force's co-equal goals, statewide efforts to conserve water and more responsibly use existing supplies directly influence success in the Delta. Some recommendations made in this Strategic Plan will have greater effect if integrated into statewide policies—the Delta is very important to success of salmon, for example, but habitat improvements from river headwaters to the ocean will benefit this species. Institutionalizing the co-equal goals and enhancing capacity of the Department of Fish and Game (DFG), the State Water Resources Control Board (State Board), and the Department of Water Resources (DWR) should be pursued statewide. Effective partnerships with federal agencies will be critical to success.

The Task Force acknowledges that working toward achieving the co-equal goals will require balance. Fish need more water on average at critical times. In any given year there may not be enough water to meet the two co-equal goals. But, averaged over several years, there may be enough water to meet both goals. Certainly, with implementation of this strategic plan, including construction of the storage and conveyance facilities and large scale ecosystem restoration in the Delta, there will be reduction in conflict between the two goals.

Although the strategies presented in this report will have effects over decades, conservation, water system efficiency, promoting regional self-sufficiency, and Delta ecosystem revitalization are, in the near term, the most likely actions to improve California's water future.

To achieve the seven goals, the Task Force recommends 22 strategies and 73 actions, organized under the seven goals. Additionally, ten near-term actions are recommended to address immediate threats as soon as possible. Part 1 of this Strategic Plan provides the context and justification of this Strategic Plan and an overview of its integrated recommendations. Part 2 provides full discussion of the strategies and recommended actions, which the Task Force believes should be viewed and implemented in their entirety in order to achieve the desired results. A compilation of the goals, strategies, actions, and near-term actions is provided here.

Many of the recommended actions specify timelines for implementation, the Task Force's best judgment of the shortest time frame the actions can realistically be undertaken. Given the urgency of the situation in the Delta, these timeframes should be accelerated whenever possible.

Goal 1: Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California

Strategy 1.1: Make the co-equal goals the foundation of Delta and water policy making.

> **Action 1.1.1:** Write the co-equal goals into the California Constitution or into statute.
>
> **Action 1.1.2:** Incorporate the co-equal goals into the mandated duties and responsibilities of all state agencies with significant involvement in the Delta.
>
> **Action 1.1.3:** Require the achievement or advancement of the co-equal goals in all water, environmental, and other bonds, and operational agreements and water contracts or water rights permits, that directly or indirectly fund activities in the Delta.

Goal 2: Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals

Strategy 2.1: Apply for federal designation of the Delta as a National Heritage Area, and expand the State Recreation Area network in the Delta.

> **Action 2.1.1:** Apply by 2010 for the designation of the Delta as a federally recognized National Heritage Area.
>
> **Action 2.1.2:** Expand by 2010 the State Recreation Area network in the Delta, combining existing and newly designated areas.

Strategy 2.2: Establish market incentives and infrastructure to protect, refocus, and enhance the economic and public values of Delta agriculture.

> **Action 2.2.1:** Establish special Delta designations within existing federal and state agricultural support programs.
>
> **Action 2.2.2:** Conduct needed research and development for agricultural sustainability in the Delta.
>
> **Action 2.2.3:** Establish new markets for innovative agricultural products and enterprises in the Delta.

Strategy 2.3: Develop a regional economic plan to support increased investment in agriculture, recreation, tourism, and other resilient land uses.

> **Action 2.3.1:** Charge the Delta Protection Commission with facilitating a consortium of local governments to create a regional economic development plan that addresses agriculture, recreation, tourism, and other innovative land uses.
>
> **Action 2.3.2:** Establish special enterprise zones at the major “gateways” to the Delta as part of the economic development plan.

Strategy 2.4: Establish a Delta Investment Fund to provide funds for regional economic development and adaptation.

> **Action 2.4.1:** Initiate the Delta Investment Fund with state funding.
>
> **Action 2.4.2:** Structure the Fund so that it can accept revenues from federal, state, local, and private sources.
>
> **Action 2.4.3:** Place the Fund under the joint management of the Delta Protection Commission and a consortium of local governments.

Strategy 2.5: Adopt land use policies that enhance the Delta's unique values, and that are compatible with the public safety, levee, and infrastructure strategies of Goal 6.

Actions: See Goals 3 and 6 for actions to address this Strategy.

Goal 3: Restore the Delta ecosystem as the heart of a healthy estuary

Strategy 3.1: Restore large areas of interconnected habitats—on the order of 100,000 acres—within the Delta and its watershed by 2100.

Action 3.1.1: Increase the frequency of floodplain inundation and establish new floodplains.

Action 3.1.2: Restore tidal habitats and protect adjacent grasslands and farmlands throughout the Delta, with active near-term pursuit of restoration targets.

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

Action 3.2.1: Improve physical habitats along selected corridors by 2015.

Action 3.2.2: Provide adequate flows at the right times to support fish migrations, and reduce conflicts between conveyance and migration, by 2012.

Action 3.2.3: Immediately use the Central Valley Flood Protection Plan to identify areas of the San Joaquin River within and upstream of the Delta where flood conveyance capacity can be expanded.

Action 3.2.4: Using the National Heritage Area and regional economic development planning efforts, begin immediately to identify ways to encourage recreational investment along the key river corridors.

Strategy 3.3: Promote viable, diverse populations of native and valued species by reducing risks of fish kills and harm from invasive species.

Action 3.3.1: Reduce fish kills in Delta pumps by instituting diversion management measures by 2009, implementing near-term conveyance improvements by 2015, and relocating diversions.

Action 3.3.2: Control harmful invasive species at existing locations by 2012, and minimize or preclude new introductions and colonization of new restoration areas to non-significant levels.

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

Action 3.4.1: Charge the Department of Fish and Game with completing recommendations for in-stream flows for the Delta and high priority rivers and streams in the Delta watershed by 2012 and for all major rivers and streams by 2018.

Action 3.4.2: Develop and adopt management policies supporting increased diversion during wet periods, a joint effort of the State Water Resources Control Board, the Department of Fish and Game, the Department of Water Resources, and related federal agencies, to be completed by 2012.

Action 3.4.3: Adopt new State Water Resources Control Board requirements by 2012 to increase spring Delta outflow. Commence implementation no later than 2015.

Action 3.4.4: Adopt new State Water Resources Control Board requirements by 2012 to reintroduce fall outflow variability no later than 2015.

Action 3.4.5: Increase San Joaquin River flows between February and June by revising the State Water Resources Control Board's Vernalis flow objectives and the state and federal water projects' export criteria. Revise the flow objectives and criteria no later than 2012 and commence implementation as soon as possible thereafter.

Action 3.4.6: Provide short-duration San Joaquin River pulse flows in the fall starting by 2015.

Action 3.4.7: Reconfigure Delta waterway geometry by 2015 to increase variability in estuarine circulation patterns.

Strategy 3.5: Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.

Action 3.5.1: Require the Central Valley Regional Water Quality Control Board to conduct three actions:

- Immediately re-evaluate wastewater treatment plant discharges into Delta waterways and upstream rivers and set discharge requirements at levels that are fully protective of human health and ecosystem needs.
- Adopt by 2010 a long-term program to regulate discharges from irrigated agricultural lands.
- Review by 2012 the impacts of urban runoff on Delta water quality and adopt a plan to reduce or eliminate those impacts.

Action 3.5.2: Relocate as many Delta drinking water intakes as feasible away from sensitive habitats and to channels where water quality is higher.

Action 3.5.3: Establish Total Maximum Daily Load programs by 2012 for upstream areas to reduce organic and inorganic mercury entering the Delta from tributary watersheds.

Action 3.5.4: Begin comprehensive monitoring of water quality and Delta fish and wildlife health in 2009.

Goal 4: Promote statewide water conservation, efficiency, and sustainable use

Strategy 4.1: Reduce urban, residential, industrial, and agricultural water demand through improved water use efficiency and conservation, starting by achieving a statewide 20 percent per capita reduction in water use by 2020.

Action 4.1.1: Improve statewide water use efficiency and conservation.

Action 4.1.2: Reduce urban per-capita water demand through specific recommended actions.

Action 4.1.3: Ensure the most efficient use of water in agriculture.

Strategy 4.2: Increase reliability through diverse regional water supply portfolios.

Action 4.2.1: Modify the Water Recycling Act of 1991 to add a statewide target to recycle on the order of 1.5 million acre-feet of water annually by 2020.

Action 4.2.2: Enact legislation now to encourage local water agencies to at least triple the current statewide capacity for generating new water supplies through ocean and brackish water desalination by 2020.

Action 4.2.3: Request that the State Water Resources Control Board set goals by 2015 for infiltration and direct use of urban storm water runoff throughout the Delta watershed and its export areas.

Action 4.2.4: Request agencies to ensure that accurate and timely information is collected and reported on all surface water and groundwater diversions in California by 2012.

Action 4.2.5: Require that all water purveyors develop an integrated contingency plan by 2015 in case of Delta water supply curtailments or drought.

Action 4.2.6: Establish a regulatory framework that encourages efficient and integrated management of water resources at local, regional, and statewide levels, with a focus on specific actions.

Goal 5: Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals

Strategy 5.1: Expand options for water conveyance, storage, and improved reservoir operations.

Action 5.1.1: Direct the Department of Water Resources and other allied agencies to further investigate the feasibility of a dual conveyance facility, building upon the Bay-Delta Conservation Plan effort.

Action 5.1.2: Direct the Department of Water Resources, the Department of Fish and Game, and other allied agencies to recommend the size and location of new storage and conveyance facilities by the end of 2010. Develop a long-term action plan to guide design, construction, and operation, and present the recommendation and plan to the California Delta Ecosystem and Water Council for a consistency determination.

Action 5.1.3: Complete substantial development and construction of new surface and groundwater storage and associated conveyance facilities by 2020, with the goal of completing all planned facilities by 2030.

Strategy 5.2: Integrate Central Valley flood management with water supply planning.

Action 5.2.1: Change the operating rules of existing reservoirs to incorporate and reflect modern forecasting capabilities.

Action 5.2.2: Require the Department of Water Resources to immediately create a flood bypass along the lower San Joaquin River.

Action 5.2.3: Request that the Department of Water Resources encourage greater infiltration as part of watershed management planning.

Goal 6: Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments

Strategy 6.1: Significantly improve levels of emergency protection for people, assets, and resources.

Action 6.1.1: Complete a Delta-wide regional emergency response plan by 2010 that establishes legally binding regional coordination.

Action 6.1.2: Immediately begin a comprehensive series of emergency management and preparation actions.

Action 6.1.3: Conduct a comprehensive analysis of the costs and benefits of highway protection strategies, and adopt a policy based on its findings by 2012.

Action 6.1.4: Complete a comprehensive analysis of the costs and benefits of infrastructure protection strategies. Adopt a policy based on its findings by 2012.

Strategy 6.2: Discourage inappropriate land uses in the Delta region.

Action 6.2.1: Immediately strengthen land use oversight of the Cosumnes/Mokelumne floodway and the San Joaquin/South Delta lowlands.

Action 6.2.2: Immediately strengthen land use oversight for Bethel Island, the city of Isleton, and Brannan-Andrus Island.

Action 6.2.3: Immediately prepare local plans for these five at-risk locations within the primary zone: Walnut Grove (including the residential area on Grand Island), Locke, Clarksburg, Courtland, and Terminous.

Action 6.2.4: Immediately form a landowner consortium to create a new land use strategy that fosters recreation, increases habitat, reverses subsidence, sequesters carbon, improves handling of dredged material, and continues appropriate agriculture on Sherman, Twitchell, and Jersey Islands.

Strategy 6.3: Prepare a comprehensive long-term levee investment strategy that matches the level of protection provided by Delta levees and the uses of land and water enabled by those levees.

Action 6.3.1: Require the Department of Water Resources, in cooperation with local Reclamation Districts and other agencies, to develop a comprehensive plan for Delta levee investments.

Action 6.3.2: Prioritize the $750 million appropriated by Proposition 1E and Proposition 84 funds for the improvement of Delta levees, including in legacy towns.

Action 6.3.3: Require those preparing the comprehensive levee plan to incorporate the Delta Levees Classification Table to ensure consistency between levee designs and the uses of land and water enabled by those levees.

Action 6.3.4: Continue the existing Department of Water Resources levee subventions program until the comprehensive levee plan is completed.

Action 6.3.5: Vest continuing authority for levee priorities and funding with the California Delta Ecosystem and Water Council to ensure a cost-effective and sustainable relationship between levee investments and management of the Delta over the long term.

Goal 7: Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals

Strategy 7.1: Establish a new California Delta Ecosystem and Water Council as a policy making, planning, regulatory, and oversight body. Abolish the existing California Bay-Delta Authority, transferring needed CALFED programs to the California Delta Ecosystem and Water Council. Establish a new Delta Conservancy to implement ecosystem restoration projects, and increase the powers of the existing Delta Protection Commission.

Action 7.1.1: Establish a California Delta Ecosystem and Water Council to replace the Bay-Delta Authority and take over CALFED programs.

Action 7.1.2: Establish a California Delta Conservancy as early as possible in the 2009 legislative session.

Action 7.1.3: Strengthen the Delta Protection Commission through legislation.

Action 7.1.4: Require the California Delta Ecosystem and Water Council to create a Delta Science and Engineering Program and a Delta Science and Engineering Board by September 1, 2009.

Action 7.1.5: Improve the compliance of diversions water use with all applicable laws.

Strategy 7.2: Require the California Delta Ecosystem and Water Council to prepare a California Delta Ecosystem and Water Plan to ensure sustained focus and enforceability among state, federal, and local entities.

Action 7.2.1: Develop a legally enforceable California Delta Ecosystem and Water Plan.

Action 7.2.2: Institutionalize adaptive management through updates to the California Delta Ecosystem and Water Plan every five years.

Action 7.2.3: Charge the Delta Science and Engineering Board, with support of the Delta Science and Engineering Program, to develop a science-based adaptive management program to provide for continued learning of, and adaptation to, actions implemented by state, federal, and local agencies in the Delta.

Strategy 7.3: Finance the activities called for in the California Delta Ecosystem and Water Plan from multiple sources.

Action 7.3.1: Enact a series of principles regarding design of financing into legislation authorizing the California Delta Ecosystem and Water Council.

Action 7.3.2: Establish a base of revenues outside the state General Fund for the work of the California Delta Ecosystem and Water Council, the Delta Conservancy, the Delta Protection Commission, and related core activities of the Department of Fish and Game, the Department of Water Resources, and the State Water Resources Control Board.

Action 7.3.3: Find new revenue sources beyond the traditional bond funds or public allocations.

Strategy 7.4: Optimize use of the CALFED Record of Decision and Coastal Zone Management Act to maximize participation of federal agencies in implementation of the California Delta Ecosystem and Water Plan.

Action 7.4.1: Use existing authority under the CALFED Record of Decision to maximize participation of federal agencies in implementation of the Delta Vision Strategic Plan until the California Delta Ecosystem and Water Plan is completed.

Action 7.4.2: Prepare the California Delta Ecosystem and Water Plan according to guidelines of the Coastal Zone Management Act, in order to achieve ongoing federal consistency.

Near-Term Actions

1. Obtain needed information on water diversion and use.
2. Initiate collection of improved socio-economic, ecosystem, and physical structure data about the Delta to inform policy processes and project level decision making by all public agencies, local, state, and federal.
3. Accelerate completion of in-stream flow analyses for the Delta watershed by the Department of Fish and Game.
4. Conduct a Middle River Corridor Two Barrier pilot project.
5. Complete construction of an alternative intake for the Contra Costa Water District.
6. Evaluate the effectiveness of a Three Mile Slough Barrier project.
7. Construct a demonstration fish protection screen at Clifton Court Forebay.
8. Advance near-term ecosystem restoration opportunities.
9. Stockpile rock and other emergency response materials.
10. Assess and improve state capacity to respond to catastrophic events in the Delta.

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Appendices

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Acknowledgments

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Greg Zlotnick
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Acronyms and Abbreviations

Army Corps	U.S. Army Corps of Engineers
AWMC	Agricultural Water Management Council
BDCP	Bay-Delta Conservation Plan
BTH	California Business, Transportation, and Housing Agency
CCWD	Contra Costa Water District
CDEW Council	California Delta Ecosystem and Water Council
CDEW Plan	California Delta Ecosystem and Water Plan
Central Valley Regional Board	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
CVP	Central Valley Project
CZMA	Coastal Zone Management Act
D-1641	Decision 1641
Delta	Sacramento-San Joaquin River Delta
DFG	California Department of Fish and Game
DOD	U. S. Department of Defense
DPC	Delta Protection Commission
DRMS	Delta Risk Management Strategy
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ERP	Ecosystem Restoration Program
ESA	Endangered Species Act
EWA	Environmental Water Account
FEMA	Federal Emergency Management Agency
IRWMP	Integrated Regional Water Management Plan
NEPA	National Environmental Policy Act

NMFS	National Marine Fisheries Service
NOAA	National Ocean and Atmospheric Administration
OES	Office of Emergency Services
Reclamation	U. S. Bureau of Reclamation
Regional Board	Regional Water Quality Control Board
SCADA	Supervisory Control and Data Acquisition
State Board	California State Water Resources Control Board
SWP	State Water Project
TMDL	Total Maximum Daily Load
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	urban water management plan
Vision	Delta Vision: Our Vision for the California Delta

Part 1
Framework and Strategic Approach

Context

This Strategic Plan outlines the major steps necessary to achieve our co-equal goals of a viable Delta ecosystem and water for Californians. The Strategic Plan builds on our linked recommendations in our Delta Vision (Vision), adopted in November 2007, and shown in Figure 1-1.

Of necessity, complex public policy issues involve many details. This Strategic Plan is no different. However, it is important to understand the context in which the Task Force presents these recommendations.

The current political deadlock over water and the Delta ecosystem

This Delta Vision Blue Ribbon Task Force (Task Force) began its work at the end of almost 40 years of water and ecosystem policy deadlock in California. During this period local water agencies have pursued their own water solutions, some making remarkable progress. Federal and state agencies have approved fragmented but well intended Delta ecosystem improvements. Several water bonds have been approved by the voters, with major amounts committed to clean drinking water, Delta levee protection and a host of water facility improvements and conservation/water efficiency measures. Not withstanding this effort, disputes over water storage facilities and how (or if) to improve the existing Delta water export system are unresolved.

California is experiencing another drought and signs indicate it will not end any time soon. Given these realities, why is the state still blocked on broad water and ecosystem change? To anyone reading the history of this state, deadlock is not surprising.

Regional battles, competing plans for development, population growth, unrealistic attitudes about what amount of water is available in the state, lack of concern about adverse consequences from inappropriate uses of water all have appeared frequently during the 158 years of statehood. Those debates and the solutions adopted by past generations shape water policy decisions today. In recent decades, the growing body of federal and state environmental laws—and the broad public support for these laws in California—have forced a realization that current water policies and infrastructure do not protect the environment and no longer fully reflect our social values.

There are some signs, faint but still clear, that the warring parties are slowly changing their positions. Some urban water districts in the south acknowledge they are no longer asking for increased water from the Delta; some acknowledge reductions will occur. Some environmentalists acknowledge the Delta is deteriorating, but admit achieving fish populations that existed 100 years ago may not be possible. Conservation is increasingly important in this state, as best exemplified by the Governor's recent announcement of a goal of achieving a 20 percent per capita reduction in water use by 2020.

The current federal litigation concerning endangered fish species in the Delta is sobering. Periodic interruptions in water exports have occurred and may be more frequent in the future.

However, even court orders favorable to fish species cannot guarantee species will return to health.

All parties to the water debate have apparently concluded the Delta ecosystem is in decline and the current system of Delta and water governance is broken and needs to be fixed. Why has that happened?

Our adopted Vision (2007) included 12 interrelated and linked recommendations.

1. The Delta ecosystem and a reliable water supply for California are the primary, co-equal goals for sustainable management of the Delta.
2. The California Delta is a unique and valued area, warranting recognition and special legal status from the State of California.
3. The Delta ecosystem must function as an integral part of a healthy estuary.
4. California's water supply is limited and must be managed with significantly higher efficiency to be adequate for its future population, growing economy, and vital environment.
5. The foundation for policymaking about California water resources must be the longstanding constitutional principles of "reasonable use" and "public trust;" these principles are particularly important and applicable to the Delta.
6. The goals of conservation, efficiency, and sustainable use must drive California water policies.
7. A revitalized Delta ecosystem will require reduced diversions—or changes in patterns and timing of those diversions upstream, within the Delta, and exported from the Delta—at critical times.
8. New facilities for conveyance and storage, and better linkage between the two, are needed to better manage California's water resources for both the estuary and exports.
9. Major investments in the California Delta and the statewide water management system must integrate and be consistent with specific policies in this vision. In particular, these strategic investments must strengthen selected levees, improve floodplain management, and improve water circulation and quality.
10. The current boundaries and governance system of the Delta must be changed. It is essential to have an independent body with authority to achieve the co-equal goals of ecosystem revitalization and adequate water supply for California—while also recognizing the importance of the Delta as a unique and valued area. This body must have secure funding and the ability to approve spending, planning, and water export levels.
11. Discouraging inappropriate urbanization of the Delta is critical both to preserve the Delta's unique character and to ensure adequate public safety.
12. Institutions and policies for the Delta should be designed for resiliency and adaptation.

FIGURE 1-1
Delta Vision Recommendations
Twelve integrated and linked recommendations were the heart of the Task Force's Vision for the Delta. (Source: Delta Vision Blue Ribbon Task Force 2007)

Facts are stubborn things

More than 250 years ago, John Adams (later to be our second President), said

> *Facts are stubborn things; and whatever may be our wishes, our inclinations, or the dictates of our passion, they cannot alter the state of facts and evidence.* [1]

Here are some key facts that suggest there may be a break in the water policy deadlock in California.

- **California's supply of water is static; it is not growing.**

Almost 97 percent of all the water that comes into California is from rain and snowfall. In our Vision, and included in this Strategic Plan as Figure 1-2, the Task Force referenced 116 years of rain and snow records to show that California's average water supply has remained constant. The chart is worth examining again.

- **Per capita urban water use is moderating in California, but the overall demands for water are increasing.**

The state's water supply is not growing, but the demand continues to rise. Although there is evidence of more efficient water use in both the urban and agricultural sectors, efficiency gains continue to be offset by the growing demand for water.

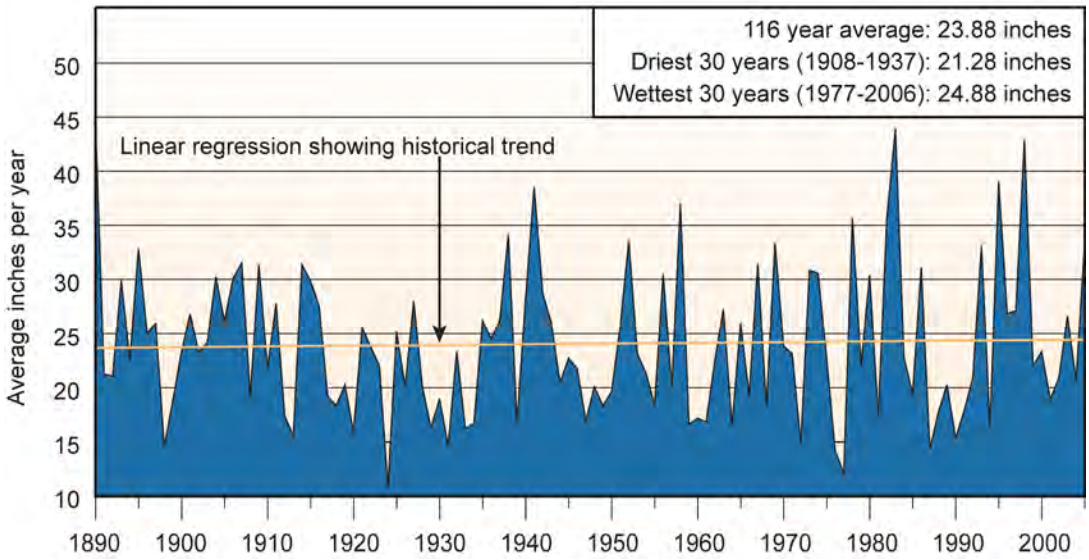

FIGURE 1-2
History of California Precipitation
California's average annual water supply has remained constant over 116 years of recorded precipitation. (Yearly precipitation calculated from 95 stations spread across California. Data compiled by Jim Goodridge, state climatologist, formerly of DWR. Source: DWR 2006)

1. John Adams, (November 27, 1770), quoted in *The Trial of the British Soldiers of the 29th Regiment of Foot, for the Murder of Crispus Attucks, Samuel Gray, Samuel Maverick, James Caldwell, and Patrick Carr, on Monday Evening, March 5, 1770.* (Boston: William Emmons: 1824), 117. http://www.loc.gov/law/help/rare-books/pdf/john_adams_1824_version.pdf.

Reliable information on water use in California is surprisingly sparse though better information is available on urban use than agricultural, the far bigger of the two uses. The most recent estimates provided by the Department of Water Resources (DWR) indicate that in an average year,[2] urban areas use is about 8.9 million acre-feet, and agriculture uses about 31 million acre-feet, statewide. Over the last 40 years, overall urban water use has increased significantly while estimated agricultural water use has remained unchanged.

In the urban sector, statewide per capita water use in 1950, prior to the State Water Project (SWP), averaged 168 gallons daily. By 1972, per capita use averaged 220 gallons daily and has remained unchanged through today. This trend indicates that despite recent technological improvements in toilets, showers, and faucets, increases in water used for landscaping, pools, and industry have offset indoor efficiency gains, particularly in the driest areas of the state. Urban per capita water use in the Central Valley regions of the state is now nearly twice that of the North Coast and San Francisco Bay regions.[3]

Although per capita water use has been steady, overall urban water use has doubled over the last 40 years as a result of growth in several urban sectors including population, landscape irrigation, and industry. DWR estimates that, under current population and use trends, overall urban use will increase 33 percent by 2030.[4]

In the agricultural sector, technological advancements have improved water use efficiency in some parts of the state. There is also evidence that farmers are gaining more value from water: between 1980 and 2000, inflation adjusted gross value per acre-foot of applied water increased by 11 percent, due in part to shifts to higher-value crops such as orchards and vineyards. However, despite increases in efficiency and value, average agricultural applied water use has remained unchanged in the last 40 years. Shifts to higher-value crops have also reduced land available to fallow, reducing management flexibility under conditions of water shortage.

Important for California water policy makers, there is no evidence that aggregate water use for agriculture is decreasing.[5] Although DWR has predicted that agricultural water use will decrease over the next 20 years as a result of efficiency gains, fallowing, and urbanization, current water use trends indicate that with no clear policy direction, the agricultural community will continue to use the same amount of water annually (Figure 1-3).

2. DWR. *California Water Plan Update 2005.* Bulletin 160-05. 2005. An "average year" is approximated by water use in 2000, when precipitation was 98 percent of average over recorded history.

3. DWR and California Department of Food and Agriculture "Current Water Use Efficiency Policy and Programs and Estimate of Agricultural and Urban Water Use." Report prepared for the Delta Vision Task Force, 2008.

4. (1) DWR and California Department of Food and Agriculture. "Current Water Use Efficiency Policy and Programs and Estimate of Agricultural and Urban Water Use." Report prepared for the Delta Vision Task Force, 2008. (2) Groves, Matyac, and Hawkins. "Quantified Scenarios of 2030 California Water Demand." Prepared for the *California Water Plan Update 2005.*

5. DWR. Working draft background documents. *Water Plan Update 2009.*

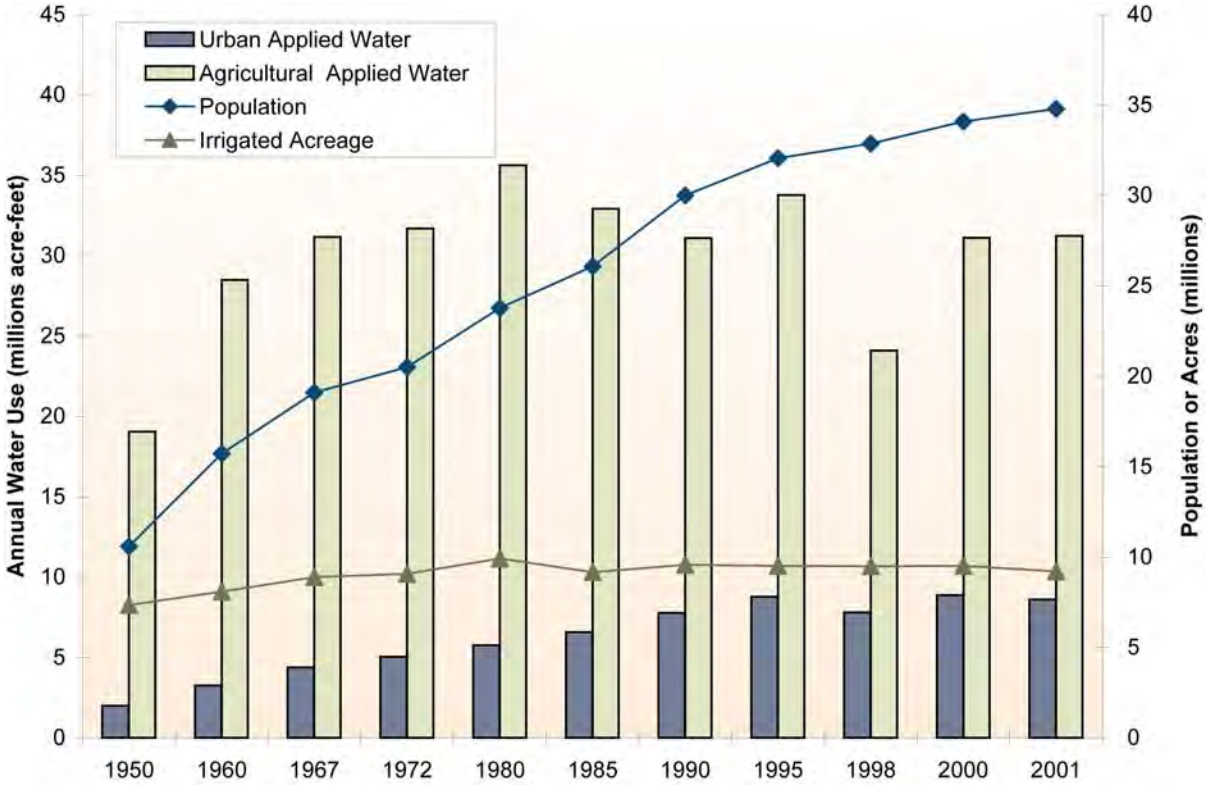

FIGURE 1-3
Urban and Agricultural Water Use and Drivers
Trends in urban and agricultural water use show that total water use has increased over the last 50 years. Urban water use continues to increase with population. On average, agricultural water use and irrigated acreage has remained relatively unchanged in the last 20 years. (Source: DWR 2008)

Overall, these data reveal the challenges of providing water for California: population and economic activity increases result in growing demand for water. Despite some evidence of efficiency improvements, more water must be conserved to meet tomorrow's demands, as well as to address today's water shortages and fish declines.

- **The Delta ecosystem, by almost any measure, is in serious decline and threatened by catastrophic failure from earthquake, floods, sea level rise, global warming, land subsidence, and urban development. These ecosystem threats equally endanger the current Delta water export system.**

The evidence is overwhelming: the Delta ecosystem is in deep trouble and the problems are increasing. Invasive species, water pumping facilities, and urban and agricultural pollution are degrading water quality and threatening multiple fish species with extinction.[6] Encroaching urban development in the Delta is reducing wildlife habitat today and foreclosing opportunities to improve the ecosystem—and the Delta water conveyance

6. (1) Sommer, T., et al. "The Collapse of Pelagic Fishes in the Upper San Francisco Estuary." *Fisheries* 32(6) (2007): 270-277. (2) Department of Water Resources and Department of Fish and Game. *Pelagic Fish Action Plan*. Sacramento: Resources Agency, 2007. (3) Lund, J., et al. *Envisioning Futures for the Sacramento-San Joaquin Delta.* San Francisco: Public Policy Institute of California, 2007.

system—in the future.[7] The levee system has eliminated the dynamic land-water interfaces crucial for aquatic and riparian plants and animals.[8]

- **Improving the Delta ecosystem is a legally required condition for improving the water delivery system for Californians.**

Over the last 40 years, the federal government and California have adopted a wide array of laws and regulations to protect the environment.[9] Many object to these laws and still call for repeal of the federal Endangered Species Act (ESA) and the National Environmental Policy Act. In spite of simmering political controversy, there is no sign Californians have lost their desire to protect the environment. In a recent decision regarding the protection of Delta smelt, U.S. District Judge Oliver W. Wanger declares,

> *The plain intent of Congress in enacting the Endangered Species Act was to halt and reverse the trend toward species' extinction, whatever the cost... Once the actions of an administrative agency in operating the CVP and a voluntarily appearing State Agency in operating the SWP, violate the ESA by endangering the species to the point where, as the undisputed evidence shows, it is critically imperiled and in imminent threat of extinction, the Court cannot balance hardships nor does it have any discretion, except to apply the mandate of Congress prescribed by the ESA... It is Congress that struck the balance in favor of affording endangered species the highest of priorities. It is up to the political branches of government, not the court, to solve the dilemma and dislocation created by the required application of the law.*[10]

This fact, in large part, dictated the Task Force's conclusion that there are two co-equal goals that must drive water policy in California: restoration of the Delta ecosystem and creation of a more reliable state water supply. Co-equal means just that: not secondary, not an afterthought, not something to be ignored until a lawsuit or catastrophe forces water users to change, or government to act. No, the Task Force means co-equal in the most important sense of the word; requiring a coherent effort to join a desired Delta ecosystem together with the effort to provide water to Californians.

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7. (1) Eisenstein, W., et al. "Re-Envisioning the Delta: Alternative Futures for the Heart of California." Institute of Urban & Regional Development Working Paper Series, Paper WP-2007-01. University of California: Berkeley, 2007. (2) DWR. *Status and Trends of Delta-Suisun Services.* Sacramento, 2007. (3) Mount, J., R. Twiss, and R. Adams. *The Role of Science in the Delta Visioning Process.* Public Review Final Report to the Delta Science Panel of the CALFED Science Program. Sacramento, 2006.

8. Florsheim, J., et al. "Bank Erosion as a Desirable Attribute of Rivers." *BioScience* 58(6) (2008): 519-529.

9. Bick, A., et al. *California Environmental Law Handbook*. 11th ed. R. Denney et al., eds. Rochester, MD: Government Institutes, 1999. See also: Delta Vision Blue Ribbon Task Force. "Context Memorandum: Delta Water Management Governance Structure." Sacramento, 2007.

10. *Natural Resources Defense Council v. Kempthorne* (E.D. Cal. December 14, 2007) "Findings of Fact and Conclusions of Law Re: Interim Remedies Re: Delta Smelt ESA Remand and Reconsultation." U.S. District Judge Oliver W. Wanger. Pages 41-2. www.fws.gov/sacramento/es/documents/OCAP_Court_Finding_of_Fact_12-14-07.pdf.

- **Urbanization pressure will continue to grow in the Delta over the long term.**

Despite recent downturns in the housing market, demand for new development will continue to grow in the Delta over the coming decades. Population growth in California—and particularly in the Central Valley—shows no sign of abating. The Delta is a neighbor to dynamic job markets in the Bay Area and Sacramento, and offers affordability and open space amenities not readily available in those regions.

One estimate suggests that the five counties that include the Delta could more than double in population by 2050, from 3.7 million to 7.5 million people—an increase greater than the entire population of Connecticut.[11]

Without appropriate safeguards, growth of this magnitude would have enormous impacts on the Delta. Depending on where growth occurs, levee failure risks to existing communities could increase, water quality could be harmed, and irreplaceable ecosystem restoration opportunities could be lost forever. It is critically important that better land use decisions be made in the future and that the protection of the Delta primary zone and key locations in the secondary zone be enhanced.

The Task Force's call to improve Delta recreational and tourism economies should not be interpreted as an endorsement to place more people and property at risk of flooding. Permanent developments necessary to support these industries should be located in areas consistent with the Task Force recommendations of matching land uses to risk exposure.

- **The current system of governance is incapable of planning, developing, and implementing any substantial new policy to provide reliable water supplies for Californians or protect the Delta ecosystem.**

The current governance of water and the Delta includes more than 200 federal, state, and local government agencies! No person or group who submitted testimony to Delta Vision supported the current governance system. Most acknowledge that no real "system" exists: everyone is involved; no one is in charge.

All those who testified about Delta governance said a change had to be made. However, each interest group believed only they should control any new governance structure. The Task Force instead recommends a Governor-appointed, State Senate-confirmed public body representing a statewide perspective, possessing clear authority and needed tools, which is discussed later in this Strategic Plan. The single alternative proposal for governance received from a coalition of business and water interests recommends creation of this statewide body but with an oversight role only.

Some Task Force members have suggested the failure of policy-makers to achieve an agreed-upon approach to solving California's water and Delta ecosystem problems will inevitably lead to federal and state court receiverships of the Delta and the water supplies that flow through it. The Task Force does not find this option attractive. Courts are constrained by the

11. Eisenstein, W., et al. "Re-Envisioning the Delta: Alternative Futures for the Heart of California," 2007, p. 6.

case brought before them, and they are limited in the remedies they can adopt. Powerful as courts are, they are no substitute for an informed, empowered, and motivated public body committed to achieving clear goals. And the courts lack both the breadth of perspective, and the mandate, required for optimal resolution of these complex issues. A court takeover of our water and ecosystem would be deeply undesirable.

Finally, it is worth mentioning some unrealistic expectations—call them urban myths—which have influenced California's water and ecosystem debates for more than a century and a half. During that time, legislatures, governors and the voters of California have adopted a large number of laws that appear to promise unrealistic amounts of water to every person, economic interest and region of the state.

In the closing days of the Task Force's work, the State Water Resources Control Board (State Board) presented a startling conclusion that 8.4 times the average annual unimpaired flows in the Delta watershed have been promised to water users based on the face value of water permits already issued! Even in the wettest years, the face value of these permits is 3.4 times more than the highest annual unimpaired flows. Even though these figures include some double counting, they do illustrate that far more water is promised than is available.[12]

These promises not only exceed the currently available supply of water but also the expectations for increased future water supply. Pending water right applications would divert an additional 4.2 million acre-feet of water within the Delta watershed.[13] Though these applications are unlikely to result in the granting of new permits for this amount, the applications do signal interest in receiving additional water, a drive unlikely to end given population and economic growth.

Given a static water supply, government promises that exceed the available water supply, a strong environmental ethic and continued population growth, how does the state meet demands for more water than is available?

The answer is that over time, California has to do almost everything suggested by the major voices in the water wars. Not every dam, canal or environmental spending project imaginable, but some of each is required.

Strong statewide water conservation measures are necessary whether California builds dams or not. Greatly increased conservation imposed both by local requirements and state mandates and resulting from incentives, seems inevitable—and desirable. Physical improvements of the existing California water systems (federal, state, and locally run), both in the Delta and around the State, will help protect supplies from natural disasters and promote more efficient use of water throughout California.

Yes, water storage facilities should and will be built. The cost will be high, but the benefited users will pay it. Improvements in the Delta water export system will and should be made. The Task Force prefers a dual conveyance system, operated within clear enforceable criteria

12. State Water Resources Control Board. "Water Rights Within the Bay/Delta Watershed." September 24, 2008.

13. State Water Resources Control Board. Response to Task Force questions to agencies. June 12, 2008.

and constraints to be established by the California Delta Ecosystem and Water Council (recommended in Strategy 7.1). Capable, transparent governance committed to the co-equal goals of a healthy Delta ecosystem and reliable water supply will address fears that water exports can trump ecosystem protection, allowing needed flexibility in water exports.

Likewise, a strong emphasis on water conservation and water system efficiency, as well as optimizing regional self-sufficiency, are more likely to create a relatively secure near-term water future than state projects or facilities.

Californians are slowly coming to terms with the fact that water is not an unlimited resource. Perhaps in time desalination of ocean water will offer a new, currently untapped supply, but energy costs of desalination are now high and environmental impacts need to be addressed.

For the next decades, however, the Task Force believes that resolving competing demands must rest upon good will, hard work, and a rational system of governance over water and ecosystem issues. Conflicts over water should be decided through effective use of California's water rights laws, which includes reasonable use and public trust principles.[14]

This recommendation, that Californians aggressively apply and enforce existing water rights laws, may be the most far reaching recommendation made by the Task Force.

A demand for guaranteed outcomes

All interests who battle in the water wars want a legally enforceable condition or promise that "what I want done, gets done."

Even if every recommendation from this Task Force's Vision and Strategic Plan is adopted, and enacted into law:

- California state government cannot guarantee heavy rain or snow every year.
- California state government cannot guarantee that deliveries under every water contract will be made in full every year; certainly not as long as the water supply is over subscribed.
- California state government cannot guarantee that water prices will always be low. The finite nature of annual water supplies strongly suggests water prices will rise dramatically in years to come.
- California state government cannot guarantee every endangered fish species in the state will be restored to a population level that existed decades ago.
- California state government cannot guarantee the Delta will be free from threats of flood, earthquake, or other natural disasters. Nor should the state promise to repair all levees and protect all current uses of land, no matter the cost in dollars.

14. The public trust doctrine is recognized and analyzed by the California Supreme Court as a key component of state water rights law in *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419.

When a natural resource like water and the ecosystem is involved, the ultimate guarantee is to use the best efforts of government to achieve the primary goals of its public policy. A higher level of protection than currently exists is what the Task Force strives to achieve.

Californians know they live in one state. California can solve its challenging water and environmental problems intelligently, but only through fully honest public debates.

The Delta in Crisis

That the Delta is in crisis is no secret.

Over nearly two years of public hearings and deliberations, the point was made again and again to the Task Force. It was made by Delta residents, Delta farmers, environmentalists, local government officials, scholars, scientists, engineers, state policy makers, and water agencies from the north, south, east, and west.

Strategies differed on how best to solve the crisis but there was unanimity in recognizing a crisis exists and that immediate action—as well as a sustained commitment over several decades—is essential to achieve the dual goals of restoring the Delta's ecosystem and ensuring a reliable water supply for California.

Many factors contribute to this crisis but it is compounded by lack of information to guide policy makers, and by lack of action.

- For example, the State Board has issued permits for the diversion of water from the Delta to less than a third of those currently assumed to be doing so. The State Board does not know how many divert water without permits.
- The owners and operators of nearly one-third of irrigated lands in the Delta watershed do not participate in programs to meet water quality standards and may not be complying with the State Water Code.
- Neither the Department of Fish and Game (DFG) nor any other state agency has yet established in-stream flow requirements for most of the Delta watershed, the foundation for effective ecosystem policy making.

It is against this backdrop that Governor Arnold Schwarzenegger created the Delta Vision Task Force through Executive Order S-17-06.

The Task Force's charge was to address increasingly visible crises in ecosystems, levee failure risks, and mounting uncertainty over the ability to reliably supply the two-thirds of Californians who receive water from the Delta and its watershed. This Strategic Plan—and the Vision—represents completion of that charge.

At the center of the Task Force's work are two co-equal goals: Restore the Delta ecosystem and create a reliable water supply for California. They are co-equal because neither restoring the ecosystem nor creating a reliable water supply can be achieved without the other.

At the same time, the Task Force has worked to find ways of achieving those goals, other governmental bodies were working to evaluate or develop plans for smaller pieces of the Task Force's larger puzzle. The Delta Risk Management Strategy assessed risks to Delta levees, and the Bay-Delta Conservation Plan was initiated to harmonize Delta water exports and endangered species laws.

The urgency of these efforts has been magnified by a growing recognition that existing institutions and policies are not addressing the Delta's challenges now, let alone in the future.

Intensifying conflicts

As the Task Force carried out its work, legal uncertainty about the ability to protect species and export water has increased, drought has stressed water supplies, and the Delta ecosystem has begun to collapse. Water users throughout California have sued each other over the state's tightening supply. Figure 1-4 provides a timeline of actions related to the Delta, showing the increased conflict.

These are just some of the more significant events of the past two years that have fueled conflict over the Delta:

- In two high-profile legal cases, U.S. District Court Judge Oliver Wanger invalidated biological opinions and policies adopted by federal regulators to protect Delta smelt and several species of salmon and steelhead. Judge Wanger imposed interim remedies in the smelt case, to remain operative until a new biological opinion is issued. He has not yet ruled on the need for interim remedies for salmon and steelhead. Legal challenges to renewals of water contracts based on the rejected Delta smelt biological opinion were heard in late August 2008.
- A short-term voluntary shutdown of the SWP in the summer of 2007 to reduce killing of Delta smelt revealed the immediate impacts on Delta-reliant water users, mostly near the Delta, that can come with drastic pumping reductions.
- Precipitous declines continued in the populations of most major open-water (pelagic) fish species. Populations of the Delta smelt fell to a record low, sparking worries about extinction. In 2008, California took the unprecedented step of prohibiting salmon fishing statewide for the entire year to help salmon populations rebound.
- The California Fish and Game Commission identified longfin smelt as an endangered species candidate and adopted emergency regulations governing incidental take during the one-year candidacy period. The U.S. Fish and Wildlife Service (USFWS) took the first steps toward possible listing of longfin smelt under the federal ESA.
- Two consecutive years of low precipitation and snow pack accumulation led Governor Schwarzenegger to declare an official drought in June 2008. He also declared a drought emergency in nine Central Valley counties one month later. Local water districts estimated between 250,000 and 275,000 acres of annual agricultural crops were fallowed in the Central Valley due to reduced water supplies from regulatory action and drought.
- Many water districts across the state urged conservation and some established mandatory water use reductions.

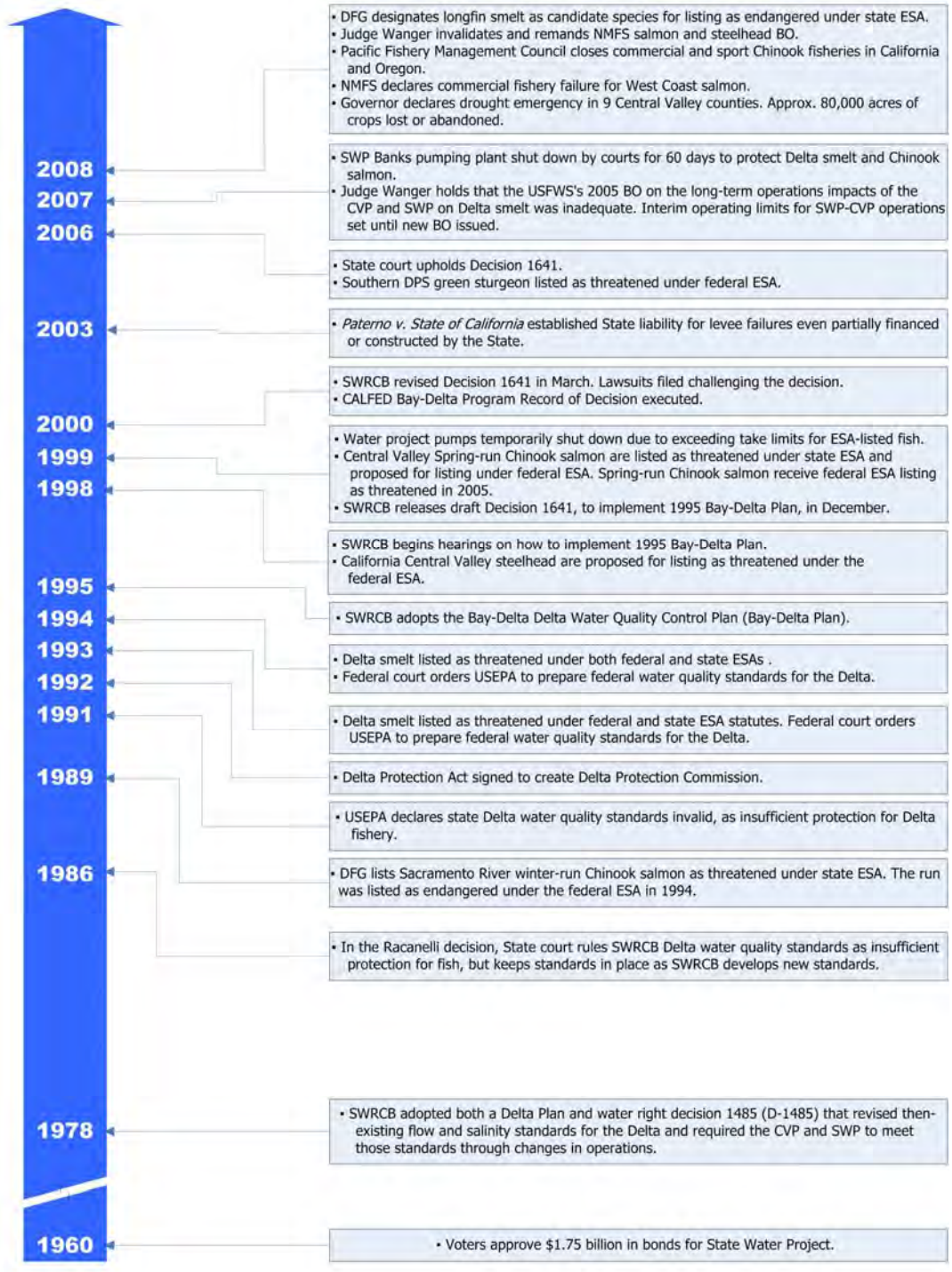


FIGURE 1-4

Delta Conflicts and Uncertainty Reach Historic Intensity

Water in the West has long been contentious. Over the last few years, however, conflicts over water in California have reached unprecedented levels. The Delta lies at the center of many of these debates. (Source: Delta Vision Staff 2008)

- Inter-regional legal disputes regarding the role of the Delta in water supply increased:
  - Five water agencies that rely on Delta water—Contra Costa Water District (CCWD), Alameda County Flood Control and Water Conservation District, Metropolitan Water District of Southern California (MWD), Santa Clara Water District, and Alameda County Water District—sued under the California Environmental Quality Act (CEQA) to challenge the Sacramento Regional County Sanitation District's long term expansion plans.
  - The Central Basin Municipal Water District in Los Angeles County sued over the drought water allocation plan adopted by MWD.
  - The San Joaquin River Group filed a letter with the State Board alleging illegal water diversions in the central and south Delta. This challenge alleges a pattern of overuse of water by Delta agricultural users.

While the crisis in the Delta accelerated over the past two years, those events are just the latest in a lengthy line of troubling developments. The impetus for creation of this Task Force stemmed, in part, from these key events.

- In 2003, the California Court of Appeal's *Paterno v. State of California* decision saddled the state with potential liability for the failure of any levee that is even partially state-financed or constructed—a dramatic financial exposure for California taxpayers.[15] The state passed a package of floodplain laws in the fall of 2007 to improve flood control throughout the Central Valley and reduce liability, but there is deepening concern that continued development in floodplains, such as the Delta, will increase risks and liabilities to the state as a whole.
- In 2005, Hurricane Katrina tragically revealed that even the relatively well-engineered levee system protecting New Orleans could be breached, with ruinous consequences. California policymakers subsequently acknowledged that Delta levees, in their current form, cannot protect against existing earthquake and flood risks, much less conditions exacerbated by future climate change.
- In 2005, the Little Hoover Commission concluded that the CALFED process, launched by the Bay-Delta Accords of 1994 and formalized by the CALFED Record of Decision in 2000, had failed to improve Delta sustainability. CALFED was criticized for its structure in which "no one level of government is fully in charge, or capable of responding in an orderly and effective way to address and mitigate the range of threats to the Delta."
- The landmark 2007 reports by the Intergovernmental Panel on Climate Change include alarming projections for the future of the American West. Many portions of the West—particularly the Colorado Basin, from which California receives over 5 million acre-feet of water per year—are projected to be dramatically hotter and drier in the coming century, threatening economies and environments across several states. The Delta watershed may be spared the worst of this, but any significant shrinkage of Colorado

15. *Paterno v. State of California* (2003) 113 Cal.App.4th 998.

River or Sierra Nevada snowpack-generated supplies will make water management throughout California more difficult and contentious.

Water crises around the world

The events in California's Delta are not isolated, as shown in Figure 1-5.

- The Colorado River Basin is in an eight-year drought. As a result of the drought and growing population and demands in the Upper Basin states of Utah, Colorado and New Mexico, the amount of water California is able to draw from the river has fallen 18 percent since 2003.
- Since 1990, the Missouri River system has been the focus of nearly a dozen lawsuits. The recent drought pitted upper and lower basin interests in multiple states against each other, and placed flood control and navigation against endangered species protection. The federal government appears to be moving, albeit very slowly, to remove at-risk populations from floodplains, rather than simply paying to rebuild after periodic flooding.
- The Great Lakes-St. Lawrence River Basin faces an estimated $15 billion to $20 billion in restoration and cleanup costs associated with invasive species and raw sewage discharge. The eight states bordering the Great Lakes, working together with two Canadian provinces, recently signed an interstate compact for sustainable management of the lakes' watershed including provisions for more conservation, better reporting of water diversions, groundwater management, and limits on diversions outside the watershed. The compact is now pending before Congress.
- In late 2007, an extreme drought in the Southeast led to a water crisis in Atlanta and increased conflict over water among Alabama, Georgia, and Florida. Georgia imposed statewide water use restrictions. In May 2008, 55 counties remained subject to restrictions, under which most types of outdoor watering are prohibited. Landscape watering was limited to one person with one hose for 25 minutes per day on an odd-even schedule between midnight and 10am.
- Across the Atlantic, France, Germany, Britain, and the European Union have all approved major legislation in the past decade to try and balance the needs for flood control, surface and groundwater management, water quality, and endangered species.
- Sea level rise and flooding, especially of the Rhine River, has driven the Netherlands, by 2050, to return an estimated 220,000 acres to floodplains, natural forests, and marshlands, designate 62,000 acres of pasture as temporary floodwater storage pools, and require 185,000 acres of farmland to adopt land use practices that tolerate soggy conditions in the winter and spring. These three categories of changed land uses are six percent of the total land area in the Netherlands. The estimated cost is between $19 billion and $25 billion over the next 50 to 100 years.
- Australia has suffered its worst drought in 200 years, leading the federal government to take over the water rights of the four Murray-Darling Basin States, reduce the over-allocation of water resources, purchase water licenses from willing sellers, assist farmers in relocating, establish surface and groundwater caps, and change the water rights system to better reflect drought and climate change risks.

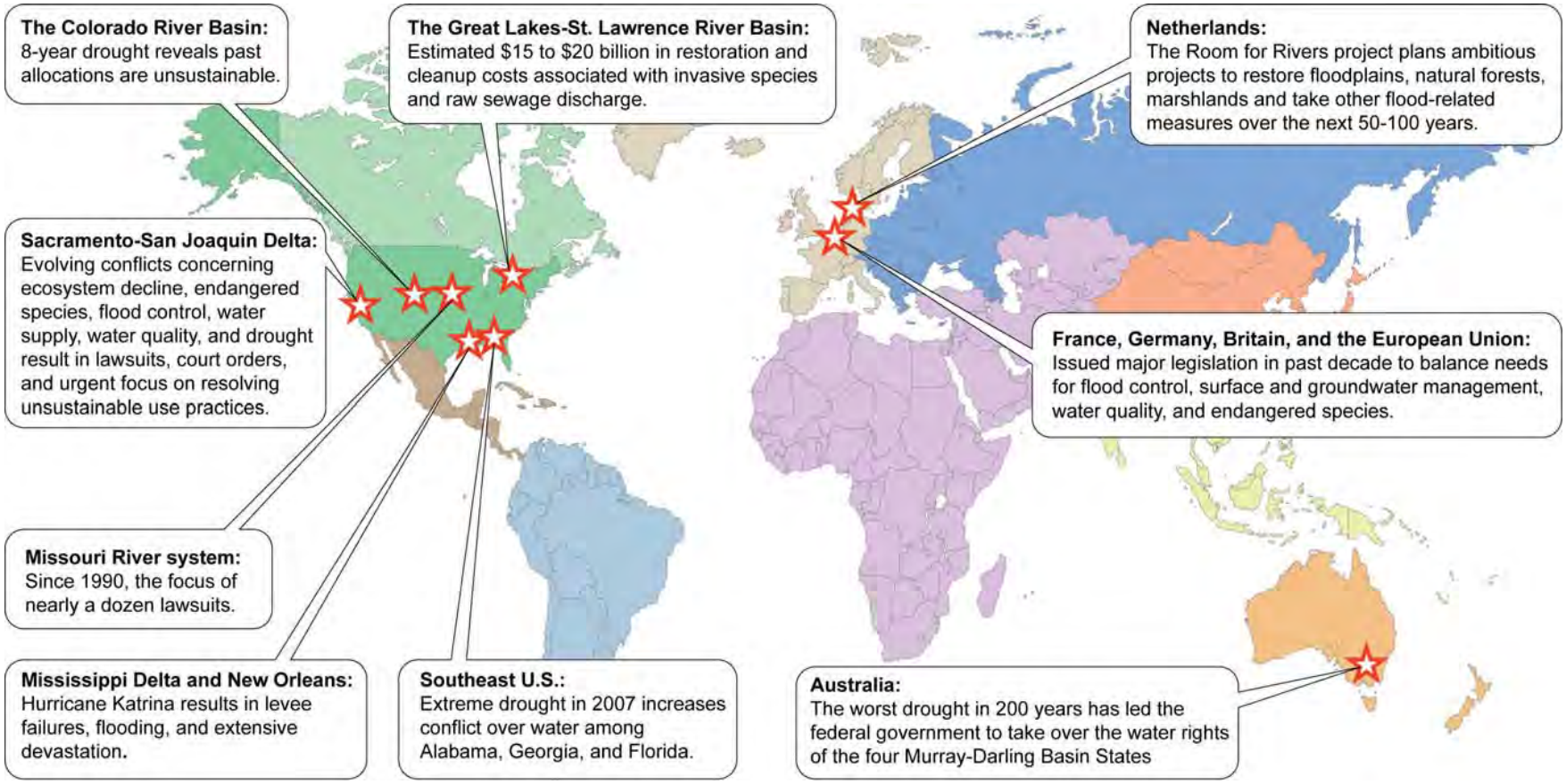


FIGURE 1-5
Global Water Crises
The problems in the Delta are not isolated events. Crises over water use have unfolded worldwide. (Source: Delta Vision Staff 2008)

Future Changes to the Delta

Delta Vision's charge is to create strategies that span decades. That means recommendations must take into account future changes to the Delta. Many of these changes are beyond the state's control. Some are even global in nature. But responsible governance and management of the Delta must anticipate these changes to secure the co-equal goals.

All of the following will have major impacts on the Delta.

Population growth will require greater efficiency and conservation

California's population will continue to grow substantially in the coming decades. The California Department of Finance expects the state's population to exceed 49 million by 2030—up from about 38 million today. Some predictions say the Golden State could be home to 90 million by the turn of the century.[16]

Within the Delta itself, population growth rates are projected to be even higher than in the state as a whole.

The population of the five counties that contain the Delta—Contra Costa, Sacramento, San Joaquin, Solano and Yolo—will more than double from 3.7 million people today to 7.5 million by 2050, according to demographer Hans Johnson of the Public Policy Institute of California.[17] The portions of these counties within or near the Delta's borders have been some of the state's fastest growing areas in recent decades, in part because they are within commuting distance of the Bay Area.

Unless major changes are made in how California's water is managed, demand for new water throughout the Delta watershed will also grow just as dramatically.

The State Board reports that the face value of existing water rights permits in the Delta watershed is more than eight times the average annual unimpaired flows in the watershed.[18] Face values overstate actual water use for several reasons, but noting that pre-1914 and riparian rights are additional to these numbers suggests that the water resources of the Delta watershed are greatly over subscribed. The State Board also has 4.2 million acre-feet of *new* water rights applications pending in the watershed—the equivalent of more than two-thirds the water that passes through the Delta annually.[19] While some of these applications will not

16. Landis and Reilly. "How We Will Grow: Baseline Projections of the Growth of California's Urban Footprint through the Year 2100." Berkeley Institute of Urban and Regional Development: Berkeley, August, 2003.

17. Hans Johnson, quoted in Eisenstein, W., et al. "Re-Envisioning the Delta: Alternative Futures for the Heart of California." Institute of Urban & Regional Development Working Paper Series, Paper WP-2007-01. University of California: Berkeley, 2007, page 6.

18. State Water Resources Control Board. September 2008.

19. State Water Resources Control Board. June 2008.

be pursued and others are unlikely to be approved, the level of existing demands further illustrates how acute the call on Delta water will be in future.

And, without major anti-pollution efforts, more Californians likely mean more contaminants washing into the Delta, further damaging water quality.

With expected statewide population growth of this magnitude—on the order of 500,000 persons each year—water conservation and efficiency must improve, throughout California.

Apart from new supplies ocean desalination may produce, there isn't a major source of new water in the state that can remotely meet future demand. Given that California's share of Colorado River water is declining—and with stresses on the Delta already unacceptably high—sharply improved efficiency and development of alternative water supplies are the state's only choices.

Climate change heightens the Delta's challenges

Global climate change will have wide-ranging effects on California, even if emissions of greenhouse gases are reduced in the coming decades. Among the significant effects predicted for the Delta are:

- More critically dry years, increasing the need for large amounts of water to be moved and stored throughout the state during periods of relative abundance.
- A potential sea level rise of 55 inches by 2100,[20] putting additional pressure on Delta levees and boosting tidal salinity intrusion.
- Wetter winters with less snow pack and smaller spring and summer inflows, making it even harder to repel salinity in the western Delta. Smaller inflows also hurt water quality because agricultural run-off and wastewater discharges will be more concentrated.
- Intense, warmer storms, raising the odds of potentially catastrophic levee failures and flooding.
- Higher water temperatures in channels, potentially harming native fish species.
- Hotter temperatures in crop-growing regions, ratcheting up irrigation demands.
- Higher ocean temperatures, potentially altering marine food chains and further threatening salmon and other anadromous fish that migrate through the Delta.

Overall, climate change will exacerbate many of the Delta's most difficult challenges. The seasonal mismatch between the demand for and availability of water will widen. The conditions under which the ecosystem will need to be managed will become more uncertain. Figure 1-6 shows expected impacts of global warming relevant to water.

20. Healey, Mike. "Projections of Sea Level Rise for the Delta." Memo to Blue Ribbon Task Force. CALFED Independent Science Board: Sacramento, September 6, 2008. http://www.deltavision.ca.gov/BlueRibbonTaskForce/Sept2007/Handouts/Item_9.pdf.

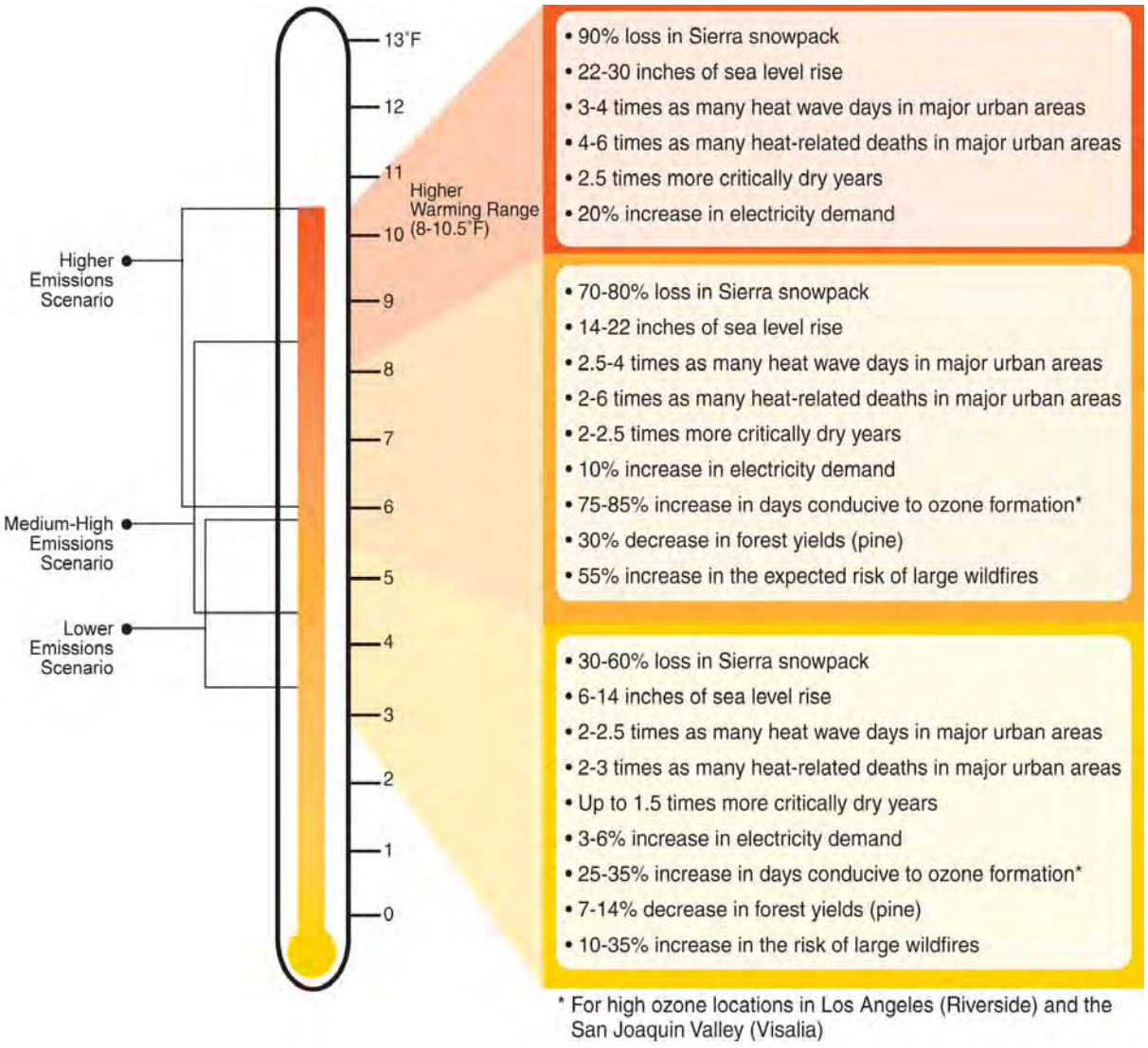


FIGURE 1-6
Summary of Projected Global Warming Impacts, 2070-2099
Three climate change scenarios all show a trend for less winter snowpack compared with conditions between 1961 and 1990. (Adapted from DWR 2007. Originally from the California Climate Change Center, 2006)

However, climate change could present new opportunities for the management of the Delta. Early experiments indicate that some plants grown in Delta soils could be extremely well suited to sequestering carbon.[21] The state's efforts to reduce greenhouse gas emissions are expected to lead to a system under which carbon emission credits are traded, potentially creating a lucrative new industry for Delta farmers.

21. (1) USGS. "Carbon Capture Farming: A New Future for Subsided Delta Islands." USGS briefing: 2008. http://ca.water.usgs.gov/news/carbon_briefing.pdf. (2) USGS. USGS, California and UC Davis begin large-scale Delta "carbon farm". Press Release. July 23: 2008.

Subsidence and seismic threats will continue to mount

Land subsidence has already put most of the Delta's primary zone below sea level—in some places as much as 15 to 20 feet. Levees, some in dire need of repair and reinforcement, are the thin line of defense preventing the Delta's islands from being permanently flooded. Subsidence is worsening on some islands because of soil oxidation, with large areas of the Delta expected to lose up to five more feet of elevation.[22]

Subsidence of soils, coupled with a rise in sea level, will gradually exert greater and greater pressure on levees. The threat of levee failures will climb—as will the number of actual breaches and collapses—unless significant upgrades are made. Figure 1-7 depicts effects of subsidence on levees.

Earthquakes also threaten the Delta and its levees. The U.S. Geological Survey (USGS) estimates a more than 60 percent chance that the Bay Area will experience a large-magnitude earthquake before 2032—most likely along one of the six major Bay Area faults that run near the Delta.[23]

DWR and CALFED have estimated that such an event could cause multiple levee failures, causing as many as 30 islands to flood. Thousands of homes and farms could be flooded, and water exports could be interrupted indefinitely because of saltwater intrusion into the southern Delta. The cost to the California economy could run as high as $40 billion.[24]

Seismic pressures build over time. The longer the Bay Area and the Delta go without experiencing a major earthquake, the higher the probability the next one will be more devastating.

More invasive species will arrive

The Delta is already one of the most invaded estuaries in the world. New invasive species will continue to arrive. Almost 200 non-native species exist in the Delta representing at least 95 percent of the biomass.

Existing invasive species, particularly the clams *Corbula* and *Corbicula*, have profoundly altered entire food webs, harming the Delta's native species. New invasive species will continue to appear. Quagga mussels and zebra mussels are of particular concern since they are voracious eaters of plankton, the base of the aquatic food chain. Many other species could also take hold in the Delta with unknown, but more than likely unfortunate, effects.

22. (1) DWR et al. *Delta Risk Management Strategy Draft Phase 1 Report.* Sacramento, 2007. (2) DWR, *Status and Trends of Delta-Suisun Services*, 2007.

23. USGS. "Bay Area Earthquake Probabilities." Summary of Main Results. http://earthquake.usgs.gov/regional/nca/wg02/results.php. Accessed 2008.

24. DWR, *Status and Trends of Delta-Suisun Services*, 2007.

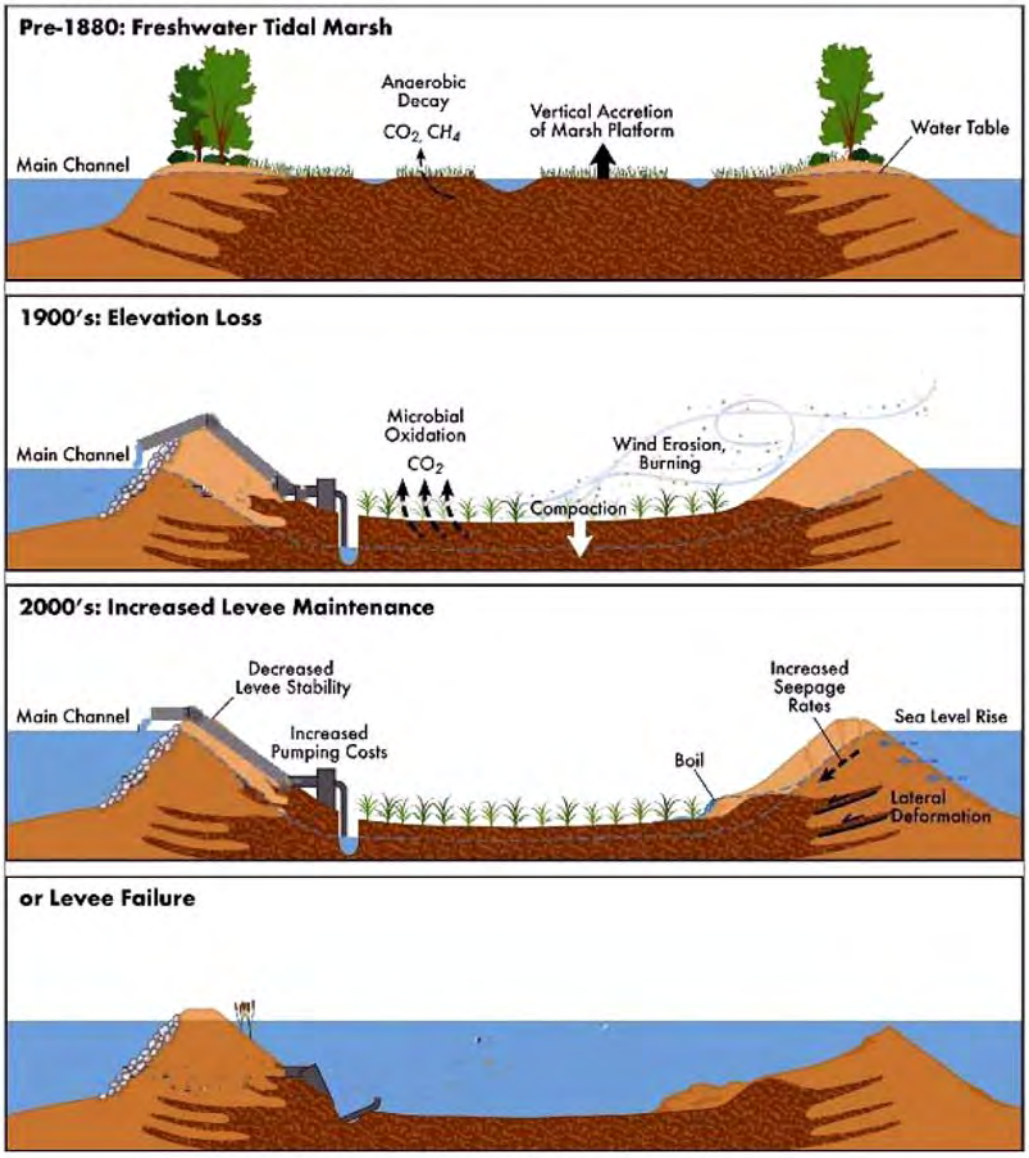


FIGURE 1-7

Effects of Growing Subsidence on Delta Levees

The effects of subsidence on Delta Levees from 1880 to today. Subsidence in the 20th century has led to decreased levee stability, resulting in the need for more intensive levee maintenance. Today, continued subsidence, sea level rise, and seismicity threatens levee failure. (Source: Mount and Twiss 2005)

Energy prices will increase

The California water system both produces and consumes large amounts of energy. Over the next several decades, energy policy will change as prices likely rise and new carbon emission regulations take effect. The hydroelectric energy produced by dams in the Delta watershed will become increasingly important to the state.

At the same time, the energy required to move large volumes of water around the state will become more expensive. The SWP is one of the largest single consumers of electrical energy in the state.

Over the long term, the price of energy will directly influence the price of water and, in turn, influence the investment decisions of water consumers. Energy-intensive sources of alternative water supply, such as desalination, may become less attractive than more energy-efficient sources. On the plus side, greater water conservation and efficiency tend to use less energy, increasing interest in those strategies as energy prices rise.

Strategies for a Better Future

The Delta is in crisis, and with it, the entire state of California confronts an unprecedented threat to its environment and prosperity.

If the Delta continues on its current path, California faces an ugly future of continuing environmental degradation and ever-tightening water supply restrictions. If the Delta were to experience a catastrophic failure—a major flood or earthquake, for example —California would face an environmental and economic disaster of massive proportion. Lives could be lost, tens of billions of dollars in damages could accrue, and the Delta's environment and culture could suffer irreparable harm.

There can be no sustainable and reliable water supply without a healthy Delta ecosystem free of court-ordered, individual species protection actions. At the same time, the Delta ecosystem cannot remain healthy if the state's economy suffers for lack of water.

The Task Force's Vision recommended officially designating the Delta region as the unique and valued place it is. Doing so is essential to achieving that vision and to the Strategic Plan succeeding.

Using the Task Force's 12 Vision recommendations as a foundation, the Strategic Plan is premised on accomplishing seven broad goals.

1. Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California.
2. Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals.
3. Restore the Delta ecosystem as the heart of a healthy estuary.
4. Promote statewide water conservation, efficiency, and sustainable use.
5. Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals.
6. Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments.
7. Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals.

The strategies in this Strategic Plan achieve these goals. All strategies must be carried out together to be successful. The recommended strategies and the reasoning behind them are summarized below. A more detailed discussion of each strategy is contained in Part 2.

Goal 1: Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California

Strategy 1.1: Make the co-equal goals the foundation of Delta and water policy making.[25]

The co-equal goals have been the foundation of the Task Force recommendations since the Vision was adopted in 2007 and throughout deliberations in development of the Strategic Plan.

Achieving the co-equal goals must be fully institutionalized in California policy making; it cannot be an occasional commitment. To this end, formal approaches are critical. The Constitution, statutes, and financing structures provide authority and responsibility, so each should incorporate the co-equal goals. Effective leadership must also consider the co-equal goals, and an on-going financing stream will maintain effort over many years.

Goal 2: Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals

Strategy 2.1: Apply for federal designation of the Delta as a National Heritage Area, and expand the State Recreation Area network in the Delta.

Strategy 2.2: Establish market incentives and infrastructure to protect, refocus, and enhance the economic and public values of Delta agriculture.

Strategy 2.3: Develop a regional economic plan to support increased investment in agriculture, recreation, tourism, and other resilient land uses.

Strategy 2.4: Establish a Delta Investment Fund to provide funds for regional economic development and adaptation.

Strategy 2.5: Adopt land use policies that enhance the Delta's unique values, and that are compatible with the public safety, levee, and infrastructure strategies of Goal 6.

There is nowhere in the world like the Delta. Every Delta resident enthusiastically attests to that. So do first-time visitors, boaters, sport-fishers, and picnickers.

Located within minutes of major urban areas, the Delta feels like another world. A world of gorgeous sunsets, a world in which a step outside the front door leads to water skiing, fishing, kayaking or any other water sport.

25. All strategies below also contribute to achieving this goal.

Its 1,000 miles of navigable waterway—once plied by some 300 steamboats—meander from Sacramento to San Francisco Bay. Its rivers and its labyrinth of sloughs and channels are home to 750 species of plants and wildlife as well as 55 species of fish. Of California's salmon fisheries, 80 percent are in the Delta.[26]

The Delta's history is rich. Locke, one of the Delta's many unique hamlets, is the only town in the United States built primarily by early Chinese immigrants. The Locke of 2008 is physically nearly the same as the Locke of 1920.

In Isleton, Rio Vista, Walnut Grove, Courtland, Clarksburg, Freeport, Knightsen, and Bethel Island that sense of history and cozy timelessness is repeated.

The Delta's 60-some islands are home to farmers, some whose families have worked the peaty soil for more than a century as well as the sites of historic buildings like the Grand Island Mansion and the Ryde Hotel.

Delightful dive bars, out-of-the-way marinas, gracefully aging drawbridges, and restaurants like Giusti's with its 1,500 hat ceiling and slips for diners who arrive by boat lie up and down the many turns of State Highway 160 and State Highway 4.

In summary, the Delta's value is far greater than its environmental and economic worth to the state. It is a community with a distinct natural and cultural heritage. The Delta should continue to thrive not only as the hub of the state water system and the West's largest estuary, but for its own sake. Figure 1-8 is a map of the Delta.

These five strategies recognize the Delta's uniqueness and protect its future.

First, the Delta should be designated a Natural Heritage Area by the federal government. Doing so communicates its stature as one of America's most distinctive and culturally significant regions. California should also create a major new State Recreation Area, encompassing multiple sites, in the region, and provide incentives to enhance recreation and tourism.

Second, the state should assist Delta agriculture. Farmers are inventive. They know their lands and markets, and continually make decisions regarding what to produce. The Delta's unique soils, growing conditions, and farming traditions favor innovative types of agriculture such as carbon sequestration crops, subsidence reversal crops, wildlife-friendly crops, and crops for direct marketing to the large urban populations nearby.

Delta agriculture is the heart of the regional economy and central to the Delta's culture and sense of place. The broader the base of agricultural enterprises, the more diversified and resilient the local economy will be. Though landforms and water quality conditions in the Delta will ultimately change due to sea level rise, earthquakes, or other forces, the Delta's traditional agriculture can, and should, remain robust.

26. Taugher, Mike. "Delta out of sight, out of mind for many." *Contra Costa Times.* December 2005.

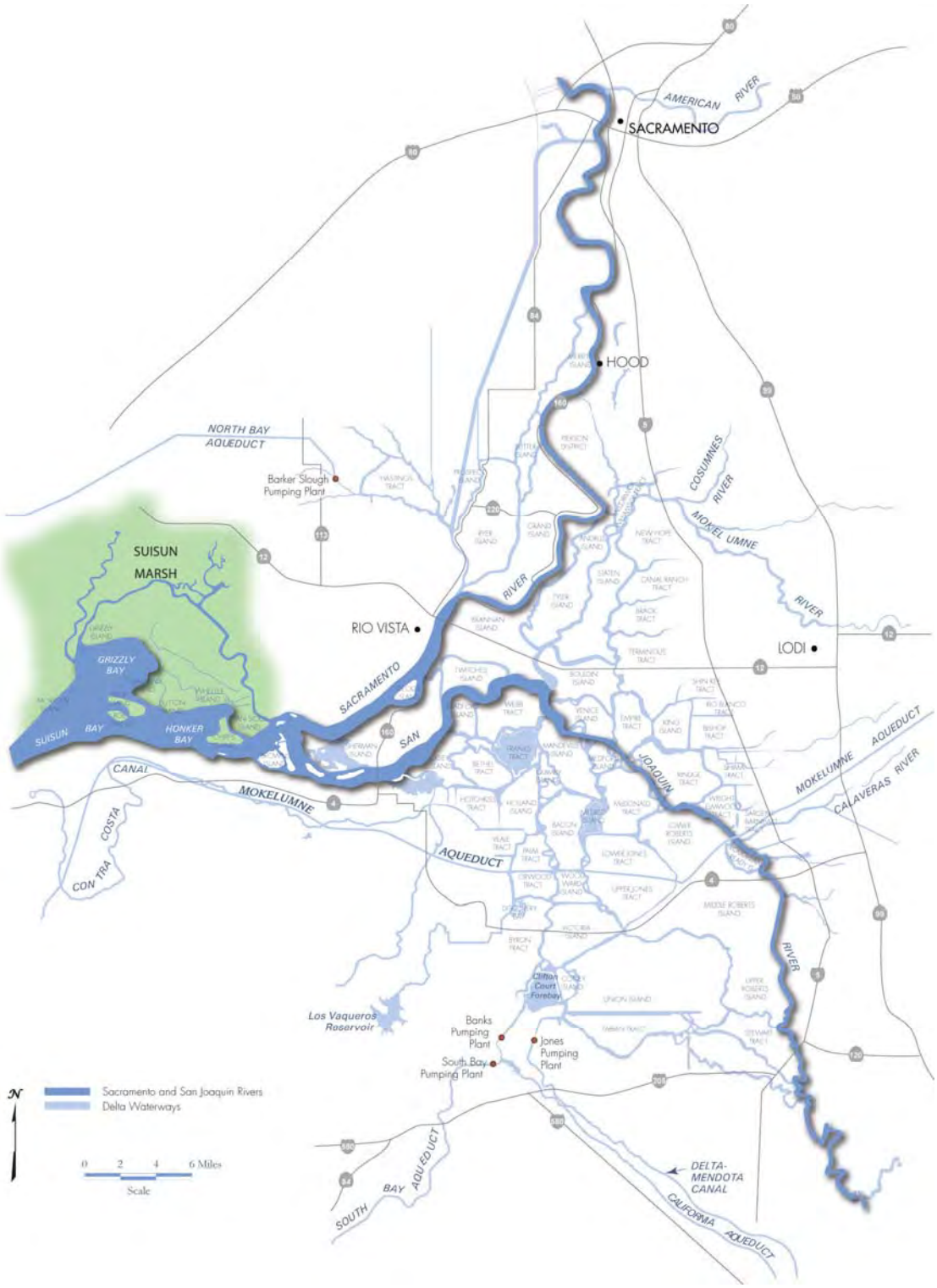


FIGURE 1-8
The Sacramento-San Joaquin River Delta
Map of the Delta showing islands, waterways, and significant infrastructure. (Source: DWR)

Third, the Delta's changing regional economy should continue to grow in the coming decades. A major regional economic development plan should be created to chart a course toward prosperity for each of the major industries in the region. The Delta's potential to become a major recreational destination for the millions of people who will move to Northern California is virtually unlimited. The necessary investments to promote tourism and recreation should be concentrated in locations above sea level or where levee failure risks are low.

Fourth, the Delta is facing a future characterized by natural changes and substantial risks to residents and property. Planning for improved water conveyance and improved Delta ecosystem function is underway and will cause additional changes in landforms, water flows, and uses in areas of the Delta. Separate from these initiatives, a major assessment of levees and flood management has begun and is also expected to propose changes in the Delta.

Even if no Delta ecosystem restoration is undertaken and no changes are made to the way water is transported through the Delta, natural events will bring floods or sudden levee failures that change the Delta. Successful adaptation to these changes and risks will require resources beyond those which can be provided by local governments and Delta residents and land owners. Indeed, state assistance in levee repairs is already important. The recommended Delta Investment Fund of on the order of $50 to $100 million would provide a structure for state support of local economic development and adaptation to change.

Finally, land use policies in the Delta must change in order to protect people, property, and state interests in the region over the coming decades. Development in deep floodplains and below sea level, which is hazardous for new residents and existing communities, has not been adequately constrained. Our recommendations in Strategies 3.1, 6.2, and 7.1 would increase oversight of particularly hazardous portions of the Delta, and help to preserve the Delta's unique values as a place.

Goal 3: Restore the Delta ecosystem as the heart of a healthy estuary

Strategy 3.1: Restore large areas of interconnected habitats—on the order of 100,000 acres—within the Delta and its watershed by 2100.

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

Strategy 3.3: Promote viable, diverse populations of native and valued species by reducing risks of fish kills and harm from invasive species.

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

Strategy 3.5: Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.

The Delta was originally a vast, sea level tidal marsh intermixed with large areas of open water, surrounded by seasonal floodplains and grasslands. Strong seasonal pulses of fresh

river water and twice-daily infusions of nutrients from the tides fed these habitats. Over time, natural islands developed.

Phenomenal numbers of birds, fish, and wildlife lived in this ecosystem, either for their entire lives, such as the Delta smelt, or on their migrations between far-flung habitats, such as the Chinook salmon or the birds of the Pacific Flyway. The blending of the rivers and tides—and the particular land structures and water flow patterns that resulted—made all of this possible.

A full-scale restoration of an eighteenth century Delta ecosystem is both impossible and undesirable. At the same time, it is not adequate merely to return the Delta to the ecological conditions preceding the major fish crashes of recent years. California's task is to restore the underlying ecosystem structures, functions, and processes in order to make a thriving Delta ecosystem possible in the twenty-first century and beyond. Such an ecosystem must possess five key characteristics:

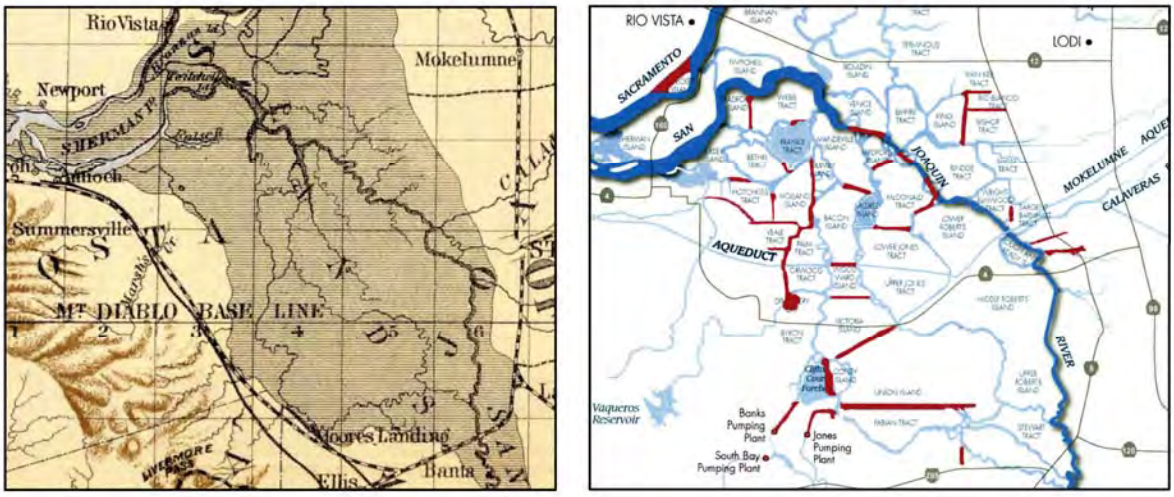
- Viable populations of native resident and migratory species
- Functional corridors for migratory species
- Diverse mosaics of habitats and ecosystem processes
- Water flows to support habitats and processes
- Significantly reduced threats and stresses on the environment

Revitalizing the ecosystem to meet these five key characteristics requires a suite of interrelated strategies. The strategies of restoring habitats, reducing environmental threats, and establishing corridors must be married with the strategies of achieving improved Delta flows to support the co-equal goals and the implementation of adaptive management procedures.

Revitalizing the Delta ecosystem on a large scale requires restoring each of the habitats that existed in the historic Delta—tidal marshes, floodplains, seasonal grasslands, small areas of open water—and ensuring appropriate connections between them wherever possible. For example, the Delta historically consisted of a web of connected, naturally branching channels which connected different habitats. Today, cross-cuts between islands have imposed an unnatural flow pattern between these habitats. Figure 1-9 contrasts the natural branching "dendritic" pattern of channels in the south Delta in 1873 with the man-made "cross-cuts" typical today. Connecting habitats wherever possible would improve the Delta's ecosystem and support native species.

Habitat connections can also be restored along channels from the low to high water levels. Figure 1-10 is a cross-section of typical tidal marsh, a naturally productive ecosystem element that stands in stark contrast to the relatively sterile system of levee-lined channels. These restorations will take place over many decades and, in many cases, will not require changes in current agricultural land uses.

True revitalization of the Delta ecosystem will entail improvements to all these habitats, each of which require specific land elevations or other conditions if they are to thrive. To achieve the co-equal goals and sustain the Delta's environment for future generations, these restorations must begin immediately in carefully identified locations in order to create a foundation that can be built on in the future.



A B

FIGURE 1-9
Transformation of Delta Channels
Habitats have been impacted by channelization and disruption of the natural flow pattern in the south Delta. The figure contrasts the natural branching "dendritic" pattern of channels in the south Delta in 1873 (A) with the man-made "cross-cuts" typical today (B). (Source: Delta Vision Blue Ribbon Task Force 2008)

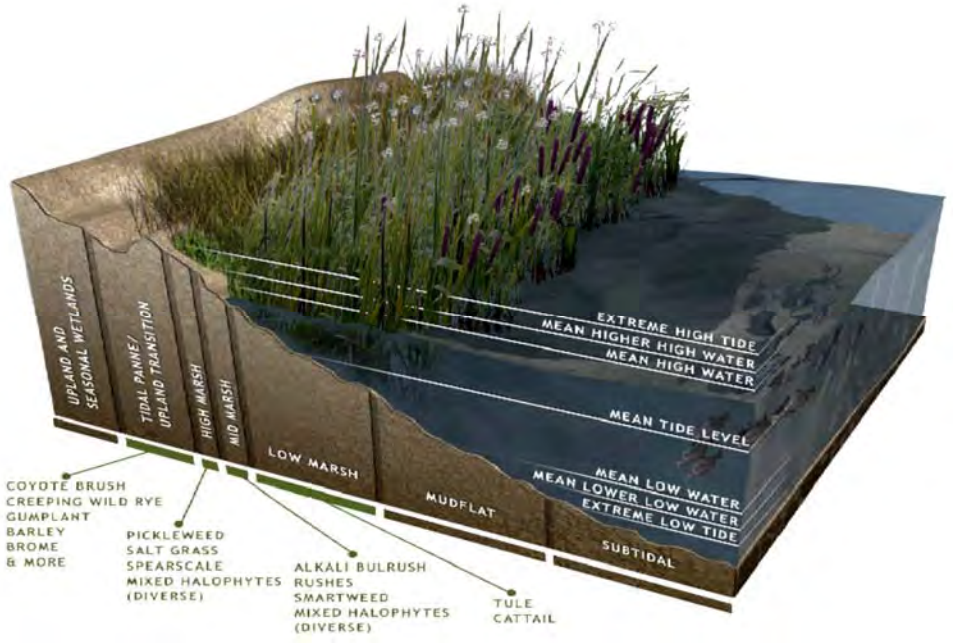


FIGURE 1-10
Typical Tidal Marsh Cross-Section
Cross-section of typical tidal marsh and connected habitats, a naturally productive ecosystem element. (Source: Stuart Siegel, Wetlands and Water Resources, Inc., 2008, originally from Moffat and Nichol.)

Migratory corridors for fish, birds, and other wildlife must also be enhanced in the near future. Salmon and other migratory fish rely on the Delta for passage to and from key spawning sites on the Delta's tributary rivers. Millions of birds, some of which are protected by federal law and international treaty, travel through or winter within the Delta.[27] These species require proper habitat conditions if they are to continue to thrive. All resident and migratory fish species should also be protected from the effects of invasive species and entrainment in water project pumps.

Finally, as conflict over the Delta has intensified, major court rulings have made clear that a "mitigation only" approach is not sufficient to restore the Delta's health or create a reliable water supply. Instead of mitigation, a more proactive approach and comprehensive approach will be required: both for ecosystem health and to ensure water supply reliability.

Comprehensive ecosystem revitalization is a far sounder long-term strategy for achieving that goal because it better supports diverse species, better copes with major disruptions, and better adapts to changes such as sea level rise or increases in temperature. An effective ecosystem revitalization strategy should also reduce future listings of species as threatened or endangered.

California must develop a system in which scheduling, permitting, and financing of major water supply and ecosystem projects are linked. Specific goals related to water use efficiency and facilities are detailed later in this Strategic Plan, but to achieve the Task Force's primary goal requires intensive management of two issues in particular—freshwater flows and water quality.

Appropriate freshwater flows trigger reproduction and migration of species, spread nutrients and organisms throughout the estuary, improve water quality, and promote a complex and diverse habitat. Water movement in the Delta has been homogenized over time by human regulation of inflows, high water exports, and the substitution of natural channels by man-made canals, especially in the south Delta.

Freshwater flows in the Delta are now not only the result of nature but also of decisions of operators of reservoirs and water systems. Those decisions are made within the framework of State Board Decision 1641 (D-1641), which regulates flows and water quality at multiple points and under specific time periods.

Flow standards will also be developed in new Biological Opinions for Delta smelt and salmon to replace the opinions found inadequate by Judge Wanger.[28] Over time, flow standards should be set through adaptive management processes rather than just permitting requirements.[29] DFG's Administrative Draft Ecosystem Restoration Program (ERP) Conservation Strategy for the Delta and Suisun Marsh describe optimal flows this way:

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27. Ducks Unlimited. Comments to Delta Vision Blue Ribbon Task Force on Fourth Staff Draft Strategic Plan. September 24, 2008.

28. *Natural Resources Defense Council, et al., v. Kempthorne*, No. 1-05-CV-01207-OWW (TAG), December 14, 2007, 2007 WL 4462395 (E.D.Cal); *Pacific Coast Federation of Fishermen's Associations v. Gutierrez*, No. 1-06-CV-00245-OWW (TAG) May 20, 2008, 2008 WL 2223070 (E.D. Cal.).

29. The public trust doctrine provides the foundation for policy making in adaptive management of needed flows: "The state as sovereign retains continuing supervisory control over its navigable waters and the lands beneath those waters. This principle,

- In general, theory and experience show that the more water left in the system (i.e., that which flows through the Delta into Suisun Bay and eventually the ocean), the greater the health of the estuary overall.
- The desired pattern of freshwater westerly flow through the Delta would more closely emulate the natural hydrograph than the current flow patterns. This may include a fall or early winter pulse that emulates the first "winter" rain and elevated late winter and spring flows…These improved flows are particularly important in normal and dry years.[30]

A shift from the traditional process of proposing a project and then mitigating its effects is necessary. The Task Force urges moving toward a comprehensive ecosystem approach which will develop adequate flow standards and policy based on more than mitigation calculations.

The ERP Conservation Strategy (Administrative Draft) prepared by DFG for CALFED is one start toward an ecosystem policy. The current draft frames policy choices in an ecosystem perspective similar to that advanced here, but has not reached consensus on recommended targets or projects. That should be required. The recommendations below on governance propose a structure that will ensure completion of this work. Actual implementation of flow targets as legally binding regulation is the responsibility of the State Board.

Improved water quality is also key to reaching the Task Force's co-equal goals. Some contaminants, such as mercury, agricultural pesticides, and urban runoff degrade water quality for both the ecosystem and water users. Chief among strategies for improving water quality is more elimination of contaminants at the source.

Among other water quality strategies are increased flexibility in managing flows, and moving intakes for water diversions to locations away from habitats where the amounts of organic carbon should be increased.

It is critical that these strategies are implemented with a comprehensive adaptive management system in place. Although testimony provided to the Task Force by some scientists and the Delta Vision work groups indicates that these strategies and actions have a good chance of success, the Task Force acknowledges that stronger, or lesser, action may be required to achieve the goal. An adaptive management program, as recommended by Strategy 7.2, will allow the flexibility for changes to be made with learning.

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fundamental to the concept of the public trust, applies to rights in flowing waters..[I]t prevents any party from acquiring a vested right in a manner harmful to the interests protected by the public trust…The state has an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect the public trust uses whenever possible." *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419.

30. DFG. *Ecosystem Restoration Program Conservation Strategy for Stage 2 Implementation.* Sacramento-San Joaquin Delta and Suisun Marsh and Bay Planning Area Version 2.2 (Administrative Draft). August 18, 2008. 23-26.

Goal 4: Promote statewide water conservation, efficiency, and sustainable use

Strategy 4.1: Reduce urban, residential, industrial, and agricultural water demand through improved water use efficiency and conservation, starting by achieving a statewide 20 percent per capita reduction in water use by 2020.

Strategy 4.2: Increase reliability through diverse regional water supply portfolios.

Some local and regional water districts have made limited strides in water use efficiency and conservation in recent decades. Their success proves the effectiveness of conservation and efficiency and reinforces the reasons the use of these strategies should be aggressively expanded. The California Constitution's reasonable use doctrine provides the foundation for needed policy making regarding water supply and allocation.[31]

The use of water inside homes has become significantly more efficient in recent decades, aided by technological improvements in toilets, showers, and faucets. However, population growth—which has primarily occurred in dry parts of the state that use water extensively for lawns, landscaping, and pools—has moderately offset the water conserved by efficient water use technologies.

Dramatically improved water use efficiency, conservation, and alternative supply development must be the bedrock of California policies at the local, regional, and state levels. Among the Task Force's key recommendations in this area is legislation to require urban retail water users and buyers to reduce per capita water use by 20 percent by the end of 2020 and 40 percent, especially in non-coastal areas, by 2050. Increased efficiency in water use is imperative because precipitation is not growing. Figure 1-2 shows that the last 30 years are the wettest on record.

Diversions from the Delta watershed—upstream, within, and exported from the Delta—are an issue of statewide importance and directly impact restoration of the Delta and the reliability of the state's water supply. With population continuing to grow, demand for these diversions will grow as well, increasing pressure on the Delta and its tributaries. One of our recommended strategies calls for linking state funding for water projects of all kinds to achievement of specific benchmarks on efficiency, conservation, and development of alternative supplies.

Reducing the demand for water is California's first—and least expensive—option in meeting its water challenges. The specific opportunities available will vary widely across the state. The per capita rates of consumption and the economic uses of water differ greatly by geographic area, and therefore the conservation and efficiency investments that make economic and social sense vary regionally as well.

31. On reasonable use, the "Racanelli" decision, interpreting and applying the reasonable use doctrine to the Delta, similarly provides this guidance: "All water rights, including appropriative, are subject to the overriding constitutional limitation that water use must be reasonable. (Cal. Const., art. X, sec 2; [Water Code] sec. 100...The [SWRCB] is expressly commissioned to carry out that policy." *United States v. State Water Resources Control Board* (1986) 182 Cal.App.3d 82, 129.

That is why such investment decisions must occur at the local and regional level.

The state's role is to provide broad policy guidance and ensure, through funding mechanisms and other means, that state policy goals are being met. Figure 1-11 shows broad categories of supply for wet, normal, and dry periods of precipitation, and urban, agricultural, and environmental uses. Although this provides the state with a picture of uses and supplies

	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.

FIGURE 1-11
California Water Supplies and Uses
Total supply and distribution of the dedicated supply to various uses within California for a typical wet, average, and dry year. (Source: DWR 2005)

statewide, these figures vary significantly from region to region, necessitating regional involvement in decisions.

Conservation and efficiency by themselves will not resolve California's water issues. Alternative supplies, such as reused water, recycled water, stormwater, and desalinated water must play a much greater role in the state's water supply portfolio.

Regional self-sufficiency is another important principal to guide the management of regional water supply portfolios. The more each region of California can rely on local supplies, the less stress is placed on the Delta ecosystem as a "switching yard" for huge quantities of water. Through its Integrated Regional Water Management Plan, California already recognizes that localized alternative supplies are preferable to moving stored water long distances.

Regional self-sufficiency must be balanced, however, with diversification. Water users cannot protect against disrupted local water shortages or system outages by relying solely on local supplies. Regional actions must be harmonized with broader state policies such as ecosystem function and water supply needs to avoid Balkanization. DWR must play key roles here.

Conservation, efficiency, and alternative supplies all have one critical thing in common—they are highly reliable. Once the initial investments are made, these strategies become very predictable and stable components of a water supply portfolio. That is obviously not the case with supplies diverted from the Delta watershed or other major systems such as the Colorado River.

In the coming century, the most reliable—and therefore the most valuable—water supplies will be those that can be obtained with the least damage to the environment.

Goal 5: Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals

Strategy 5.1: Expand options for water conveyance, storage, and improved reservoir operations.

Strategy 5.2: Integrate Central Valley flood management with water supply planning.

California's climate is highly variable. Native aquatic ecosystems, including the Delta, have learned to adapt to that variability. Human water users, however, demand predictable and consistent access to water. Although the demand for certainty is reasonable, there is no way that the state or federal government can guarantee to deliver water that is not available. Learning to deal honestly with constraints and competing demands for water is essential.

Water must be moved and stored when it is least harmful to the environment. To the extent possible, stored water needs to be accessible to purveyors and users at times of their choosing. The term "wet-period diversion system" is shorthand for this principle. The wettest periods also have special ecological value that should not be sacrificed. Nonetheless, through integrated surface and groundwater planning, California must take advantage of abundance when it exists, so that conflict between water needs and ecosystems can be reduced during dry periods.

Figure 1-12 shows diversions and use by region. Most of the water that historically flowed through the Delta and out the Bay is used in the watershed itself, with only relatively small

FIGURE 1-12

Statewide Upstream and Export Diversions from the Delta Watershed

California's water supply is moved all over the state to meet regional demands. Most of the water that historically flowed through the Delta and out the Bay is used in the watershed itself, with relatively small amounts transferred across the Tehachapi Mountains. Meeting the needs of all regions will require improved conveyance, increased storage, and aggressive conservation and efficiency improvements. (Source: DWR 2005)

amounts transferred across the Tehachapi Mountains. Meeting the needs of all regions will require improved conveyance, increased storage, and aggressive conservation and efficiency improvements.

Our Vision recommended that conveyance and storage facilities in the Delta watershed, in the Delta itself, and in its export areas need to be improved—and better linked. The Task Force concludes that the best option for Delta conveyance is probably a two-channel dual conveyance that combines a single through-Delta channel, likely Middle River, with another channel designed for water conveyance. The Task Force has identified a dozen factors to be analyzed in reaching final decisions regarding improved conveyance and storage. These factors are listed in Part 2, Strategy 5.1, and include analyses of water flows needed for the ecosystem, integration with storage, operational criteria, sea level rise, and seismic and flood risks.[32]

The Task Force's recommended approach has multiple advantages over the current system:

- It expands overall water export capacity, allowing larger amounts of water to be moved across the Delta when it is least harmful to the ecosystem and the Delta itself.
- It expands management flexibility, so that water can be conveyed in a variety of ways, depending upon the needs of the ecosystem and the Delta region.
- It reduces pumping risks to fish in the south Delta
- It encourages some drinking water supplies to be moved from the current dead-end located in the south Delta, where quality is low, to free-flowing river channels where quality is higher.

But improved conveyance through the Delta serves little purpose if there are not sufficient reservoirs or underground water banks both north and south of the Delta to store the water. Though there is currently more storage in Southern California than can be filled, over the long-term increased demand and climate change will put storage at a premium.

The Task Force calls for the immediate completion of CALFED's surface storage investigations and speedy implementation of any options that optimize the capture of wet-period flows. Groundwater storage also remains a critical and preferable part of any successful storage system, and the Task Force recommends several specific actions to better integrate groundwater storage into water planning throughout the state. In particular, more aquifers must be filled or recharged during wet periods so that withdrawals can be made during dry periods, reducing the strain on water supplies conveyed through the Delta in dry years. To achieve this, groundwater storage must be further developed regionally, and conveyance capacity must be improved and linked to local storage basins. The Task Force recommends that state funding for various water projects be contingent on timely completion of such groundwater planning.

32. Delta Vision Blue Ribbon Task Force. Letter to Governor Arnold Schwarzenegger, June 30, 2008.

Goal 6: Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments

Strategy 6.1: Significantly improve levels of emergency protection for people, assets, and resources.

Strategy 6.2: Discourage inappropriate land uses in the Delta region.

Strategy 6.3: Prepare a comprehensive long-term levee investment strategy that matches the level of protection provided by Delta levees and the uses of land and water enabled by those levees.

Scientists conclude that the Delta faces enormous risks of levee failure—as high as a two-in-three chance of multiple levee failures in the next 30 years, according to the USGS. Even without a catastrophe, levee maintenance and strengthening against sea level rise and subsidence require better policies and continued investment. The projected expense of fully fortifying all Delta levees against sea level rise and potential disasters is very substantial.

The State must reduce risks to life and property—and its own potential liabilities for levee failures—in an equitable and economically rational manner. The state cannot and should not attempt to create an unsustainable "fortress Delta."

The chief strategy is to match levee design to function throughout the Delta. Levees not only protect land uses on Delta islands, but they also protect the Delta from major saltwater intrusion and shape the flows of fresh water through the ecosystem. The co-equal values and the Delta as a place must be recognized. When setting levee policy, it is essential to look some decades in the future to protect levees that are critical to state interests.

The overarching goal should be to reduce risk. But there are two sides to the risk equation—the quality of levees, and the value of the people, assets and resources they protect. The more intensive the land use in a particular place, or the more critical the levee is to the co-equal values, the stronger the levees should be. However, this principle should not be mistaken as encouragement for intensive urban development in order to finance levee costs within the Delta. Such development would place residents at unacceptable risks, even with new levees, and could also increase flood risks to neighboring islands or communities.

Where levees are inadequate, intensive land uses such as housing should not occur. Land use decisions in the Delta are a matter of public safety. Even if new developments in flood-prone areas were to build their own levees, there would still be a considerable residual risk of flooding. Just as importantly, any new levees constructed to protect new developments in floodplains could actually increase failure risks for existing levees nearby. Over time, as levees are selectively strengthened and wise land use choices are made, risk will be reduced—a benefit to the Delta and the state as a whole. A rational state policy on Delta levees and urban development is essential, because the state is now potentially exposed to near-complete financial responsibility for any levee failure.

This strategic plan recommends limited, but important, changes in local government land use powers. Within the primary zone, the Delta Protection Commission (DPC) is given direct consistency determination authority over land use. This is intended to integrate decision making in this critical area where land uses are already heavily limited by the Delta Protection Act. The shift recognizes that the state's interests in the primary zone, already large as evidenced by policies focused on water and the ecosystem, current land ownership, and funds for levees, will continue to grow. This recommendation creates a single arena for addressing both state and local government interests in land uses in the primary zone of the Delta.

In addition, selected areas of the secondary zone would be subject to increased land use oversight. The floodplains of the San Joaquin and Mokelumne Rivers, along with Bethel Island and the northern portion of Brannan-Andrus Island, pose special land use challenges that merit additional oversight. Local governments should be required to create local plans for these areas that ensure that land uses will be in conformity with the state's California Delta Ecosystem and Water Plan (see Strategy 7.2).

There is an additional way to reduce risks in the Delta—by ensuring that its inhabitants are prepared for emergencies. Emergency preparedness exercises, planning, and other emergency management actions should commence immediately. If a major disaster were to strike the Delta without proper emergency drills, evacuation planning, and pre-positioning of materials, California must shoulder the blame for the resulting loss of life and economic damage. Although emergency preparedness attracts little attention or enthusiasm among citizens, it is critical to saving lives, protecting property and reducing costs after disasters.

Goal 7: Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals

Strategy 7.1: Establish a new California Delta Ecosystem and Water Council as a policy making, planning, regulatory, and oversight body. Abolish the existing California Bay-Delta Authority, transferring needed CALFED programs to the California Delta Ecosystem and Water Council. Establish a new Delta Conservancy to implement ecosystem restoration projects, and increase the powers of the existing Delta Protection Commission.

Strategy 7.2: Require the California Delta Ecosystem and Water Council to prepare a California Delta Ecosystem and Water Plan to ensure sustained focus and enforceability among state, federal, and local entities.

Strategy 7.3: Finance the activities called for in the California Delta Ecosystem and Water Plan from multiple sources.

Strategy 7.4: Optimize use of the CALFED Record of Decision and Coastal Zone Management Act to maximize participation of federal agencies in implementation of the California Delta Ecosystem and Water Plan.

There is now no effective way to accomplish any of the recommendations made in last November's Vision for the Delta, or this Strategic Plan, without a more effective governance structure.

No existing state, federal, or local governmental entity has the legal authority, nor the competency and resources needed, to implement the recommendations made here. Yet the legal authority to act and the development of needed expertise are the foundations upon which policy making for water and the Delta ecosystem must be based.[33] Successful construction of an improved Delta water conveyance system will not solve forever all the water problems of California. Consider these points:

- Growth in population will create ever greater demand for already oversubscribed water.
- The list of species being protected by state and federal endangered species acts will increase and some species are likely to become extinct.
- Lacking accurate information on water diversion and uses or on the functioning of ecosystems, policy makers will find it difficult to anticipate either future crises or responses to their proposed actions.
- Without the ability to integrate actions in multiple arenas, policy initiatives will not mesh well and are likely to often be at cross purposes.
- Private investment in business, agriculture, and housing will be increasingly affected by less reliable water supplies and increased risk.

Figure 1-13, showing the various Delta policy efforts now underway, is a graphic representation of the current fragmentation of authority. Success in achieving the goals of Delta Vision requires far more sustained and coherent action than is possible with current institutions.

Beyond the fragmentation of governance, in the 35 years since the passage of the federal ESA and 24 years since the passage of the California ESA, California has yet to adequately incorporate these species protection laws into water policy making.

Most Californians receive water supplies from systems designed and primarily constructed before passage of modern species protection laws. The legal challenges to biological opinions for smelt and salmon before Judge Wanger, in particular, have unambiguously signaled that water delivery systems must now comply with species protection laws. Moreover, the remedies imposed by Judge Wanger also signal that water needed by endangered species will be provided as a first obligation.

33. ABx2 8 (2008), a pending water bond bill, proposes expanding powers of the inactive California Water Commission to allocate money among proposed water storage projects on public benefit criteria. Under current authority, the Commission is advisory to the Director of DWR on water policies. The proposed law does not create a clear governing body with authority to implement recommendations made in this Strategic Plan.

In a separate decision on the legality of the Programmatic Environmental Impact Statement/Report of the CALFED Bay-Delta Record of Decision under CEQA, the California Supreme Court also commented on the interplay of water exports and endangered species laws. The Court strongly—and unanimously—stated:

> *"...Bay-Delta ecosystem restoration to protect endangered species is mandated by both state and federal endangered species laws, and for this reason water exports from the Bay-Delta ultimately must be subordinated to environmental considerations. The CALFED Program is premised on the theory, as yet unproven, that it is possible to restore the Bay-Delta's ecological health while maintaining and perhaps increasing Bay-Delta water exports through the CVP [Central Valley Project] and SWP [State Water Project]. If practical experience demonstrates that the theory is unsound, Bay-Delta water exports may need to be capped or reduced."*[34]

Crises of ecosystem deterioration lead to court-ordered interruption of water deliveries. There are physical solutions for these problems, such as alternative conveyance, but the only way to make, implement, and refine these solutions is through effective governance.

The need for strengthened governance lies at the heart of the Delta's challenges. The quality and flexibility of governance is a pivotal concern that stretches across every aspect of Delta management. Both improved "carrots" and more effective "sticks" are needed. Capacity to make decisions, especially to improve the reliability of water supply, is a large incentive for water users. Authority to enforce ecosystem requirements is the way to achieve a more reliable water system in the state.

Any new governance structure must be capable of making and implementing sound policies in a world of competing stakeholders, climate change, new invasive species, and the potential of catastrophic levee failures. The governance structure, advised by evolving scientific understanding of the Delta, must be capable of learning and adapting in difficult circumstances of high risk and high importance to society.

The recommendations here do not create another layer of government but rather seek primarily to improve structures, more effectively utilizing existing laws and processes. The recommended Council and the Science and Engineering Board replace existing CALFED structures, but have new responsibilities. The recommended Delta Conservancy is a new entity, needed to significantly increase the capacity for ecosystem restoration in the Delta, which will integrate existing efforts of state agencies and is designed to work with local governments, land owners, and non profits. New laws and finances are proposed where needed.

34. *Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1168.

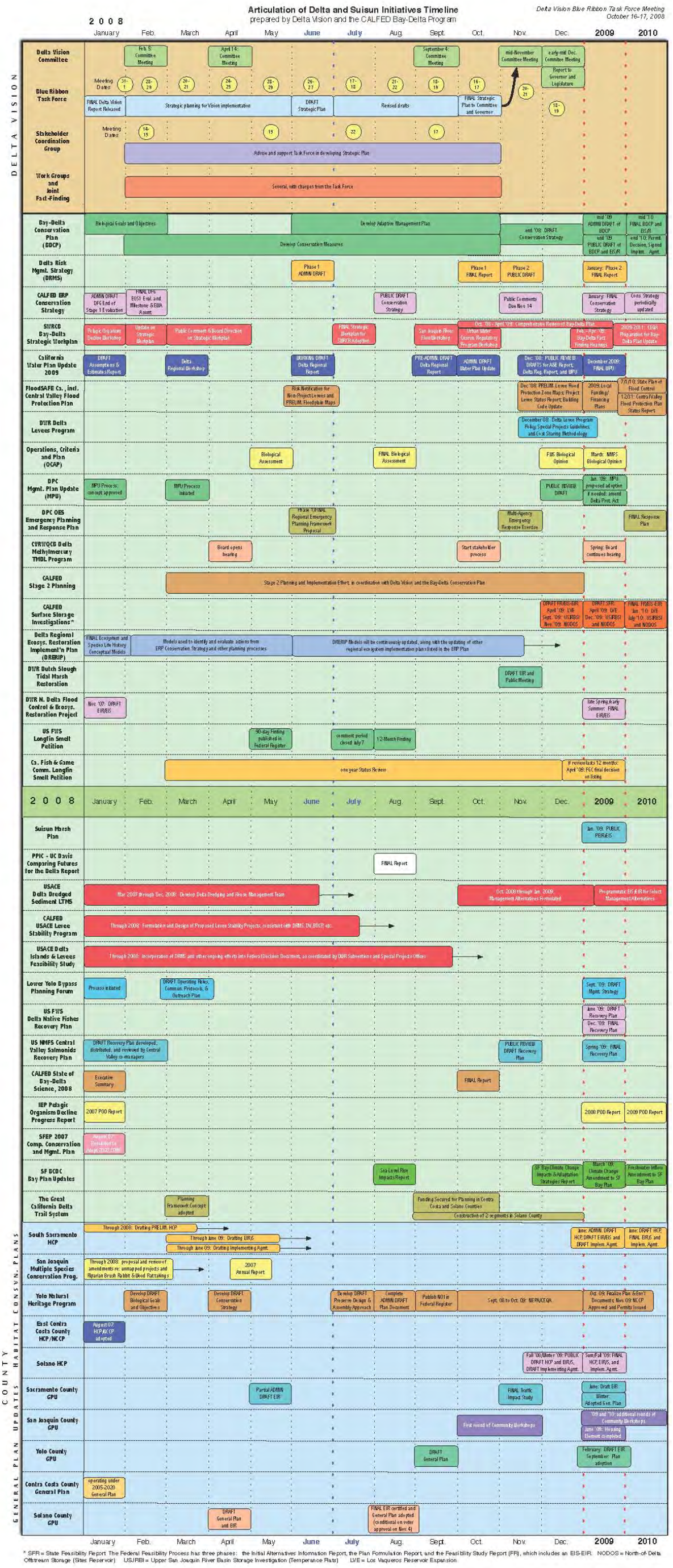

FIGURE 1-13
The Dorian: Delta Policy Efforts Currently Underway
(Source: Delta Vision and CALFED Bay-Delta Program Staff 2008. PDF available for download from www.deltavision.ca.gov.)

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The core ideas recommended—a Council achieving its work primarily through a Delta plan which guides the actions of government agencies, a conservancy to implement ecosystem restoration projects, and an enhanced role for the DPC—emerged from the impressive effort of a Delta Vision stakeholder work group. That work group found the status quo unacceptable and could identify no existing state agency with the authority or competencies required to achieve the recommendations of Delta Vision.[35]

The recommended governance structure, shown in Figure 1-14, focuses on the actions required to address the charge given to the Task Force by Governor Schwarzenegger. It includes the crucial elements of accountability, transparency, and financing. That structure would include:

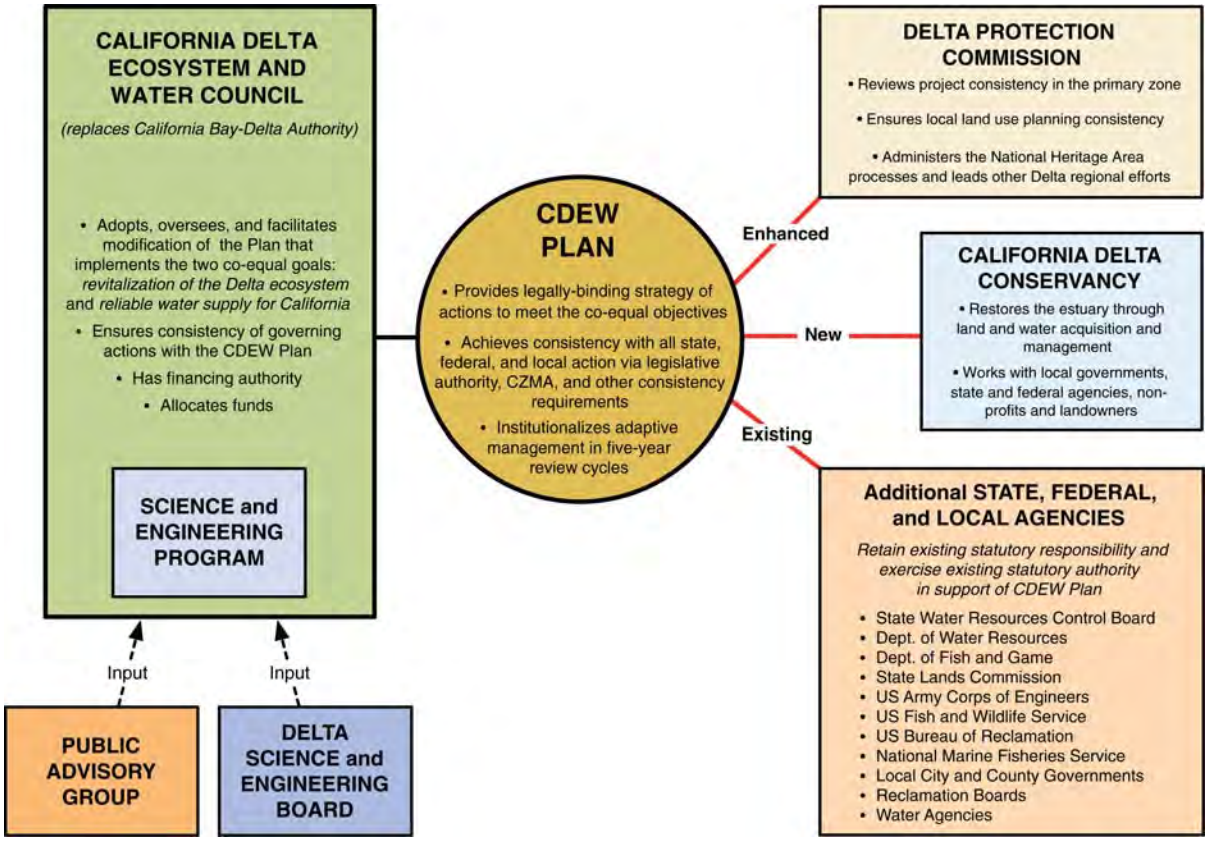


FIGURE 1-14
Proposed Governance Structure
(Source: Delta Vision Staff 2008)

35. Governance and Finance Work Group for the Blue Ribbon Task Force. "Conceptual Strategies from the Governance and Finance Work Group." Draft report. May 1, 2008, http://www.deltavision.ca.gov/BlueRibbonTaskForce/May2008/Handouts/Item_13.pdf.

- **A California Delta Ecosystem and Water Council (CDEW Council) charged with achieving the co-equal goals and the other goals of this Strategic Plan. The existing California Bay-Delta Authority would cease to exist, with any remaining duties transferred to the CDEW Council.**

  The CDEW Council should consist of five to seven voting members, including a chair, all nominated by the Governor, and confirmed by the State Senate. No geographic, occupational, or representational criteria are proposed for these appointments. The criteria used for appointment of the Task Force are appropriate: "members…to include diverse expertise and perspectives, policy and resource experts, strategic problem solvers, and individuals having successfully resolved multi-interest conflicts." The members and a chair should be appointed to five-year staggered terms.

  The CDEW Council's primary responsibilities and authorities would be to develop, adopt, and lead implementation of a CDEW Plan governing activity in the Delta, incorporating elements of relevant plans from other agencies where appropriate. The CDEW Plan would have legal standing, and the CDEW Council would have the authority to determine if other agencies are in compliance with the CDEW Plan. All state, regional and local agencies with planning responsibilities should be required to carry out their actions consistently with the CDEW Plan, while providing the flexibility needed to meet the Delta's management challenges.

No individual or group defended the existing governance system for the Delta and water; all said change is needed. Several other governance proposals for the Delta have been advanced from various organizations and individuals. Almost every aspect of these other proposals was addressed in some fashion by the Governance Work Group and subsequently by the Task Force. Ideas discussed include: a joint powers authority or utility as future operator of the State Water Project, issues associated with existing authorities of state agencies, concerns about oversight of local land use where state interests are involved, and management approaches to achieving the co-equal goals and adaptability. Considerable investigation and deliberation of governance structures, both in the United States and around the world, and studies such as the Little Hoover Commission report on CALFED led to the proposed structure. None of the other proposals submitted provided both the breadth necessary to manage the full range of Delta issues and the needed fixes to overcome the widely accepted limitations of existing governance mechanisms.

- **A California Delta Conservancy to coordinate Delta ecosystem restoration.**

  The Conservancy would be responsible for implementation and coordination of Delta ecosystem enhancement and related revitalization projects. The Conservancy's jurisdiction should cover the Delta and the Suisun Marsh and it would have responsibility for working with public agencies, local, state, and federal, land owners, and non profits in achieving its mission.

  The Conservancy should be governed by 11 voting members, including both local and state officials serving staggered terms, with selected federal participation in non-voting roles. Five members would represent the five Delta counties, selected by the Governor from nominees advanced by the DPC; four members would represent state interests, including the Secretary for Resources, the Director of the Department of Finance, and two

pubic members with business or land trust experience, appointed by the Governor; and two public members, one each appointed by the Senate Rules Committee and the Speaker of the California Assembly. The Governor should appoint the chair.

- **An expansion of authority for the existing DPC to facilitate critical land use decision making of state and local interest in the Delta. The DPC would also support regional policies enhancing the value of Delta as a place, including responsibility for management of the proposed National Heritage Area designation for the Delta.**

  The DPC was created in 1992 to consist of 19 members including county supervisors, city council members, reclamation district director board members, and directors or designees from several state departments such as Parks and Recreation, Fish and Game, etc. Its membership should be expanded to include representation of the Central Valley Flood Board. Federal agencies, including the U. S. Army Corps of Engineers (Army Corps), the USFWS, and the U. S. Bureau of Reclamation (Reclamation) should be invited to participate as needed.

  As originally created, the DPC was given appellate review of proposed land uses in the Delta primary zone. In its new role, the DPC would exercise direct consistency determination authority over development proposals in the primary zone. This means that the DPC must make an affirmative determination that any project approved by local governments within the primary zone is consistent with the Resource Management Plan and the CDEW Plan. Also, the Commission would exercise appeal authority over selected portions of the secondary zone once local plans are created for those areas. Until those local plans are created, DPC should possess direct consistency determination authority over development proposals in these areas. Finally, the DPC would determine the consistency of the local plans with the CDEW Plan.

Local government decisions and actions are important in the Delta. Counties and cities make land use decisions, provide many critical services, and encourage economic development, among other roles. Reclamation districts maintain levees and other special districts provide services such as water supply or mosquito control. Success in implementation of the policies of the Council expressed through the CDEW Plan will rely heavily on local government actions.

Existing state agencies would retain their existing authorities but have statutory responsibility to implement the adopted CDEW Plan. DWR, DFG, the State Board, State Lands Commission and other state agencies will be critical participants in developing the CDEW Plan, which will build upon and incorporate their relevant planning and policy making. In developing and adopting the CDEW Plan, the CDEW Council will make decisions required to achieve integrated action focused on the co-equal goals and other policies of the Council.

Existing agencies have a critical role in achieving the CDEW Plan:

- For the science and regulatory implementation of species protection laws: DFG, USFWS, and the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS)

- For linkage of ecosystem policies and programs focused on the Delta and the larger Delta watershed: DFG, in cooperation with the USFWS and NMFS through the CALFED Ecosystem Restoration Program and successor programs established by the recommended CDEW Council
- For construction and ownership of water conveyance and storage facilities: DWR and Reclamation
- For application of water rights and water quality laws: the State Board and regional water quality boards
- For land use and resource management policies under the Delta Protection Act: the DPC and the State Lands Commission
- For local government functions, including police powers and service provision, which contribute to the value of the Delta as place: Existing local governments
- For strategic levee planning, improvements, maintenance, and repair: DWR and the Army Corps

While the authorities of existing agencies will remain largely unchanged, increased resources are needed to implement these recommendations. This is especially true for DFG and the State Board, which need additional revenue to discharge their responsibilities effectively.

It is clear that the capacity of DWR to effectively plan and manage California's water supply should be significantly enhanced. It is likely that responsibility for operating and maintaining the SWP should be shifted to a new public entity, although the details of that shift remain to be developed. DWR's responsibilities for water policy, flood control, project design, permitting and for grant administration should be enhanced. DWR should also retain responsibility for design, construction, and ownership of facilities for the SWP.

All three of these state agencies—DFG, DWR, and the State Board—need sufficient and stable revenues that are not dependent on general fund allocations or bonds in order to discharge their responsibilities effectively.

Successful governance of the Delta will depend on a coherent, effective, and reliable financing structure. That system must include financing to pay capital costs, whether by General Obligation or Revenue Bonds, and Council authority to impose reasonable fees related to the implementation of the Delta Plan.

Financing will require a flexible approach. There is currently no reliable estimate of benefits, costs, obligations, and risks of the projects being discussed in this Strategic Plan. However, analyses developed by state agencies currently reviewing levee, ecosystem, and facility options suggest that the cost of their own plans range from $12 billion to $24 billion over the next 10 to 15 years, with the highest estimates approaching $80 billion. The Task Force is not recommending that all of these improvements, projects, and upgrades currently proposed should be built, nor the capital expenditures made. However, implementing the Strategic Plan will require funding, and refined estimates of capital and operations costs must be developed as projects become more specific. Commitments to transparency, cost effectiveness, and incentives for efficiency will expedite financing. The use of federal funding must be maximized as should all currently available bond funding.

Learn While Acting

The Task Force's Vision emphasized that the Delta's challenges are characterized not only by their complexity, but also by their uncertainty. But as the Vision says, "far from being a prescription for paralysis… recognizing both uncertainty in knowledge and uncertainty about outcomes of policies and programs has very specific implications for future Delta management."

One of those implications is that adaptive management must be at the center of Delta governance and decision-making. Indeed, addressing uncertainty effectively *requires* improved governance and decision making.

Uncertainty in the Delta ecosystem and in policy making

There are two kinds of uncertainty in the Delta ecosystem. One is lack of full understanding of how the system works. Drawing cause-and-effect conclusions about the ecological changes occurring in the Delta is surprisingly difficult. There are multiple variables that interact in complex ways, making it hard to establish precisely what the effects of a given management action will be on a specific resource.

The second form of uncertainty is that the Delta ecosystem will continue to change in ways that cannot be predicted. Even if the ecosystem was understood perfectly now, its future behavior still cannot be predicted with certainty. In addition, outside forces, such as climate change or earthquakes, will eventually change important underlying factors that shape the system's overall behavior.

Equally important is the uncertainty about the effectiveness of policy tools. An attractive approach may prove impossible to implement. The best idea may prove less effective than anticipated, or even counter productive. New technologies create opportunities for new policy tools. For these reasons, continuing systematic assessment of the performance of policies is critical. This approach to resources planning can best be described as "adaptive management."

Defining adaptive management

Adaptive management is defined by the federal government as follows:

> *"A type of natural resource management in which decisions are made as part of an ongoing science-based process, adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices."*[36]

36. Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, 65 Fed.Reg. 62565. 62572, Oct. 18, 2000.

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

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

The CDEW Plan recommended in Strategy 7.2 has the advantages of integrating the actions of many relevant agencies and also of being regularly revised on five-year cycles. These regular reviews and updates also provide a schedule of review activities involving stakeholder participation. This rhythm of review cycles requires organizing scientific understanding and program assessment to a point where they can inform policy making.

Reporting Progress

Milestones and Report Cards

For Delta Vision to succeed many things must occur, but the order of what must be done, and when, is less clear. The Task Force recommendations are comprehensive and integrated: all contribute to eventual success. But some recommendations must be initiated and completed before another recommendation dependent on the first can be initiated. Moreover, a meaningful way to measure progress toward a goal is critical to maintaining focus, to accountability and to adjustments in actions as conditions change or when initial programs are found to be less or more effective than expected

Milestones and report cards can address these two issues of establishing priorities for early actions and for measuring progress over time. As most of the first priority actions involve establishing needed institutions, policies, programs, and financing, the milestones here result in a ”Public Policy Report Card.” The milestones include successful adoption of needed legislation, securing needed funding, adopting needed regulatory actions, or the establishment of programs by existing government agencies. This report card is a measure of procedural and legal success.

Success measured by the Public Policy Report Card is the foundation which makes other actions possible, and it can greatly facilitate later action; however, that is no guarantee that specific initiatives later will succeed. Needed here are indicators which measure progress toward achieving clear goals. An effective and transparent method of evaluating progress

toward clear goals provides focus for decision makers and managers. Clear expectations about what is to be achieved both motivate action and provide measures of accountability. Effective measurement of progress toward clear expectations of what is to be achieved allows decision-makers to assess strategy effectiveness and take corrective action if needed. This can be achieved with a "Goals Report Card."

Such reports yield benefits beyond policy makers and scientists. Clearly and regularly communicating the Delta's condition and success on state wide strategies such as those for water conservation also informs the public about how well the Strategic Plan is working. Transparent, regular reports also promote trust among responsible authorities and stakeholders.

Each report card is presented in turn.

A Public Policy Report Card: Legal and Procedural Milestones

Among the administrative actions required to advance the recommendations of this strategic plan, the following are key.

Goal	Milestones	Targets
Goal 1	Legal recognition of co-equal values in Constitution or statute	By 2009
Goal 2	Achievement of National Heritage Area designation	By 2010
	Establishment and funding of a Delta Investment Fund	By 2010
Goal 3	Initiate large scale habitat restoration consistent with the overall goal of this Plan	By 2010
	Adoption of appropriate Delta flow standards by State Board, DFG, and other agencies	By 2012
	Adoption of appropriate Delta water quality standards by State and Regional Boards	By 2010
Goal 4	Legislation to achieve 20 percent reduction in urban per capita water use by 2020	By 2009
Goal 5	Authorization and funds to implement near-term improvements to Delta water conveyance system	By 2010
	Completion of alternative conveyance recommendation by DWR and DFG	By 2010
Goal 6	Completion of emergency response plans, scenarios and exercises	By 2010
	Completion of local plans for specified areas of the secondary zone	By 2012
Goal 7	Establishment of CDEW Council, which will adopt the CDEW Plan and have the authority to determine consistence of all state agencies. Funding authorization, through fees and otherwise, to allow CDEW, the Conservancy, and DPC to act as directed.	By 2009
	Establishment of Delta Conservancy	By 2009
	Strengthening of Delta Protection Commission	By 2010
	Completion of CDEW Plan	By 2011
	Approval of CDEW Plan by federal government as meeting CZMA requirements	By 2012

A Goals Report Card

The Goals Report Card must derive from the seven goals of this strategic plan and the strategies proposed to achieve those goals. Part 2 of this report proposes performance measures for strategies under each goal. Performance measures provide an objective method for quantifying progress toward the goal.

As stated above, performance measures and targets for achieving desired results are important tools to focus efforts, serve as the basis for changing policies over time, and encourage long-term accountability. The Task Force recommends that the Delta Science and Engineering Board make developing such measures and targets a high priority, to be completed by July 2009. The performance measures included in this strategic plan are a starting point for that effort.

Example of Ecosystem Habitat 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 (+)

This is a sample of proposed performance measures provided with each strategy in Part 2 of this Strategic Plan.

Performance measures and targets must be detailed enough to provide information required for scientific judgments and also meaningful to policy makers and the broader public. Both needs can be met if the detailed measures are incorporated into broader summary measures of progress with targets of performance in specified time periods. This summary information should be provided in the form of a Goals Report Card of progress relative to each goal. To be most effective, the Goals Report Card should be easily understood.

Report cards are effective tools for highlighting assessment results and communicating scientific understanding to policy makers and the general public. They have been used successfully in other complex planning arenas, such as the restoration of Chesapeake Bay.

Near-Term Actions

As in the Vision, near term actions are also needed and recommended. These are critical steps which need to be taken as soon as possible. They either are needed to foster more effective policy making or address immediate threats to Delta inhabitants or its ecosystem, or to water conveyance systems. All these actions are recommended; no ranking of priority is suggested.

1. **Obtain needed information on water diversion and use.**

   It is impossible to create an effective water policy for the state or to "plan for drought" if so large amounts of water use in the state is unreported. The Legislature should enact, and the State Board should enforce, a law requiring universal, consistent reporting on water diversion and use by all water agencies and other substantial diverters.

   This law should repeal all current exemptions to reporting, plus include reports on groundwater and pre-1914 and riparian users. The legislation should require reporting for water use for the years 2006 through 2009. That would become the presumptive level of water use for public policy decisions until a better system is established. Water users who did not meter water in this period may develop estimates of water use from utility bills, crop production records, or other means approved by the State Board or DWR. The reports for 2006 to 2008 should be provided by March 1, 2009 and are due annually for the immediate past year thereafter.

2. **Initiate collection of improved socio-economic, ecosystem, and physical structure data about the Delta to inform policy processes and project level decision making by all public agencies, local, state, and federal.**

   Improved data will provide a better basis for policy making, which will be increasingly critical as decisions move from broad planning to specific projects in the Delta. Among the data to be collected, high priority should be given to socio economic data. Assembling and assessing available data and analyses should be the first step and should be completed by April 2009. A plan for collection of additional data and analyses should be completed by June 2009 and recommended data collection and analyses initiated no later than July 2009.

3. **Accelerate completion of in-stream flow analyses for the Delta watershed by DFG.**

   Use bond or other funding to complete these in-stream flow analyses by 2015. They are the foundation for Delta-related decision making by the State Board.

4. **Conduct a Middle River Corridor Two Barrier pilot project.**

   This pilot project involves testing two temporary barriers at two locations—Old River and Connection Slough—to partially isolate Middle River and Old River near Franks Tract. The temporary barriers would be tested together with preventive flow control actions and possibly modified Delta Cross Channel operations to maintain positive San Joaquin River outflow and reduce smelt and salmon migration toward the export pumps. Some believe that this project has the potential to provide immediate ecologic benefits and will also generate data needed to evaluate dual conveyance as a potential long-term Delta conveyance solution.

5. **Complete construction of an alternative intake for the Contra Costa Water District.**

   As the Middle River corridor project is undertaken, it will be desirable to reduce entrainment risk on Old River so that it may be managed primarily for fish habitat. Once CCWD's alternative intake on Victoria Canal is completed, CCWD, the East Contra Costa Irrigation District, and DWR should consider ways to reduce dependence on Old

River in order to avoid any such conflicts and also provide better water quality for customers throughout Contra Costa County.

6. **Evaluate the effectiveness of a Three Mile Slough Barrier project.**

   This project involves constructing an operable barrier across Three Mile Slough between Sherman Island and Brannan-Andrus Island. This project could potentially provide protection for delta smelt, reduce Delta salinity intrusion in the fall, and reduce the water supply impacts resulting from recent federal court decisions. The pace of the DWR's Environmental Impact Report on alternative barrier configurations should be accelerated, so that DWR may conduct a pilot study to evaluate the effectiveness of the selected Three Mile Slough barrier within two years.

7. **Construct a demonstration fish protection screen at Clifton Court Forebay.**

   Recent bond measures have made funds available for constructing a demonstration fish screen at Clifton Court Forebay to protect delta smelt, salmon, and steelhead in the vicinity of the pumps. A pilot study of these fish screens should monitor data on the screen's effectiveness in reducing fish kills in the pumps and predation losses.

8. **Advance near-term ecosystem restoration opportunities.**

   Several near-term ecosystem restoration opportunities in the Delta have been analyzed sufficiently to move forward in the immediate future. Each could have benefits for threatened fish species, and will offer an opportunity to gain experience that can be applied to larger scale restoration projects in the future. DFG and DWR, drawing upon expertise in the CALFED Science Program as needed, should move these projects forward as quickly as possible. Examples of these opportunities include:

   - Tidal marsh restoration in Dutch Slough
   - Tidal marsh restoration on Meins Island
   - Improved floodplain in the Yolo Bypass

9. **Stockpile rock and other emergency response materials.**

   In the event of a disaster in the Delta, it is imperative that emergency response materials be pre-positioned so that they can be brought to bear as quickly as possible. If a levee failure or other disaster occurred, stockpiled materials could reduce the length of an outage of the state and federal water projects and could help reduce disruption to infrastructure and risk to Delta residents. Rock and other materials should be stockpiled at Rio Vista, Hood, the Port of Stockton, and other appropriate locations. See Strategy 6.1 for additional near-term emergency preparation actions.

10. **Assess and improve state capacity to respond to catastrophic events in the Delta.**

    Local governments and the DPC are developing emergency response plans. The state needs to assess and improve its capacity to respond to catastrophic events. That assessment and improvement must go beyond water supply issues to human life, infrastructure and other property and resources in the Delta. The assessment should be led by the Office of Emergency Services and include at least the Business, Transportation, and Housing Agency; DFG; and DWR. It should be completed by June 2010 and presented to the governor, Delta local governments, and the DPC.

Part 2
Detailed Strategies and Actions

Introduction

The following descriptions offer greater detail on the specific strategies and actions proposed in this Strategic Plan for each goal:

- **Goal 1:** Legally acknowledge the co-equal status of restoring the Delta ecosystem and creating a more reliable water supply for California.
- **Goal 2:** Recognize and enhance the unique cultural, recreational, and agricultural values of the Delta as an evolving place, an action critical to achieving our co-equal goal.
- **Goal 3:** Restore the Delta ecosystem as the heart of a healthy estuary.
- **Goal 4:** Promote water conservation, efficiency, and sustainable use.
- **Goal 5:** Build facilities to improve the existing water conveyance system and expand state wide storage, and operate both to achieve the co-equal goal.
- **Goal 6:** Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses and strategic levee investments.
- **Goal 7:** Establish a new governance structure with the authority, responsibility, accountability, science support and secure funding to achieve these goals.

Many of the goals, strategies, and actions recommended here identify specific timelines for implementation. These dates represent the Task Force's best judgment of the earliest time these strategies and actions can realistically be undertaken or completed. However, given the urgency of the situation in the Delta, they should be accelerated whenever possible.

The strategy descriptions each include quick-reference boxes to other related strategies and the proposed method for quantifying the strategy's progress toward meeting goals:

- Vision Recommendations Met
- Performance Measures

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

Goal 1: Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California

Strategy 1.1: Make the co-equal goals the foundation of Delta and water policy making.

Achieving the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California was the first recommendation of the 2007 Vision. It is also the first goal of this strategic plan.

Vision Recommendations Met

1

Performance Measure

Integration of ecosystem and water policies (+)

The co-equal goals must be fully institutionalized in California policy making; commitment to achieving them cannot be discretionary. To this end, the goals should be reflected in the state's constitution, its statutes, and its financing structures. That way, policy makers have the authority, responsibility, and long-term revenue stream necessary to accomplish the goals. In addition, the water contracts, water rights permits, and operational agreements that drive much of the day-to-day management of the Delta should also contain stipulations that recognize the co-equal goals.

Recommendations on governance structures and strategic finance are in Goal 7. The recommendations here are separate, critical actions.

Action 1.1.1: Write the co-equal goals into the California Constitution or into statute.

Action 1.1.2: Incorporate the co-equal goals into the mandated duties and responsibilities of all state agencies with significant involvement in the Delta.

Action 1.1.3: Require the achievement or advancement of the co-equal goals in all water, environmental, and other bonds, and operational agreements and water contracts or water rights permits, that directly or indirectly fund activities in the Delta.

Goal 2: Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals

Strategy 2.1: Apply for federal designation of the Delta as a National Heritage Area, and expand the State Recreation Area network in the Delta.

Vision Recommendations Met

2, 9

Performance Measure

Achievement of special designations (+)

The Task Force's November 2007 Vision described the Delta as "a unique and valued area, warranting recognition and special legal status from the state of California." Despite the risks and inevitable changes that will confront the Delta in the coming decades, this Strategic Plan is premised on recognition of the Delta's unique natural, cultural and historic character (see Figure 2-1), rather than abandonment of the region. Such recognition is warranted at a national as well as state level.

This acknowledgement of the Delta's value and uniqueness is the "third leg of the stool." Along with the two co-equal goals, it forms the foundation for the Strategic Plan. State and federal recognition of the Delta should support the Delta as a place—regardless of any other actions on the environment and water supply.

Any designation of the Delta should be structured to increase the visibility of the Delta nationally and within the state of California. It should strengthen the recreational, tourist and agricultural economies in the Delta. And as the recommendations of Delta Vision and other initiatives are implemented, priority should be given to Delta institutions and businesses whenever possible.

The critical elements of this strategy include:

Action 2.1.1: Apply by 2010 for the designation of the Delta as a federally recognized National Heritage Area.

National Heritage Areas are places designated by the Congress "where natural, cultural, and recreational resources combine to form a cohesive, nationally-distinctive landscape arising from patterns of human activity shaped by geography."

Despite being a federal designation, heritage areas do not involve any federal ownership or regulation of land. The National Park Service and the Department of the Interior review proposed heritage area management plans to see that intended actions advance the mission of the Park Service and the National Heritage Area program. Otherwise, the federal role is limited to partnering in marketing efforts.

Designation should be applied for through three major steps:

a. Beginning immediately, the Delta Protection Commission (DPC) and interested local entities should jointly conduct the required feasibility study, and identify the appropriate agency or non-profit to serve as the ongoing management and implementation entity.

b. The state and the heritage area's management entity should apply to Congress for the designation

c. Upon receiving the designation, the management entity and its partners must develop a plan within three years that describes how the heritage area will combine preservation, recreation, economic development, tourism, and heritage education to interpret and promote the region's distinctive landscape.

FIGURE 2-1
Promotional Material for Delta Tourism, 1911
The National Heritage Area designation will help the Delta market itself. (Source: California State Railroad Museum)

Action 2.1.2: Expand by 2010 the State Recreation Area network in the Delta, combining existing and newly designated areas.

Beginning immediately, the California Department of Parks and Recreation should initiate a feasibility and siting study that considers at least the following:

a. Establishment of a southern recreation area on Sherman Island, located somewhere that is visible from the Antioch Bridge and is easily accessible from Highway 160, or

cooperative management for recreational purposes of lands owned by the Department of Water Resources and the Department of Fish and Game on Sherman Island. Any investment in fixed facilities should be appropriate to an area with a high risk of deep flooding.

b. Establishment or enhancements of sites that are readily accessible to populations living to the north of the Delta.

c. The potential expansion of Caswell Memorial State Park, or cooperative management for recreational purposes of lands in the San Joaquin River floodplain adjacent to Caswell.

d. The potential costs and benefits of consolidating or jointly managing multiple State Recreation Areas and State Parks within and near the Delta.

Strategy 2.2: Establish market incentives and infrastructure to protect, refocus, and enhance the economic and public values of Delta agriculture.

Vision Recommendations Met

2, 9

Performance Measures

Gross regional product from agriculture (+)

Gross regional product from sustainable agriculture (+)

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

The Delta is already a highly productive agricultural area. From wine grapes and pears to corn and tomatoes, the Delta grows more than 90 different crops, producing more than $650 million annually in farm sales for the California and Delta economies. But the state must support continued innovation and diversification of production, and help develop marketing opportunities (see Figure 2-2), so that agriculture can continue to thrive in the Delta of the future.

Market forces will largely guide agricultural activity in the future, and Delta farmers will continue to be the best judges of agricultural business opportunities. But the Delta is uniquely suited for several kinds of specialized agriculture that advance public values. Special incentives should be created for farmers to pursue these opportunities profitably and sustainably.

There are several examples already in practice. Farmers on Staten Island grow grains in a manner that supports populations of sandhill cranes and other migratory birds. Much of the Yolo Bypass is farmed even as it stands ready to divert floodwaters from the Sacramento River. And many farms in the Delta contain recreation and tourism enterprises, such as wine tasting or U-Pick farms.

Perhaps the most promising long-range opportunity is the potential farming of tules and other wetland plants that can absorb carbon from the atmosphere and raise land elevations. California's regulatory efforts to curb greenhouse gas emission should establish a market for carbon, so that Delta farmers can profit from absorbing carbon—and making the entire region more sustainable in the process.

All of these creative farming techniques—and others that may not even be known today—should be supported to take their place alongside traditional agricultural industries.

The critical actions of this strategy include:

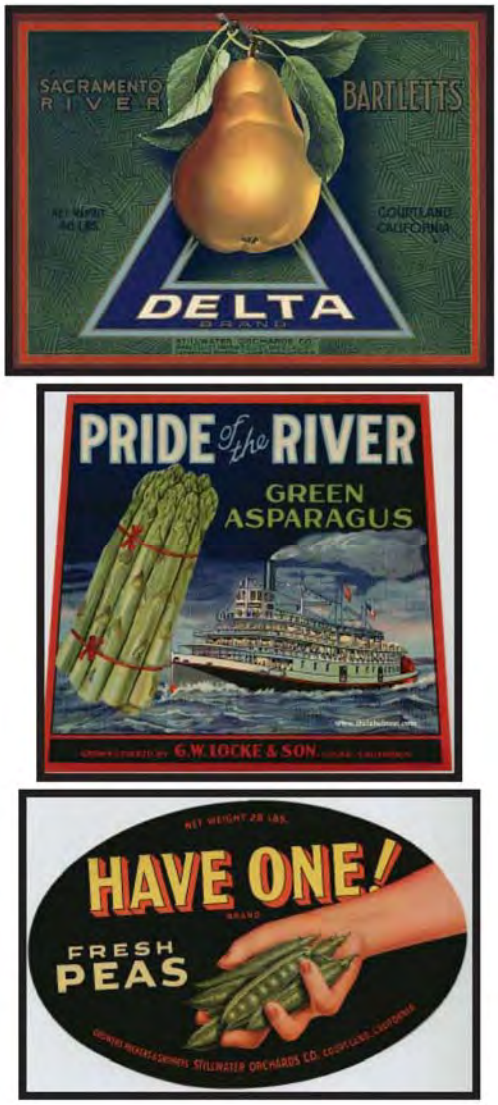


FIGURE 2-2
Regional Branding for Delta Agriculture, 1910s to 1930s
Delta produce can be marketed to nearby populations. (Source: Fruit Crate Labels, Vintage Advertisements, Cigar Labels, and Canning Labels. www.thelabelman.com. Accessed August 2008.)

Action 2.2.1: Establish special Delta designations within existing federal and state agricultural support programs.

This should include:

a. Partnering the California Department of Food and Agriculture with commodity boards, and local governments and use U.S. Department of Agriculture (USDA) Farm Bill funding to begin a regional labeling program and assist in the direct marketing of Delta produce in nearby cities.

b. Reviewing the new Farm Bill for agricultural opportunities in the Delta, particularly for funding that supports agricultural marketing including labeling, direct marketing, and the development of new crops, crop varieties, and value-added products. Among the Farm Bill titles that should be assessed are Research, Conservation, Rural Development, Energy, and Nutrition. The Delta Protection Commission (DPC), the Task Force's proposed Delta Conservancy, and state and local agricultural institutions should collaborate to secure funding from these and other Farm Bill titles, and foundations.

c. Leveraging the conservation funding available through the federal Farm Bill, such as that available through the Cooperative Conservation Partnership Initiative, by using the state's working lands conservation programs.

d. Requiring the DPC to continue working with the USDA to secure funding for a Resource Conservation and Development Council to promote natural resource-based economic development. Among other functions, this council should develop housing for agricultural laborers in and around the Delta.

Action 2.2.2: Conduct needed research and development for agricultural sustainability in the Delta.

This should include:

a. Conducting a Delta-wide study—similar to that done by the University of California's Agricultural Issues Center for Solano County—in which barriers and opportunities to improve agricultural sustainability are identified through economic analysis and stakeholder interviews. The study should include an assessment of the potential to achieve habitat and water management objectives while continuing to farm in potential restoration areas.

b. Increasing the University of California's research and extension capacity in the Delta as well as the technical field staff of the USDA's Natural Resources Conservation Service, to explore the use of crops that slow or reverse subsidence, improve water use efficiency and quality, are wildlife-friendly, and improve floodplain management.

Action 2.2.3: Establish new markets for innovative agricultural products and enterprises in the Delta.

This should include:

a. Ensuring that carbon farming is officially recognized as an emissions reduction mechanism under California's Global Warming Solutions Act (AB 32), and that appropriate carbon trading mechanisms are created to permit Delta farmers to enter into contracts with carbon emitters.

b. Creating federal, state, and local mitigation requirements and agricultural easement programs that support the transition of Delta growers to multifunctional forms of agriculture, particularly ones that help wildlife habitat and flood management.

c. Devising protection strategies for farmlands threatened by urbanization through conservation easements, Williamson Act contracts, and "transfer of development rights" arrangements.

Strategy 2.3: Develop a regional economic plan to support increased investment in agriculture, recreation, tourism, and other resilient land uses.

Vision Recommendations Met

2, 9

Performance Measure

Gross regional product from recreation and tourism (+)

The Delta economy presents important opportunities for innovation. The agricultural and recreational economies both occupy important—and singular—niches in the larger economy of California. Economic development planning is required if the Delta is to take full advantage of these opportunities.

Agriculture, recreation, and tourism are the mainstays of the regional economy, and will remain so. However, innovative, high-value land uses should also be encouraged, especially those that contribute to levee financing and local tax rolls and do not increase flood risks. On-island water storage, on-island flood storage, materials handling, and other non-traditional land uses may play an important role in the future Delta. The plan should assess these opportunities and recommend means to encourage them, when possible.

The plan should also address the location of future projects with respect to disaster risks. Though recreation and tourism should be enhanced throughout the Delta, the buildings and services required to expand the industry should be concentrated in highly visible locations near highways and population centers—and in areas with relatively low disaster risks such as those above sea level or protected by high-quality levees.

Action 2.3.1: Charge the Delta Protection Commission with facilitating a consortium of local governments to create a regional economic development plan that addresses agriculture, recreation, tourism, and other innovative land uses.

a. Require the plan to have active stakeholder participation from business owners, land owners, farm bureaus, and other local institutions.

b. Require the plan to identify strategies that will strengthen the Delta economy, including agriculture, even if significant changes occur to the Delta landform, to water infrastructure, or to west Delta water quality.

Action 2.3.2: Establish special enterprise zones at the major “gateways” to the Delta as part of the economic development plan.

a. By 2010, the Governor’s Office of Planning Research should issue a model ordinance to local governments to create these zones.

b. By 2013, the Legislature should pass a law providing tax incentives and/or low-interest loans within these zones to spur investment in welcome centers, interpretive centers,

recreational support services, and land and water transportation from these locations to points of interest throughout the region.

c. There should be at least one gateway on each of the four sides of the Delta to ensure visibility and access. Potential sites for such gateways include Rio Vista in the west, Freeport, West Sacramento or the Yolo Bypass to the north, Stockton in the east, and Antioch, Discovery Bay or Lathrop to the south.

Strategy 2.4: Establish a Delta Investment Fund to provide funds for regional economic development and adaptation.

Vision Recommendations Met

2, 9

Performance Measures

Gross regional product from recreation and tourism (+)

Gross regional product from sustainable agriculture (+)

Success rate of small and new Delta businesses (+)

Amount of new private investment leveraged with public funds (+)

The Delta will change in the future due to population growth, climate change, and other forces. It is critical that the Delta economy retain the vitality and resiliency needed to meet these challenges. Delta agriculture, tourism, recreation, and other industries will need to have access to new sources of investment and funding so that they may diversify and innovate.

As the state makes major investments in ecosystem restoration and water supply reliability, there should also be investment in the vitality of the Delta economy. The Delta has special cultural and historical value, but that does not make it a museum. It deserves and requires a healthy economy that can grow and change as new circumstances arise in the future. A Delta Investment Fund on the order of $50-100 million will provide a funding and credit base to sponsor the growth of such an economy.

The critical actions for this strategy are:

Action 2.4.1: Initiate the Delta Investment Fund with state funding.

Possible funding mechanisms include a general obligation bond (perhaps as part of a large bond measure to fund Delta restoration and water infrastructure improvements) or an appropriation from the General Fund.

Action 2.4.2: Structure the Fund so that it can accept revenues from federal, state, local, and private sources.

The fund should be able to draw from federal, state, local, and private sources to ensure long-term stability and prevent the “boom-and-bust” pattern that can occur when relying solely on bond funds.

Action 2.4.3: Place the Fund under the joint management of the Delta Protection Commission and a consortium of local governments.

Require that the funds be expended in a manner consistent with the California Delta Ecosystem and Water Plan (CDEW Plan). See Strategy 7.2.

Strategy 2.5: Adopt land use policies that enhance the Delta's unique values, and that are compatible with the public safety, levee, and infrastructure strategies of Goal 6.

The Delta and its residents are threatened by widespread urbanization of the secondary zone. Development of low-lying lands not only places people at flood risk, but also may inadvertently increase stress on existing levees. Strategy 6.2 recommends new Delta land use policies intended to avoid these dangerous outcomes. Strategy 7.1 describes the needed increases in the authority of the Delta Protection Commission to accomplish those policies.

Vision Recommendations Met

2, 9

Performance Measures

See Strategy 6.2

Land use policies also have important consequences for the Delta as a place. Large subdivisions within the primary zone, or the geographical areas identified in Strategy 6.2, would significantly change the social and visual character of the Delta. Delta residents value the small scale of their cities and towns, and in general do not wish to see them become "bedroom" communities.

As population growth transforms the Central Valley in the coming decades, the Delta's rural character also will be an important part of its appeal as a recreational destination. Large-scale urbanization interferes with that rural character.

In order to keep the existing towns and rural areas economically vital, however, a small amount of physical growth will likely be necessary in the legacy towns. This growth should be consistent with the historic, architectural, and cultural character of the existing communities, and consistent with our recommended approach to levees and flood risk. A total prohibition on development within the primary zone would freeze the economy in place, inhibiting the growth of tourism and recreation in particular.

Finally, large-scale urbanization, especially of floodplains and lands at or near sea level, would compromise the ecological quality of the Delta. These lands are irreplaceable for restoring tidal marsh and floodplain habitat as well as accommodating sea level rise. Opportunities for such restoration would be thwarted by urbanization. See Strategy 3.1 for specific recommendations on this subject.

Actions: See Goals 3 and 6 for actions that address this strategy.

Goal 3: Restore the Delta ecosystem as the heart of a healthy estuary

Strategy 3.1: Restore large areas of interconnected habitats—on the order of 100,000 acres—within the Delta and its watershed by 2100.

Revitalizing the Delta ecosystem cannot be implemented piecemeal. Creating a diverse mosaic of connected habitats is the cornerstone upon which this restoration strategy is built. To do so, this strategy calls for restoration of selected intertidal marshes, seasonal floodplains, and open bays. According to the best current scientific knowledge, all are necessary to restore the endangered and declining fish species whose plight has destabilized the water supply system (see Figure 2-3). These habitats must be connected to one another and to adjacent upland areas that support grasslands and seasonal wetlands, including vernal pools.

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 to 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 (+)

Revitalization efforts must focus on water, land, and the intersections between the two. The Delta ecosystem is not just about fish. Vast migrations of waterfowl and shorebirds, many protected by state and federal laws and international treaties, depend upon the Delta. Millions of migrating birds either pass through, or stay the winter in, the Delta. Since about 95 percent of California's original wetlands have been lost, those that remain are vital to the survival of these birds. There are also many land-based species in the region that require conservation attention. Protecting the wetlands, grasslands, forests, and farmlands that these birds and animals depend upon is essential. Proper connections between these habitats should also be ensured.

Ecosystem vitality must also be ensured through wise land use planning. Upland areas adjacent to restored intertidal marshlands must be protected so that as the sea level rises, marshlands can migrate landward and continue to fulfill their important ecosystem functions. These lands are located around the entire perimeter of the Delta. Priority should be placed where intertidal marsh restoration is most feasible in the shortest time.

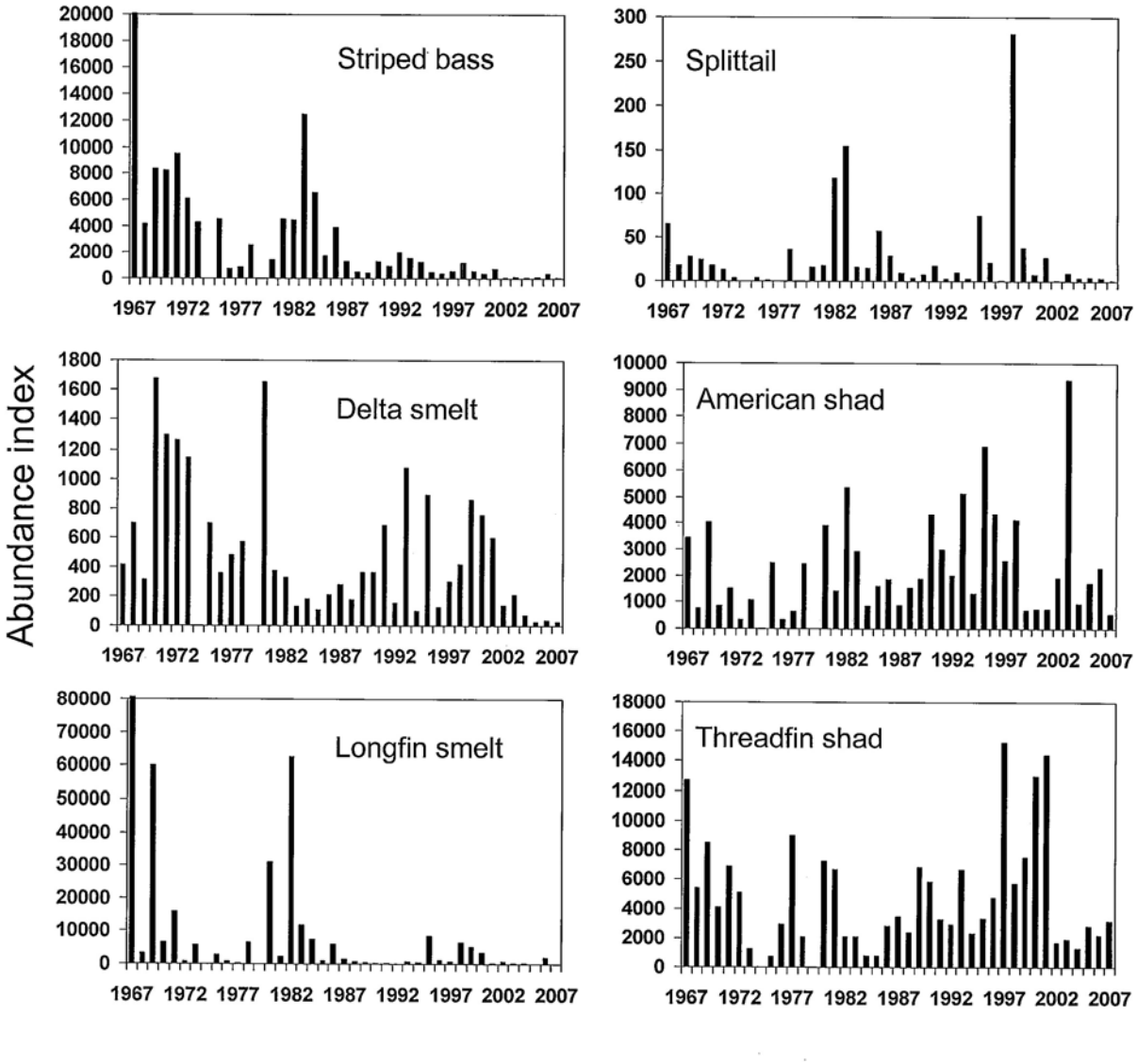


FIGURE 2-3
Abundance of Key Fish Species in Delta, 1967-2007
Several major fish species have declined in the last 40 years. (Source: DWR 2008)

In September 2007, the CALFED Independent Science Board recommended that planning for critical Delta facilities and services anticipate a 55-inch rise in sea by the year 2100. This considers more recent scientific information than was available when the California Climate Action Team Report estimated a 12-inch to 36-inch increase in 2006.

How the Delta ecosystem will respond to revitalization efforts cannot be predicted with precision. Final outcomes are further clouded by the impact of climate change, sea level rise, population growth, and seismic activity. But initial experiences in some recent large-scale restorations, such as in the Yolo Bypass, suggest positive results. The amount and type of restoration ultimately needed can be determined only through a rigorous adaptive management framework overseen by the California Delta Ecosystem and Water Council (CDEW Council). See Strategy 7.1.

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

All restoration and associated scientific monitoring and research efforts must follow the new California Delta Ecosystem and Water Plan (CDEW Plan) created by the proposed Council. The Delta Science and Engineering Board must review and approve design, research, and monitoring programs for consistency with these plans. Any restoration efforts implemented prior to enactment of the new CDEW Plan shall be reviewed by the CALFED Science Program and the Ecosystem Restoration Program (ERP) Implementing Agencies[1] for consistency with the ERP's Draft Stage 2 Conservation Strategy and existing monitoring and research priorities and science as described in the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) Delta Conceptual Models.

Studies and restoration work would be carried out by the proposed Delta Conservancy, described in Goal 7, and the California Department of Fish and Game (DFG), the U.S. Fish and Wildlife Service (USFWS), the Department of Water Resources (DWR), the U.S. Bureau of Reclamation (Reclamation), the proposed Delta Engineering and Science Board, and other scientific research organizations, non-governmental organizations, and private entities engaged in restoration. See Strategy 7.1.

1. Includes the California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service.

The key elements of this strategy are:

Action 3.1.1: Increase the frequency of floodplain inundation and establish new floodplains.

Floodplains provide ecosystem benefits (see Figure 2-4), as well as flood management benefits, and improve levee protections downstream by reducing peak flood stages. Expanding floodplains also may allow upstream reservoirs to be managed more flexibly, which could increase water supply yield. See Strategy 5.2.

The floodplains of the San Joaquin and Mokelumne River are threatened by urbanization that would put people at risk and severely limit restoration opportunities. The land use controls that the Task Force recommends to address this problem are described in Strategy 6.2.

FIGURE 2-4
Fish Reared in Floodplains versus Channels
Salmon reared in floodplains (right) grow faster and larger than those reared in channels (left). (Source: Jeffres 2007. Cosumnes River field study.)

Examining specific areas of Delta floodplain, the Task Force recommends:

a. Sacramento River/Yolo Bypass: Increase inundation frequency on the Yolo Bypass by 2015 without compromising flood protection. Modify the Fremont Weir and other internal waterway features as needed to allow the Yolo Bypass to 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 two-to-three week intervals during this inundation period. Doing so promotes primary and secondary productivity, splittail spawning, as well as other benefits. Improvements should ease passage impediments at the Fremont Weir, Lisbon Weir, Toe Drain, and other barrier points for adult and juvenile salmon, sturgeon, and splittail. These actions will be balanced with existing fish and wildlife benefits provided in the bypass.

b. Mokelumne River: Establish by 2015 new seasonal floodplains where the Mokelumne River enters the Delta. Place under management or acquire the necessary land and update the Draft North Delta Flood Protection Environmental Impact Report for Staten Island 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 the northern portion of New Hope Tract into the flood corridor.

c. San Joaquin River: Immediately establish one or more lower San Joaquin River floodplain segments above and/or below Vernalis and along upper Old River. Identify suitable lands by examining San Joaquin River and Old River flows and stage, channel flood flow capacity, options for flood bypass configurations, and land surface elevations needed to provide both seasonal floodplain habitat and flood protection, and ability to achieve multi-functional land uses, including ongoing agriculture.

d. Upstream Floodplains: Investigate, and implement by 2015 where feasible, additional floodplain habitat along all rivers and streams entering the Delta capable of supporting salmonid rearing and splittail reproduction. Identify suitable lands in the context of available flows, channel carrying capacity, and land surface elevations needed to provide seasonal floodplain habitat and flood protection.

Action 3.1.2: Restore tidal habitats and protect adjacent grasslands and farmlands throughout the Delta, with active near-term pursuit of restoration targets.

a. Restore intertidal marsh. The amount of tidal marsh restoration for the Delta and Suisun Marsh has been estimated by previous studies and re-examined by the Task Force. Various conclusions have been made about how much tidal marsh restoration is needed for the Delta and Suisun Marsh. The 2000 CALFED Record of Decision and the Suisun Marsh Plan currently under development call for restoration of 7,000 to 9,000 acres in Suisun. The 1999 Suisun Marsh Habitat Goals Report suggested 17,000 to 22,000 acres. The 2006 Central Valley Joint Venture Habitat Management Plan said 23,000 acres could be restored without adversely affecting target waterfowl populations. The Task Force recommends a near-term and longer term approach with the following components:

i. Restore, in the near term, approximately 15,000 acres of intertidal marsh in the Delta by 2020. Give priority to locations with the greatest anticipated benefit to the ecosystem and the highest feasibility for successful restoration.

ii. Restore up to an additional 15,000 acres of intertidal marsh in the Delta by 2040. If adaptive management monitoring indicates prior restoration and other activities have not yet accomplished ecosystem goals, restore as much remaining land of suitable elevation as possible by 2060.

iii. Restore 12,500 acres of intertidal marsh, approximately 20 to 25 percent of the diked lands, in Suisun Marsh by 2020.

iv. Restore another 12,500 acres of intertidal marsh in Suisun Marsh by 2040. Add more acreage as lands become available, if adaptive management monitoring indicates prior restoration and other activities have not yet accomplished ecosystem goals.

b. Restore tidal open water areas, if new studies show it to be effective. Large, open water areas with broad tidal connectivity to Delta waterways have the potential to provide pelagic habitats important for several fish and diving duck species, and to provide desirable food web productivity. However, it is also important to ensure that such areas do not become dominated by harmful invasive species of fish or vegetation.

i. Complete studies by 2015 to address harmful invasive species interference. The CALFED Science Program and ERP agencies are examining the most effective strategies for restoring tidal open water bays in the Delta to increase diatom-based productivity and minimize the adverse effects of harmful invasive plants, fish, and invertebrates on native fish.

ii. Restore sufficient acres to achieve 20,000 total acres of tidal open water habitats in the Delta by 2020. Restoration locations should achieve fall open water conditions in which the temperature below critical thresholds and the salinity is of 0.5 to 6 parts per thousand to support rearing habitat for resident native fish. Achieving this quantity of open water habitat requires a mix of physical habitat restoration and providing appropriate flows.

iii. Restore an additional 15,000 acres of Delta tidal open water habitats by 2040, if viable.

c. Protect and enhance grasslands, farmlands, and seasonal wetlands to improve ecosystem functioning today and allow for sustainable intertidal communities even with projected future sea levels.

The Delta is home to bird populations of international importance, and to populations of mammals and other land-based species that require conservation attention. These animals rely upon grasslands, streamside forests, and farmlands, as well as marshlands, to survive. Any effort to revitalize the Delta ecosystem must protect and enhance these lands in order to increase populations of key bird and other terrestrial animal species.

Grasslands next to tidal habitats are especially important. They support desirable species that need both water and land-based habitats. If connected in corridors, they can also allow migration of species between marsh habitats.

Tidal habitats will also move as sea level rises. At current sea levels, certain areas of land are within the elevation band that the tides can wash over (approximately -3 to +3 feet elevation, relative to sea level), making them eligible for tidal marsh restoration. As the sea level rises, more lands will fall within this elevation band and other areas will fall below it.

These new areas will be just uphill from the existing tidal elevations, on what is currently grassland and farmland. In order to allow this necessary movement of tidal marshes as sea level rises, these lands need to be kept in a land use that will permit eventual conversion into tidal marsh decades from now.

The CDEW Council, the Delta Protection Commission, and the Delta Conservancy described in Strategy 7.1 should carry out the following:

i. Develop a model land-use protection ordinance for protecting sea level rise buffer lands by 2010. The model ordinance should provide cities and counties located around the Delta margins with language for protecting these lands. The specific language should clearly indicate that only land uses incompatible with future ecosystem landward shifts should be precluded. Many current land uses, including most forms of agriculture, are generally compatible with this protection.

ii. Acquire land ownership, easements, purchase options, or management agreements in areas adjacent to the highest priority ecosystem restoration areas by 2020. Land uses compatible with long-term open space buffer protection, such as farming, can continue on these properties. Acquire land ownership, easements, purchase options, or management agreements in areas adjacent to lower priority restoration areas by 2040.

iii. Acquire land ownership, easements, purchase options, or management agreements on other grasslands, riparian forestlands, and farmlands of conservation importance by 2020. Land uses compatible with the needs of identified species can continue on these properties.

iv. Support wildlife-friendly agriculture practices on Delta farmlands that are of conservation importance. See Strategy 2.2.

d. General principles applicable to all types of restoration:

- Establish wetlands before restoring tidal action in order to reverse subsidence where feasible. Consider marketing carbon sequestration credits for these subsidence-reversal efforts to assist with offsetting restoration implementation costs.
- Initiate a comprehensive land and easement acquisition program to make suitable lands available for restoration. For lands targeted for later restoration, use either

lease-back approaches or easements with purchase options that allow existing land uses to continue until restoration.

- Include large blocks of variable land to support restoration of diverse ecosystem complexes. Such lands can only be found around the perimeter of the Delta. The deeply subsided interior Delta does not contain the same variability.

e. Restoration areas and restoration priorities.

In determining where the best restoration opportunities are, a suite of criteria should be applied:

Opportunity Criteria

1. Topography. The elevation of land relative to the tides and rivers is the fundamental criterion for restoration. Tidal marsh must be within modern ranges of the tides. Accommodating future sea level rise must occur in those elevations immediately above current intertidal zones. Shallow open water occurs at elevations below low tide, with target depth dictating how far below low tide is appropriate. Floodplains, by nature, are above modern tide elevations and suitable elevations depend strongly on how high rivers can rise during large flow events.

2. Topographic variability and habitat complexity. Variability in elevations, within the desired ranges, supports the ability to establish interconnected complexes of multiple habitat types.

3. Size and shape to support branching or dendritic channel networks in tidal marshes. Branching channel networks that are self-maintaining require a minimum drainage area as well as restoration parcels that are not too "long and narrow" to allow branching to occur. Defining the minimum size is not possible for the Delta at this time because there are no historical examples or adequate maps available to assess the relationship between marsh size and channel network geometry. DFG has recently begun investigations into historical accounts that may yield some insight.

4. Length of interfaces across habitat types and associated connectivity. Restoration parcels that provide for lengthy interfaces between habitat types, including uplands to wetlands, floodplains to wetlands, and wetlands to open water can—*if connected*—provide a greater exchange of organisms, energy, nutrients, water, and other materials. That, in turn, promotes greater ecosystem functions.

5. Sea level rise accommodation. Delta Vision is using the sea level rise numbers put forward in September 2007 by the CALFED Independent Science Board of 55 inches by 2100. Most of that rise may occur later this century, though there is considerable uncertainty over timing. Restoration sites that can accommodate sea level rise, primarily by allowing a small uphill shift of natural habitats into slightly higher elevations, will provide greater long-term sustainability of ecosystem functions.

6. Known presence of target species and natural communities. Restoration efforts in the near term should focus on locations where the primary species and natural community

targets already occur and have the greatest potential to provide benefits in the shortest time frame possible. As conditions improve throughout the system, restoration should proceed over greater geographic extents.

7. Corridors within complexes. In order to survive, organisms move within and between natural habitats on daily, spring-neap tidal, seasonal, and interannual time scales. Successful movement depends wholly upon availability of corridors for these migrations.

Constraints Criteria

1. Proximity to influence of export pumps. Export pumps exert major influences on water flow directions and velocities in the Delta. Because of export pumps, fish in all life stages as well as the nutrients that support them are subject to entrainment (i.e. likely death) or, at a minimum, the inability to reach necessary habitats. Locating restoration as far from pumps as possible reduces those threats.

2. Position relative to future possible water supply conveyance. Moving water through the Delta to the export pumps affects habitat suitability by changing flow direction and minimizing variability. Restoration should avoid sites close to possible future water conveyance intakes and channels.

3. Proximity to major wastewater inputs. Loadings of nutrients and contaminants from wastewater inputs can adversely affect species, natural communities, and natural habitats. Locating restoration as far from these influences as possible minimizes their effect and maximizes the success of the restoration areas.

4. Proximity to high mercury loadings. Though mercury is widespread in the natural environment, there are some known source areas of high loadings. Locating restoration areas away from these sources reduces the potential for generating and transporting methyl mercury.

5. High land values based on existing use. Restoration of tidal marsh and aquatic habitat necessitates a permanent land use change. Land acquisition is always a significant component of restoration costs. High-value real estate will reduce the amount of restoration area that can be acquired with available funds. Priority should be given to suitable lands owned or controlled by governments or non-profit organizations.

6. Number of parcels per restoration area. Restoration inherently needs to occur in relatively large blocks of land that can utilize natural landforms rather than artificial structures, such as new levees to protect adjacent properties. The more parcels in a restoration area, the more complex and costly the acquisition, planning and restoration process.

7. Infrastructure: This includes roads, rail, pipelines, natural gas fields, and transmission lines. Infrastructure must be protected and accessible for maintenance and repair, or relocated entirely, for restoration to proceed.

8. Proximity to harmful invasive species. One of the greatest perils to ecosystem restoration is harmful invasive species. Invasive species can colonize new habitat and out-compete desired species for food and resources. Invasive species can also prey on targeted species near restoration areas, preventing successful use of the new habitats. Locating restoration areas farthest from known invasive species populations, minimizing the suitability of new habitats for invasives, and controlling harmful invasive species around and within restoration areas, is essential to success.

TABLE 2-1

Total Area Potentially Available to Reach Ecosystem Targets, by Subregion, Delta and Suisun

This table shows the total acreage of lands potentially available for ecosystem purposes in the Delta and Suisun Marsh by elevation (Criterion 1). It extends outward to the boundary of the legal Delta and Suisun Marsh and excludes the deeply subsided interior Delta and all urban areas. Not all such land can or should actually be used for restoration.

Elevation Category	Restoration Location, Groupings Based on Landform Divisions													Total Acreage
	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 to 5 feet > 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 to 3 feet < MLLW)[a]	-2 to 1		0 to 3								-1 to 2	-1 to 2		
Intermediate Subtidal (3 to 6 feet < MLLW)[a]	-5 to -2		-3 to 0								-4 to -1	-4 to -1		
Deep Subtidal (deeper than 6 feet < MLLW)[a]	< -5		< -3								< -4	< -4		
Area Available to Reach Ecosystem Targets (acres)[b, c, d]														
Upland Area	19,705	TBD	31,619	53	29,512	12,017	4,438	150	5,425	1,690	85,255	3,402	39	**193,305**
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	**94,318**
Tidal Portion														
Intertidal	*42,802*	*0*	*9,491*	*1,553*	*5,454*	*14,503*	*6,906*	*440*	*4,066*	*5,531*	*16,694*	*2,594*	*241*	***110,275***
Shallow Subtidal	*10,826*	*0*	*2,704*	*59*	*593*	*13,391*	*2,782*	*585*	*3,718*	*4,471*	*13,592*	*1,775*	*342*	***54,838***
Intermediate Subtidal	*491*	*0*	*1,930*	*20*	*1,625*	*935*	*2,860*	*862*	*1,492*	*5,737*	*10,047*	*1,576*	*234*	***27,809***
Deep Subtidal	*0*	*0*	*78*	*0*	*1,511*	*18*	*2,704*	*11*	*52*	*1,093*	*5,872*	*1,186*	*107*	***12,632***
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	**205,554**
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**	**2,984**	**1,206**	**493,175**

Prepared for Delta Vision by Stuart Siegel (WWR) with data from Dave Hansen (USBR), 8.20.08 + Twiss edits + Siegel edits 9.2.08.

Notes:
[a] All subtidal areas exclude existing tidal waterways; restoration opportunity areas already exclude the "deep Delta" or deeply subsided islands.
[b] From USBR GIS analysis August 2008.
[c] 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 DEM.
[d] Based on current sea level heights.

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

Enhanced multi-purpose river corridors connected with restored upstream habitat will improve the survival rate of endangered migratory species and popular sport fish. They will also increase recreational opportunities in the Delta and allow more flexible management of upstream reservoirs. Such river corridors are managed to allow easier migration, and where possible are connected to adjacent habitats and have streamside vegetation. In addition, each of the Delta's three major migratory river systems—the Sacramento, San Joaquin, and Mokelumne—should have multiple migratory corridors to allow passage under a broad range of conditions.

Various factors now impair the migration and survival of salmon, steelhead, and sturgeon in the Delta. These barriers can be minimized by:

- Providing sufficient and timely flows to support adult and juvenile fish migrations
- Resolving conflicts between water conveyance and migration patterns
- Establishing multiple migratory corridors for each river system
- Restoring large areas of floodplain and intertidal habitat along those corridors
- Restoring riparian and other emergent vegetation habitats along each corridor in areas away from large restoration areas

Recovery of these fish populations enhances sport fishing and other recreational opportunities along these corridors. In addition, expanded flood conveyance capacity on selected Delta river channels would allow more flexible operation of upstream reservoirs, potentially increasing water supply.

Vision Recommendations Met

3, 9

Performance Measures

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

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 (+)

Miles of habitat maintained with suitable water temperatures, flows, and habitat conditions for spawning and rearing of anadromous species (+)

Implementation will require close coordination and consistency among many parties, including the proposed Delta Conservancy, the Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the Department of Water Resources, and the U.S. Bureau of Reclamation, non-project water users, and others.

For each major river system in the Delta there already exist preferred corridors based on established migratory patterns and the current and future availability of suitable habitat.

As above, flow targets recommended here are based on the best available information and are for interim use until relevant agencies can develop and adopt flow targets through a comprehensive and transparent process. Decision makers must move to sufficient specificity regarding proposed actions to make informed decisions. These recommendations are based on available analyses and can be refined by additional scientific review concurrent with public policy processes.

- *Sacramento River* corridors are: (1) Yolo Bypass—Cache Slough—lower Sacramento River, (2) upper Sacramento River—Steamboat, Sutter, Miner, and lower Cache sloughs—lower Sacramento River, and secondarily (3) Three Mile Slough
- *San Joaquin River* corridors are: (1) mainstem San Joaquin River, (2) Old River, and, secondarily, (3) Middle River
- *Mokelumne River* corridors are (1) North Fork Mokelumne River and (2) South Fork Mokelumne River

In addition to these major river systems, improvements to Marsh Creek and Putah Creek might benefit steelhead populations.

The actions needed to carry out this strategy are:

Action 3.2.1: Improve physical habitats along selected corridors by 2015.

These habitat improvements should be made with the needs of both fish and migratory wildlife in mind. Subject to further analysis in the proposed CDEW Plan, this should involve:

a. Implementing Yolo Bypass floodplain habitat improvements, without reducing flood safety (see Strategy 3.1).

b. Expanding floodplains along the Mokelumne River, upstream of the Delta.

c. Restoring floodplains and tidal marshes at the Delta confluence—including integration with flood protection improvements in the McCormack-Williamson and New Hope Tract area.

d. Restoring floodplain habitats along the San Joaquin River upstream of the Delta, and between Vernalis and Stockton, wherever possible.

e. Restoring intertidal marsh throughout the Cache Slough complex.

f. Integrating lower San Joaquin River floodplain restoration with South Delta tidal marsh restoration after any conflicts with conveyance are reduced.

g. Restoring Prospect Island and other selected islands and tracts.

h. Enhancing and restoring channel margin habitat along:

  i. Key Sacramento River locations, including Sutter Slough, Steamboat Slough, Miner Slough, Cache Slough between Miner Slough and the Sacramento River, and the main stem of the Sacramento River, beginning upstream of Steamboat Slough, then proceeding downstream.

  ii. Both forks of the Mokelumne River and along the San Joaquin River downstream of where it meets the Mokelumne.

  iii. San Joaquin River and Old River with priority applied to migratory paths consistent with conveyance and operations.

  iv. Middle River, if it is not dedicated to conveyance.

  v. Three Mile Slough, unless it is cut off by barriers.

Action 3.2.2: Provide adequate flows at the right times to support fish migrations, and reduce conflicts between conveyance and migration, by 2012.

Subject to further analysis in the proposed CDEW Plan, this should involve:

a. Inundating the Yolo Bypass at least once every two years at levels similar to current inundation (see Strategy 3.4) and altering Sacramento River flows to meet water quality and fish passage flow needs.

b. Reducing adverse flow effects from through-Delta conveyance during migration periods on the Mokelumne River and its tributaries, including potential use of temporary or permanent gates and barriers.

c. Achieving net downstream flow at Jersey Point from February through June, and one or two fall pulse flows at Vernalis, as described in Strategy 3.4. Evaluate the use of temporary barriers at the head of Old River to direct migrating fish toward the best water quality and away from pumps.

d. Closing the Delta Cross Channel during migration periods, especially November through January.

e. Coordinating Mokelumne River corridor improvements with any changes in through-Delta conveyance and the location of an isolated facility.

f. Changing operations of existing gates and barriers, and reconfiguring selected channels, if necessary to keep fish within functional migratory corridors

Action 3.2.3: Immediately use the Central Valley Flood Protection Plan to identify areas of the San Joaquin River within and upstream of the Delta where flood conveyance capacity can be expanded.

Use existing bond funds to begin acquiring title or easement to floodplain lands immediately, especially in areas where urbanization threats are high. See also Strategy 5.2.

Action 3.2.4: Using the National Heritage Area and regional economic development planning efforts, begin immediately to identify ways to encourage recreational investment along the key river corridors.

These investments should be consistent with the improvements described previously. See Strategies 2.1 and 2.3. They should also be consistent with risk reduction Strategy 6.1.

Strategy 3.3: Promote viable, diverse populations of native and valued species by reducing risks of fish kills and harm from invasive species.

Numerous ecological stressors must be reduced to revitalize the Delta estuary. Throughout the Delta's watershed, harmful invasive species and fish kills from improperly designed diversions continue to play havoc with the ecosystem.

Invasive species prey on native species, and outcompete them for food. Fish are killed by both state and federal water pumps, and at other municipal and agricultural diversions within the Delta. The sizes of the diversions relative to the channel from which they are pumped, and the time of year when operations are at highest demand, affect the number of fish killed.

Contaminants are also a stressor on fish and wildlife populations. Actions for reducing contaminant loading in the Delta are described in Strategy 3.5.

The critical actions necessary to implement this strategy are:

Action 3.3.1: Reduce fish kills in Delta pumps by instituting diversion management measures by 2009, implementing near-term conveyance improvements by 2015, and relocating diversions.

See also Strategies 3.4, 3.5, and 5.1.

As these conveyance and diversion improvements are carried out, the following criteria should be used to reduce fish kills:

a. Consolidate diversions and properly size and screen those diversions.

b. Reduce water demand relative to capacity (see Strategies 4.1 and 4.2) to permit greater flexibility in operations away from times of ecological sensitivity.

c. Carefully manage exports during times of greatest sensitivity for resident and migratory fish distribution.

Vision Recommendations Met

1, 3, 9

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 (-)

Ducks sustained at peak wintering abundance in Delta and Suisun Marsh combined (+)

d. Relocate diversion points to areas less likely to kill fish and away from new fish populations and habitat restoration projects.

Action 3.3.2: Control harmful invasive species at existing locations by 2012, and minimize or preclude new introductions and colonization of new restoration areas to non-significant levels.

Possible methods include:

a. Control existing populations by chemical treatment and mechanical removal, or by alteration of the habitat to disfavor unwanted species without harming desired species.

b. Minimize the potential of new invasives—including quagga mussel, zebra mussel, and northern pike—by restoring habitat they are less likely to disturb, such as floodplains, designing fish screens that still work in the presence of freshwater mussels, and strengthening ballast water control.

c. Reduce the likelihood of new invasives through a combination of public education, tougher regulation, and stricter enforcement.

d. Investigate ways to reverse the spread of freshwater invasives, using an adaptive management experiment to reduce Delta outflow in summer or fall of critically dry years.

e. Restore floodplains, elevated side channels, or other habitats that periodically dry out, in order to limit the impact of invasive species on the seasonal use of such areas by desirable species.

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

Freshwater flow conditions in the Delta must change in order to revitalize the ecosystem and the species that live in it. Higher and more variable flows provide new habitat, trigger reproduction and migration, transport nutrients and organisms, and maintain and improve water quality.

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 (+)

Percentage of achievement of the state and federal "doubling goal" for wild, fall run Chinook salmon (+)

Major changes in the Delta's channel geometry over past decades has homogenized flow conditions across seasons and reduced the total water supplied to the ecosystem. Natural flows, which varied by season and annual rainfall, have been altered to serve the purposes of water users throughout the Delta watershed and of water exporters. This has contributed to the spread of non-native organisms and the decline of native species.

Current standards directing flows are mainly contained in the State Water Resources Control Board's (State Board's) Decision 1641 (D-1641), issued in 1999 and revised in 2000. There are complex relationships among these flow standards. Included are flow and operational standards for fish and wildlife measured at eight locations. Salinity water quality standards are measured at five municipal and industrial use locations and eight locations for in-Delta agriculture. Two additional salinity standards focus on fish and wildlife in Suisun Marsh and the San Joaquin River.

Among these standards is the requirement to maintain Delta outflows in February through June, as measured by the location of the two parts-per-thousand salinity threshold known as "X2." This standard receives attention from both scientists and policy makers as it historically has a strong correlation with the abundance and survival of numerous estuary-dependent organisms in the Bay-Delta ecosystem.

The flow and water quality standards of the Water Board's Decision 1641 (D-1641) are increasingly recognized as inadequate. In late 2008, for example, the State Board initiated workshops to provide background information and updates on San Joaquin River flow

objectives, because salmon are declining under current flow standards. Pelagic organisms, including the Delta smelt, are also declining. Some fear extinction of that species.

Flow analyses from the Pelagic Organism Decline work team are being used in legal cases, rule making, and ecosystem planning. Those analyses have recently emphasized the importance of fall flows for Delta smelt,[2] a perspective reflected in other research.[3]

For most species, higher flows affect survival and abundance in multiple ways. Higher flows increase habitat area, increase food supply, and ease fish and nutrient movement within the estuary. Increasing spring inflows and outflows in most years, in particular, will improve floodplain and open water habitat in the Delta and also habitat upstream.

Delta outflows during fall months strongly affect habitat quality for estuary-dependent species, like Delta smelt. Higher fall outflows should follow wet springs. Lower fall outflows should follow dry springs. Under natural conditions, wet winters and springs produced later-season storms and larger snowpack that provided relatively greater outflows in the following summer and fall months. The converse is true for drier winters and springs. Native species have adapted to these conditions.

Modern water supply management has partially disconnected summer and fall flows from prior winter and spring conditions. Fall dam releases, to make room for winter flood storage, have led to above-natural fall flows. These artificial flows provide important low-salinity aquatic habitat. Restoring locations that in the fall would provide suitable low-salinity aquatic habitat without the same high level of fall Delta outflow would be an alternate mechanism to meet ecological needs.

In the late summer and fall of critically dry years—about one year in ten—flow requirements that create more variable conditions should result in salinity intrusions to the Delta and improved carryover storage in upstream reservoirs.

The San Joaquin River is now hydrologically disconnected from the western delta and San Francisco Bay at most times. Reconnecting it will revitalize a number of ecological processes:

- Improved larval survival of delta smelt by ensuring that some smelt spawned in the south delta reach their nursery grounds in the west delta.
- Better migration of salmon smolts by providing migratory cues and reducing stressors along their migratory corridors.

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

2. Baxter, Breuer, et. al. *Pelagic Organism Decline: Synthesis and Conceptual Models for 2007*. IEP Report. 2008. Available at: http://science.calwater.ca.gov/pdf/workshops/POD/IEP_POD_2007_synthesis_report_031408.pdf

3. Feyrer, F., M. Nobriga, and T. Sommer. "Multi-decadal trends for three declining fish species: habitat patterns and mechanisms in the San Francisco Estuary, California, U.S.A." *Canadian Journal of Fisheries and Aquatic Sciences*, 64:723-734, 2007.

- Improved spread of zooplankton to fish nursery areas, increasing fish populations.
- Improved delta water quality.

Reconnecting the San Joaquin River can only be achieved through flow management in conjunction with the implementation of other actions including channel reconfiguration, changes in land use, construction of natural habitats to provide resting places for fish and reductions in diversions from the south Delta. See Strategies 3.2, 6.2, 3.1, and 3.3, respectively.

Achieving the flow targets of this strategy can be done through combinations of:

- Releasing more water from storage to improve flow conditions,
- Altering conveyance of water exports to the export pumps, or
- Reducing the amount of water diverted from the Delta ecosystem.

From an ecosystem perspective, flow targets are achieved far more effectively by reducing water diversions through the use of alternate supplies, conservation, increased efficiency, retiring marginal agricultural lands, recycling, desalination, conjunctive use of surface and groundwater supplies, regulatory re-allocation, and market mechanisms.

The critical elements of this strategy include the recommendations below. Additional scientific analyses will be required to support these recommendations and must be completed as policy making moves forward. The flow volumes included here suggest the magnitude of what may be required, based on available science, but must be refined during formal regulation writing.

Action 3.4.1: Charge the Department of Fish and Game with completing recommendations for in-stream flows for the Delta and high priority rivers and streams in the Delta watershed by 2012 and for all major rivers and streams by 2018.

These recommendations are essential if any solutions to the water and ecosystem problems of the Delta and California are to be achieved. DFG must receive additional funds to complete these analyses with highest priority given to analyses in the Delta watershed. A report to the Legislature[4] and correspondence to the State Board[5] provide a rationale for additional funding and personnel, but offer differing priority lists of streams or watercourses.

DFG also signed a settlement agreement regarding in-stream flow recommendations on May 30, 2008.[6] The settlement commits DFG to report progress on its analyses to the State Board. Efforts to seek additional funds for in-stream flow analyses are required. However, the settlement requires “To the extent funds are available, the Department will begin one flow study in 2008. The Department will transmit to the State Board at least one flow

4. DFG. Supplemental Report of the 2007-08 Budget Act. January 10, 2008.

5. Letter from Carl Wilcox, Chief, Water Branch, DFG, to Vicky Whitney, Deputy Director, Division Water Rights, SWRCB, August 12, 2008.

6. *California Coastkeeper Alliance v. McCamman*, (Super. Ct. Sacramento County, 2007, No. 07-CS-01353, Notice of Final Settlement and Diismissal, May 30, 2008).

recommendation within the four year term of this agreement, subject to available funds, starting in 2010, the Department will complete and transmit to the State Board, one flow recommendation per year on average." More flow analysis is required for sound policy making.

Action 3.4.2: Develop and adopt management policies supporting increased diversion during wet periods, a joint effort of the State Water Resources Control Board, the Department of Fish and Game, the Department of Water Resources, and related federal agencies, to be completed by 2012.

Available science suggests these policies should include the following:

a. Avoid immediate high flow diversions. Fish use change in flows or associated turbidity to initiate movement.

b. Allow flows upstream of the Delta during early-season high flow events. Fish benefit greatly from these early-season flows.

c. Operate diversions during daylight hours to the extent possible. Fish migrate mostly at night.

d. Provide higher flows than necessary to meet current regulatory requirements, at least at critical times, as these larger flows provide significant ecological benefits.

Action 3.4.3: Adopt new State Water Resources Control Board requirements by 2012 to increase spring Delta outflow. Commence implementation no later than 2015.

The Board should revise the Bay-Delta Water Quality Control Plan to include new spring Delta outflow objectives by 2012.

Under the new requirements, the largest percentage flow increases will occur in dry and "average" years, while wet years generally will require no increase. These variable percentage increases allow greater water supply diversions during wet winter and spring periods. Even shifting diversions to wet periods, it is important to remember that the magnitude and duration of very high flow events are important ecologically. In the past, these flows were not captured or diverted due to limited storage and conveyance capacity. Improved storage and conveyance capacity offer increased opportunity for reliable water supply while improving ecosystem function.

Action 3.4.4: Adopt new State Water Resources Control Board requirements by 2012 to reintroduce fall outflow variability no later than 2015.

Prior to 2000, there was more habitat for smelt and striped bass after wetter springs. After 2000, fall habitat quantity and quality has been consistently at levels previously only seen during drought years. This decline in fall habitat is an important predictor of reproductive success of delta smelt and, in some years, seems to have exacerbated the impact of other stressors on the Delta. Inflows to the Delta are largely unchanged over the last 30 years, but

the export of upstream releases has greatly increased to the point where flows no longer support large areas of estuary habitat.

For the short term, the State Board should revise the Bay-Delta Water Quality Control Plan to require fall outflows to provide habitat equivalent to the pre-2000 period. Appropriate fall flow standards should be set by the State Board. Among the proposed recommendations from some scientists are that in the fall following a below-normal, above-normal, and wet year, the flow requirements should provide two months, between August and November, in which Delta outflows are between 1.5 to three times those during the 1990s.

Action 3.4.5: Increase San Joaquin River flows between February and June by revising the State Water Resources Control Board's Vernalis flow objectives and the state and federal water projects' export criteria. Revise flow objectives and criteria no later than 2012 and commence implementation as soon as possible thereafter.

The San Joaquin River is hydrologically disconnected from the western Delta and San Francisco Bay at most times. Reconnecting it will revitalize a number of ecological processes, including:

- Improving larval survival of delta smelt by ensuring that some smelt spawned in the south Delta have access to their nursery grounds in the west Delta;
- Better outmigration of San Joaquin Rover salmon smolts by providing migratory cues and reduced stressors along their migratory corridors;
- Improved productivity by facilitating the spread of zooplankton productivity that is at times concentrated in the San Joaquin River near Stockton downstream to fish nursery areas;
- Improving Delta water quality.

Achieving these spring flows will require some combination of diversion or export modifications and San Joaquin River inflow increases in the spring. Further efforts are required to develop effective approaches and evaluate their effects on water supply and other ecosystem functions.

Action 3.4.6: Provide short-duration San Joaquin River pulse flows in the fall starting by 2015.

These pulse flows provide migration cues to fall-run salmon and help improve south Delta water quality. Scientists conclude that pulse flows are needed between September and November. DFG should provide advice to the State Board upon which to establish appropriate pulse flows. As examples, some scientists recommend that one or two pulse flows should last seven to fourteen days, and be in the range of 2,000 to 3,000 cubic feet per second discharge at Vernalis.

Action 3.4.7: Reconfigure Delta waterway geometry by 2015 to increase variability in estuarine circulation patterns.

These reconfigurations should be planned in conjunction with near-term and long-term conveyance modifications. These reconfigurations will include installing removable or operable flow barriers, especially in channels of the south Delta, so that channel lengths are greater than tidal excursion distances. These modifications should allow for continued navigation.

Reconfiguring portions of Delta channel geometry to restore variability to transport improves ecosystem function. Humans have constructed numerous "connecting" waterways throughout the Delta for shipping and water supply conveyance. Connecting what were naturally disconnected waterways has radically altered flow geometry and homogenized the aquatic environment, adversely affecting fish, their food resources, and water quality. Native species evolved under natural heterogeneous water conditions—a likely cause of their decline is the modern homogeneity of the Delta's remaining aquatic environments.

Strategy 3.5: Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.

Goal 3 must be achieved while also meeting the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California. That means water quality must be appropriate not only for the ecosystem, but also sufficient to support drinking and irrigation water needs.

Contaminants such as agricultural pesticides and nutrient loads, municipal wastewater discharges and chemicals can contribute to the death of fish and the organisms they feed on. This recommended strategy uses a combination of source control, which benefits many downstream uses, and relocation of intakes, to reduce the amount of harmful pollutants and improve water quality in the Delta.

The Central Valley Regional Water Quality Control Board (Central Valley Regional Board) has assembled water quality information on the numerous rivers, streams, and drains that flow into the Delta. Many have had historical contamination problems. Virtually all have current contamination

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 (-)

Toxicity to aquatic life using standard species and methods (-)

problems which threaten the Delta. The main pollutant contributors are old mining operations (mercury and other heavy metals), agriculture (pesticides, herbicides, nutrients), urban and stormwater discharges (pathogens), wastewater treatment plant discharges (ammonia, pathogens) toxicity from unknown sources, or a combination of causes (dissolved oxygen).

Performance Measures (continued)

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 (-)
Percentage of time that contaminants or their precursors meet, or are better than, water quality targets (+)

The Central Valley Regional Board has taken more than 7,000 enforcement actions since 1990 to address these contamination sources. Virtually all of these actions involve rivers and streams directly feeding into the Delta.

However, in spite of this enforcement history, pollution pressures continue. Many rural, low-income areas are impacted, raising potential environmental justice concerns. At the same time, the burden of regulatory compliance can also fall on low-income residents in the form of high utility costs and lost jobs. Working through these issues requires additional attention.

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

Relocating intake facilities or modifying the movement of water to draw more of it from flowing Delta channels improves the quality of drinking water and agricultural export supplies—and reduces adverse ecosystem impacts. For example, relocating the current south Delta state and federal intakes to the Sacramento River near Hood would reduce bromide in exported water to approximately five percent of current levels and would reduce the take of Delta smelt.

Changes to Delta conveyance systems and the effects of climate change will impact the reliability and water quality for those with intakes located within the Delta. Investing in additional alternative intakes for these users can provide further flexibility in helping change the pattern of diversions to times and locations least harmful to the environment.

Action 3.5.1: Require the Central Valley Regional Water Quality Control Board to conduct three actions:

a. Immediately re-evaluate wastewater treatment plant discharges into Delta waterways and upstream rivers, and set discharge requirements at levels that are fully protective of human health and ecosystem needs. This process should involve formal consultation with the California Department of Public Health.

b. Adopt by 2010 a long-term program to regulate discharges from irrigated agricultural lands.

c. Review by 2012 the impacts of urban runoff on Delta water quality and adopt a plan to reduce or eliminate those impacts.

Action 3.5.2: Relocate as many Delta drinking water intakes as feasible away from sensitive habitats and to channels where water quality is higher.

In the near term, the North Bay Aqueduct and the Contra Costa Water District intakes should be relocated, with state and federal south Delta intakes relocated upon completion of the current environmental planning processes. The cost of these actions should be borne by the beneficiaries.

Action 3.5.3: Establish Total Maximum Daily Load programs by 2012 for upstream areas to reduce organic and inorganic mercury entering the Delta from tributary watersheds.

The mercury program for the Delta itself should continue and other Total Maximum Daily Load programs should be developed to meet known and future needs.

Action 3.5.4: Begin comprehensive monitoring of water quality and Delta fish and wildlife health in 2009.

As part of its governance authority, the proposed CDEW Council should build on the recent work of the U.S. Environmental Protection Agency, the CALFED Science Program, and the State Board and Regional Water Quality Control Boards (Regional Boards) to develop a comprehensive monitoring program for fish and wildlife health in the Delta. In particular, these programs should make a concerted effort to study the overall health effects of the mixture of contaminants that cumulatively impact Delta species, as opposed to examining contaminant-species relationships individually.

In addition, the State Board and Regional Boards should initiate development of an integrated regional water quality monitoring program for the Delta in 2009. They should

develop a plan for comprehensively gathering, evaluating, and reporting contaminants and toxicity data currently being collected by the Regional Boards and other agencies by 2010.

Goal 4: Promote statewide water conservation, efficiency, and sustainable use

Strategy 4.1: Reduce urban, residential, industrial, and agricultural water demand through improved water use efficiency and conservation starting by achieving a statewide 20 percent per capita reduction in water use by 2020.

Paramount to the success of this Strategic Plan is a major shift over the next half-century in water use expectations and behaviors of California's communities and farming economies. Water must be used more efficiently in cities and towns, and to produce the crops that feed the state, nation, and world.

Vision Recommendations Met

1, 4, 6

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 (-)

Over the last decade, some regions of California have improved water use efficiency, but the state needs to do better. Many of California's communities have implemented more efficient water use technologies, leading to some reductions in per capita use, particularly in coastal cities. However, while some urban regions have improved, others have lagged.

Governor Schwarzenegger has already established a target of reducing California's per capita water use by 20 percent by 2020, and directed state agencies to develop aggressive conservation plans to achieve this target. Even if this target is achieved, current trends indicate that population growth will overtake these conservation gains by 2030. Water saving devices and better water management practices can have an immediate effect on today's demand, but including a conservation ethic in planning for future residents—whose demand has yet to occur—is just as important.

Many water districts around the state have made vigorous efforts to improve indoor water use efficiency in recent years. The success of these programs means that it is now outdoor landscape irrigation, which has the greatest potential for conservation and efficiency improvements in the urban sector.

In agriculture, opportunities to improve water use efficiency exist, but increased efficiencies often do not result in water savings that can be applied to other purposes. For most farming operations within the Delta watershed, diversions are made from surface water or

groundwater to provide for irrigation demands. Water not used by crops generally returns to groundwater or surface water—though it is commonly of degraded quality. Throughout California, more closely matching applied water volume with crop requirements can result in real water savings. Over the past decade, increased delivery costs and less reliable water supplies have led to adoption of strategies for more efficient water use, but more can still be done.

Along with establishing conservation goals, planning how conserved water will be used must play a critical role in state water management. The California Water Plan currently uses scenario planning and analysis to understand the implications of water policy, but more rigorous analysis is needed. The Water Plan Update 2005 projects that total agricultural water use will decrease in the future under all scenarios as a result of reduced irrigated acreage and crop shifts,[7] and planning now underway assumes that growing populations will be able to use the excess supply. Current evidence suggests that total agricultural use is not decreasing, however, and agriculture policies being developed assume continued or increased supplies of water. These policies are not sustainable given the expected population growth and ecosystem needs.

The state must plan the future of water use in California and the Delta ecosystem with the public trust in mind. Over the long-term, water prices for all uses will move closer together. The large price differentials between urban and agricultural uses will be socially and politically difficult to maintain. Water exchanges will tend to equalize prices, and definitions of reasonable use can be expected to require ever more efficient use.

The three critical elements of this strategy include improving overall water use efficiency and conservation statewide, reducing urban per-capita water demand, and ensuring the most efficient use of water for irrigation:

Action 4.1.1: Improve statewide water use efficiency and conservation.

a. Enact legislation to require urban and agricultural water agencies to adopt more aggressive tiered pricing and related mechanisms.

b. Reward entities that have successfully completed Urban and Agricultural Water Management Plans through state grants and loans from the Department of Water Resources (DWR) or the State Board.

c. Continue DWR's support for the California Urban Water Conservation Council and the Agricultural Water Management Council. These organizations provide leadership in water use efficiency and are preferable to regulatory action.

d. Encourage the use of basin water planning for both surface and groundwater.

e. Request DWR and the State Board to sharply increase public educational messaging and promote widespread adoption of aggressive water conservation throughout the state through market measures.

7. Groves, Matyac, and Hawkins. "Quantified Scenarios of 2030 California Water Demand." Prepared for the *California Water Plan Update 2005*.

f. Request DWR and the State Board to consider a mandatory water "loading order" that would make conservation and efficiency improvements the investments of first resort, even as other supply augmentation activities are undertaken.

Action 4.1.2: Reduce urban per-capita water demand through specific recommended actions.

a. Enact legislation as requested by the governor requiring urban water purveyors to implement measures to achieve a 20 percent reduction in urban per capita water use throughout California by December 31, 2020. Direct DWR to develop additional regional targets for 2050 that further reduce per capita water use to offset population growth. The baseline for the reduction targets will be the most recent reporting available to DWR as of November 2008.

b. Ensure new developments incorporate all available water use efficiency opportunities. Establish requirements for land use authorities to undertake community-based water conservation and efficiency planning in cooperation with local water purveyors. These requirements should focus particularly on outdoor landscape irrigation, where there is the largest potential for efficiency gains in the urban sector.

Action 4.1.3: Ensure the most efficient use of water in agriculture.

a. Require the State Board and DWR to establish a statewide agricultural water conservation target by 2010. A starting point is the estimated potential for 800,000 acre-feet of agricultural water conservation identified in the 2005 State Water Plan Update.

b. Require Agricultural Water Management Plans be prepared and submitted to DWR every five years starting in 2011. Require these plans from (1) agricultural water districts using more than 3,000 acre-feet of groundwater and/or surface water, and (2) counties who provide the regulatory oversight for individual agricultural groundwater users outside of recognized water districts.[8] The Plans should address projected agricultural water demands, availability of supplies, and implementation of Efficient Water Management Practices. DWR's criteria would embody the analysis currently required by members of the Agricultural Water Management Council (AWMC). Efficient Water Management Practices, developed by DWR and the AWMC, should be treated as the "floor level" of conservation, and updated every 5 years.

c. Request the State Board to use its authority to determine reasonable use of water over the coming decades to evolve away from the generally accepted practices of diverting surface water for irrigated agriculture. Consider climatic and agronomic factors in making these on-going determinations.

8. Agricultural water users not within the boundaries of a designated water supplier (e.g. irrigation district, water company, flood control and water conservation district, etc.) represent approximately 4 million acres of the approximately 9.6 million irrigated acres in the State. Many of these users pump groundwater and could be encouraged to implement efficiency measures.

d. Request the State Board and its regional entities to set goals to effectively manage return flows to surface water and groundwater systems. Incentivize the adoption of irrigation management equipment and techniques and best management practices to comply with the Irrigated Lands Regulatory Program.

Strategy 4.2: Increase reliability through diverse regional water supply portfolios.

Throughout the state, the concept of regional self-sufficiency is being embraced through Integrated Regional Water Management planning. On their own or with the incentive of grant funding, many water districts are banding together to optimize available water supplies, develop new local supplies, and manage demands in a more comprehensive manner. These collaborative planning efforts ensure regions are adequately addressing risks and investing in strategies to cope with an unpredictable future.

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 groundwater 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 (+)

Elevating flexibility—a critical part of regional self-sufficiency—requires a diversified portfolio of water management strategies. See Figures 2-5 and 2-6 for additional information on the potential quantities and costs of major components of these portfolios. Those include:

- New places, either above ground or below, to store supplies locally during periods of surplus
- New facilities to reclaim or desalt otherwise non-potable or poor quality supplies
- Better land uses that control water demands, capture urban storm water, and result in less impact to water quality
- Improved efficiency of existing and future agricultural and urban uses of water

Greater regional water self-sufficiency allows Delta water diversions to reliably ebb and flow in unison with the water needs of the Delta ecosystem.

Success of the Strategic Plan requires more diversified regional water supply portfolios.[9] The critical elements of those portfolios include water recycling, desalination, stormwater infiltration, diversion data collection and reporting, and a regulatory framework that ensures integrated water resources management.

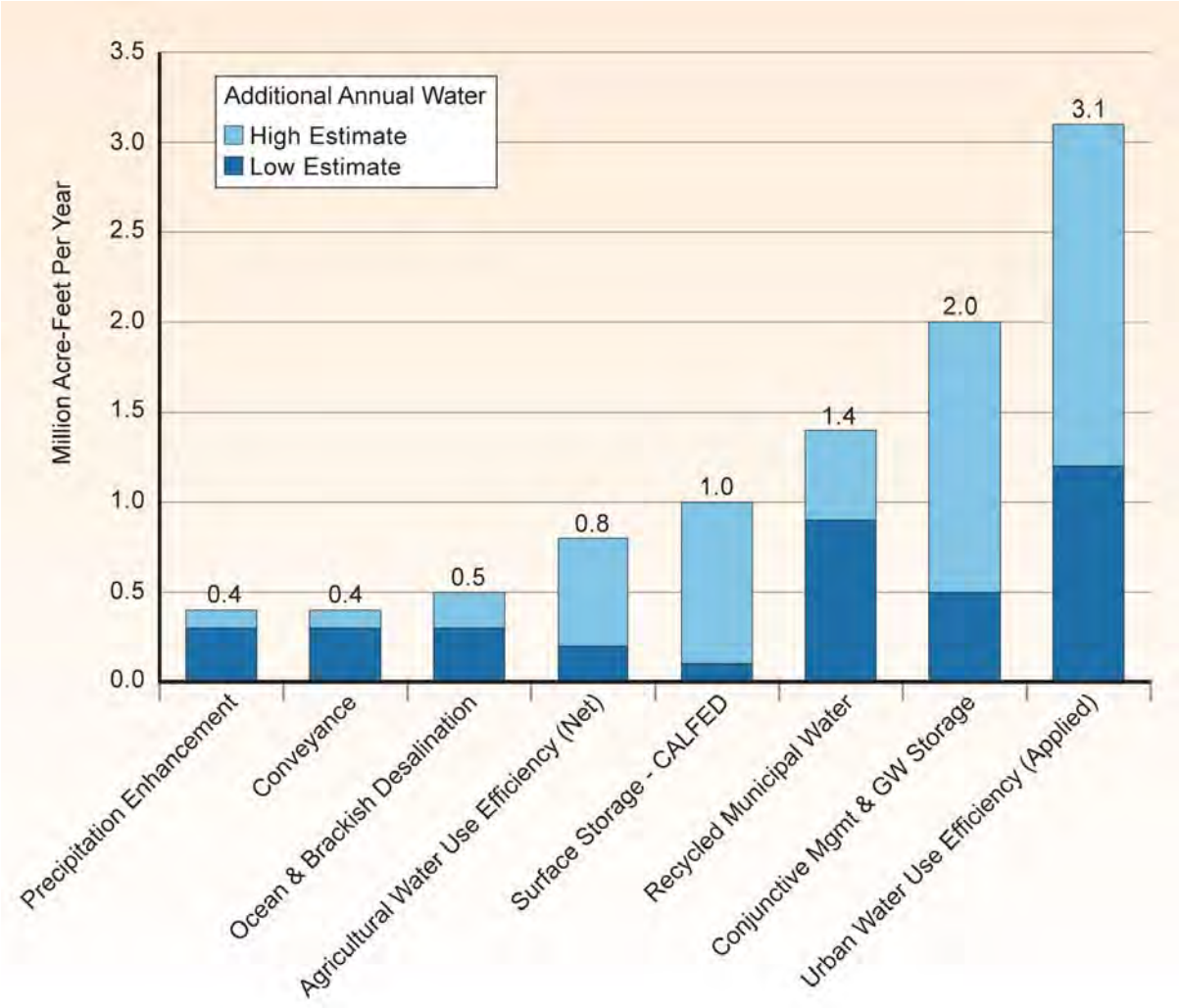
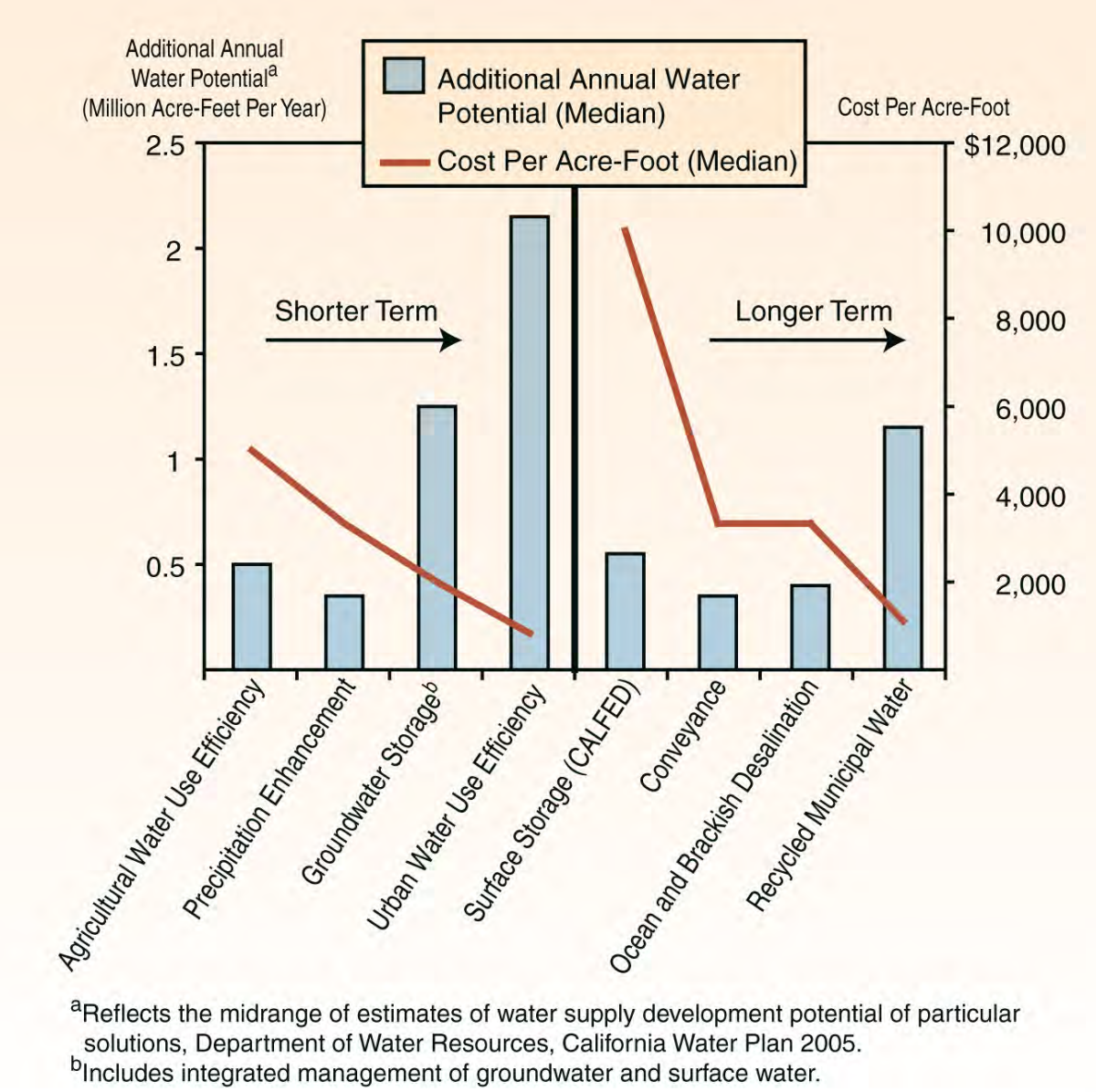


FIGURE 2-5
Strategies to Reduce Water Demand or Increase Supplies
The Department of Water Resources has identified several promising strategies to diversify water portfolios. (Source: DWR 2005)

9. 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.



[a]Reflects the midrange of estimates of water supply development potential of particular solutions, Department of Water Resources, California Water Plan 2005.
[b]Includes integrated management of groundwater and surface water.

FIGURE 2-6
Options for Additional Water Supply
The same water supply portfolio elements depicted in Figure 2-5, organized by estimated costs. (Source: LAO 2008)

Action 4.2.1: Modify the Water Recycling Act of 1991 to add a statewide target to recycle on the order of 1.5 million acre-feet of water annually by 2020.[10]

Ways to reach this goal include:

a. Encouraging local and regional land use and water management entities to require dual plumbing when and where appropriate.

b. Addressing issues associated with seasonal storage.

c. Harmonizing State and regional permitting requirements.

d. Modifying land use planning practices.

e. Funding public educational efforts on the value of recycled water.

f. Significantly increasing state funding for grant and loan programs.

Action 4.2.2: Enact legislation now to encourage local water agencies to at least triple the current statewide capacity for generating new water supplies through ocean and brackish water desalination by 2020.[11]

California should continue to promote research of coastal and brackish water desalination projects that use renewable energy or participate in carbon offset programs.

Action 4.2.3: Request that the State Board set goals by 2015 for infiltration and direct use of urban storm water runoff throughout the Delta watershed and its export areas.

Link achieving these goals with access to state grant and loan programs. Require local governments to adopt the best management practices necessary to achieve these goals in both their land use planning and decision making. The goals should also address water quality degradation that could occur with urban stormwater recharge projects.

Action 4.2.4: Request agencies to ensure that accurate and timely information is collected and reported on all surface water and groundwater diversions in California by 2012.

To accomplish this aim:

a. Repeal all State Board reporting exemptions for surface water diversions, and create new information systems to collect information on groundwater uses and report that data to the State Board. Data should be collected by expanding the Department of Water

10. 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.

11. 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.

Resources' (DWR's) groundwater monitoring networks and reporting by local and regional entities associated with Urban Water Management Plans and Groundwater Management Plans.

b. Use state grants and loans as well as water transfer approvals from DWR or the State Board to reward entities that are providing all necessary reporting data to the state.

Action 4.2.5: Require that all water purveyors develop an integrated contingency plan by 2015 in case of Delta water supply curtailments or drought.

Include a schedule of reductions from (a) drought conditions which reduce a purveyor's water supply by 40 percent for two years, and (b) a one-year loss of all surface water imports from the Delta. These plans, similar to one recently developed by the Metropolitan Water District of Southern California, should be developed with guidance from DWR and incorporated into Urban Water Management Plans submitted for 2015.

Action 4.2.6: Establish a regulatory framework that encourages efficient and integrated management of water resources at local, regional, and statewide levels, with a focus on specific actions.

a. Enact legislation to facilitate and encourage groundwater banking, extraction, and delivery facilities, and protect groundwater recharge areas. Measures should address immediate revisions of State and federal place-of-use restrictions, adoption of statewide guidelines addressing injection permitting, and continuation of successful DWR and State Board grant and loan programs. Require land use plans to protect groundwater recharge areas.

b. Request local governments to enact standards and provide incentive programs for low-water use landscaping. Examples include "cash for grass" programs that pay homeowners to reduce landscape watering like those introduced in Santa Ana, Marin County, and other localities.

c. Request that DWR and the State Board form an interagency team to facilitate transfers between existing water buyers and sellers. These policies must not reduce or abrogate the constitutional provision that all waters are the interest of the people of California and should be used to promote the public welfare. Concepts to be promoted include rotational fallowing as a mechanism to assure reinvestments of transfer funds into local agricultural economies and pre-approval of some transfers to create an "option" pool in case of emergencies.

d. Permit agencies to test new market mechanisms to provide water users and ecosystem managers with better tools to cooperatively and adaptively manage in-stream flows and diversions.

Goal 5: Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals

Strategy 5.1: Expand options for water conveyance, storage, and improved reservoir operations.

Achieving the co-equal goals requires a strategy that expands conveyance and storage options statewide and builds facilities that move water through and around the Delta.

Vision Recommendations Met

1, 7, 8

The current conveyance and storage system places the co-equal values in direct conflict because there is little flexibility in the timing or location of water flows through the Delta. The more choices there are in when and how to move water, the greater ability California will have to meet the flow needs of the Delta ecosystem and to achieve water supply reliability.

Performance Measures

Achievement of new conveyance and storage system to support the co-equal goals (+)

Annual probability of a catastrophic interruption of Delta conveyance system (-)

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

Flexibility is also essential to discover what those needs are. Ultimately, only real-world adaptive management and rigorous monitoring will provide the answers to achieve the co-equal goals.

New water conveyance also should reduce the impacts of water exports on Delta fish. The current conveyance system kills large numbers of fish in the south Delta export pumps because fresh water must be drawn across the Delta by powerful pumping action. Alternative intake locations would reduce those effects.

To achieve these benefits, the Task Force proposes a dual conveyance facility using a combination of through-Delta and isolated facility improvements. This strategy recognizes the need to maintain flows through the Delta for water supply and ecosystem health, while also accounting for future risks to statewide water supply, such as earthquakes or floods. A dual conveyance system offers extra insurance against such disasters by creating an additional path for water conveyance. Design studies and investments in these facilities should be completed as quickly as is feasible, given the urgency of the need to improve the Delta ecosystem.

Unlike some other analyses of Delta conveyance, Delta Vision's charge has been to consider the full range of potential impacts of conveyance choices, and to consider the necessary linkage between conveyance and storage. In particular, the future conveyance and storage system must be able to support a healthy regional economy in the Delta, as well as sustain the Delta's unique cultural heritage.

New conveyance alone is not enough. Storage must be increased and smarter operation of existing reservoirs implemented, to improve reliability for water users and reduce risk to the environment. If flow managers are to have the flexibility to move water through or around the Delta at appropriate times, there must be places for the water to be stored until it is needed. This applies both to upstream locations (from which water could be released to increase Delta inflow), and to locations downstream of export diversions (from which users could access it directly).

Issues of water reliability and sustainability must be considered in the context of future changes in the Delta from climate change and, potentially, seismic disruptions. Climate change will cause the sea level to rise and alter the amount and timing of snowmelt, leading to changes in storage and surface water flows. The potential for seismic events affecting the Delta will increase.[12] While none of these events are certain, not considering the possibilities in Delta planning would be foolish.

Any new water conveyance must allow flexibility in the timing and quantities of diversions to shift away from periods with highest impacts on Delta and upstream ecology while still providing predictable and acceptable volumes of quality water for diverted uses. In order to do this, it will be necessary for the California Delta Ecosystem and Water (CDEW) Council to establish clear and enforceable criteria and constraints for Delta water operations.

The Task Force's Vision called for dual conveyance of water supplies through and around the Delta as the "preferred direction"; however, the Task Force has concluded that much more analysis of sizing combinations, impacts, and costs of either an improved through-Delta channel or an isolated channel are needed to finalize any decision regarding conveyance that meets the co-equal goals. Based on the information at hand, the Task Force believes dual conveyance is the best option to restore Delta ecosystem and create a reliable water delivery system. However, the Task Force's work will be completed before studies confirm the feasibility of dual conveyance.

This Strategic Plan proposes:

- Investigation of a dual conveyance facility to meet the reliability goals for those dependent on Delta water and to improve the Delta ecosystem.
- Design and construction of new facilities for storage and conveyance—and changes in operation of existing facilities—to improve water supply reliability statewide.

The detailed elements of this strategy are:

12. DWR. Delta Risk Management Strategy Draft Phase 1 Report. 2007.

Action 5.1.1: Direct the Department of Water Resources and other allied agencies to further investigate the feasibility of a dual conveyance facility, building upon the Bay-Delta Conservation Plan effort.

The following specific elements should be addressed to gauge the feasibility and design of the Task Force's conditional dual conveyance recommendation.

a. Directly assess alternative choices and design configurations by how well they serve the co-equal goals.

b. Analyze, in concert with the Department of Fish and Game (DFG), a full range of through-Delta flows and isolated facility flows on in-Delta ecological processes and functions. Quantify thresholds for water required in the Delta (in volume, timing, and quality at various locations) for effective functioning of the estuarine ecosystem under different conditions.

c. Incorporate anticipated levels of usage of available ground and surface storage, including possible supply increases from changes in system operations.

d. Work with the State Board to determine the expectations on water diversions and comprehensively describe the decision processes and rules that would be used to determine allowable diversions under a range of hydrologic and climatic conditions.

e. Assess, along with DFG, the implications for migratory fish species and upstream rivers.

f. Work with the State Board to determine and incorporate realistic estimates of reliable water transfers.

g. Identify and evaluate improvements to through-Delta conveyance for resiliency and recoverability in the event of catastrophic loss.

h. Incorporate a sea level rise projection of at least 55 inches (by 2100) in facility designs.

i. Evaluate all alternative facilities against a common level of seismic and flood durability.

j. Work with the State Board and regional boards to incorporate water quality objectives in analyses and evaluate the implications of the alternatives.

k. Obtain permits and ground-test a two-barrier Middle River conveyance option through the Delta, as recommended in the Delta Vision Stakeholder Coordination Group Report and modified by the Bay-Delta Conservation Plan.

Action 5.1.2: Direct the Department of Water Resources, the Department of Fish and Game and other allied agencies to recommend the size and location of new storage and conveyance facilities by the end of 2010. Develop a long-term action plan to guide design, construction, and operation, and present the recommendation and plan to the California Delta Ecosystem and Water Council for a consistency determination.

Design decisions should be informed with completion of CALFED surface storage investigations, which require the Legislature and the administration to ensure stable state and federal funding through Fiscal Year 2010.

The roles of the proposed CDEW Council are provided in Strategy 7.1.

Action 5.1.3: Complete substantial development and construction of new surface and groundwater storage and associated conveyance facilities by 2020, with the goal of completing all planned facilities by 2030.

Complete construction, negotiate ownership, and operate significant new state or federal storage facilities—surface and groundwater—through open and public bidding processes.

Manage groundwater storage projects and associated conveyance facilities through regional entities in compliance with local groundwater management planning requirements and applicable ordinances. Strengthen efforts to complement surface diversion and delivery systems with groundwater management to increase flexibility in transfers.

Strategy 5.2: Integrate Central Valley flood management with water supply planning.

The entire Central Valley is directly or indirectly reliant on Delta water. Major multi-purpose reservoirs exist on many of the Delta's tributaries to store surface water supplies, control floods, generate hydroelectricity, and provide recreation. The challenges of flood control and water supply reliability in the Delta are two sides of the same coin. Within a given reservoir, water supply storage and flood control are competing priorities at certain times of the year—more of one means less of the other.

Present management practices focus on maintaining a given capacity in the reservoir at a given time of year. Improved forecasting allows reservoir managers to modernize flood control operations so that more water can be

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 (+)

stored for supply without compromising flood safety. Expanding the flood conveyance capacity downstream of reservoirs also increases management flexibility by allowing more flood water to be released safely from the reservoir if necessary.

Increased infiltration of Delta precipitation 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.

As noted in Strategy 3.1, the preservation and restoration of floodplains has important environmental benefits. This strategy should be carried out in coordination with Strategy 3.1, especially Action 3.1.1, to ensure that these environmental benefits are achieved. In addition, Strategy 2.3 recognizes that on-island floodwater storage may be a viable use of certain Delta islands. Flood management planning should consider this possibility.

Actions needed to accomplish this strategy are:

Action 5.2.1: Change the operating rules of existing reservoirs to incorporate and reflect modern forecasting capabilities.

Modernize by 2012 the flood control operation diagrams for all major California reservoirs for which the U.S. Army Corps of Engineers has prescribed flood control regulations. This modernization should take into account existing technological advances, the hydrologic changes that have occurred since the diagrams were first created, and the hydrologic changes likely to occur because of climate change. It should also account for any planned increases in the flood capacity of downstream rivers. At a minimum, the operations criteria should be based on forecasts—not on existing reservoir storage. The Department of Water Resources and the Bureau of Reclamation should cooperate with the Army Corps on both the update of the operations criteria, manuals, and any environmental impact studies required to accomplish the operational changes.

Action 5.2.2: Require the Department of Water Resources to immediately create a flood bypass along the lower San Joaquin River.

Use existing bond funds to quickly acquire title or easement to floodplain and bypass lands, especially in areas where urbanization threats are high. Identify appropriate sites immediately and protect them by easement or purchase.

Action 5.2.3: Request that the Department of Water Resources encourage greater infiltration as part of watershed management planning.

Specifically, request that DWR immediately incentivize additional infiltration and storage of runoff and floodwater upstream of the Delta using both groundwater and floodplain storage in the Sacramento Valley, San Joaquin Valley, the Tulare Basin, and any opportune sites in the upper watersheds. Work with the U.S. Forest Service to revise its management plans for the National Forests in the Sierra Nevada to encourage greater infiltration. Concurrently, request that DWR study, and if feasible implement by 2012, a plan to convey water from storage reservoirs to groundwater infiltration sites with an eye to expanding the storage and flood control capacities of reservoirs.

Goal 6: Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments

Strategy 6.1: Significantly improve levels of emergency protection for people, assets, and resources.

Vision Recommendations Met

9, 12

Performance Measures

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

Completion of response plans and regular scenario "gaming" and full-scale response drills (+)

The Task Force's Vision recognized that the Delta faces extraordinary risks in both the near term and the long term. Earthquakes, river floods, "sunny-day" levee failures, and continuing subsidence and sea level rise all pose substantial risks to people, property, and infrastructure in the Delta. Emergency response capabilities must be thoroughly assessed and rapidly strengthened.

The protection of human life is a fundamental responsibility of government at all levels. In a disaster-prone area like the Delta, it is imperative that federal, state and local governments—and the citizens themselves—be prepared for a variety of emergency situations, including those in which rapid evacuation or rescue from cold floodwaters are necessary. Emergency response should be routinely tested and practiced to ensure that critical operations can proceed smoothly when needed.

In addition, the most cost-effective strategies for the protection of critical infrastructure systems—including highways—must also be assessed and quickly implemented. Service providers themselves are in the best position to conduct assessment of the long-term risk exposure facing these systems. Highways should be considered separately, since they are directly managed by the state and are essential to any emergency response efforts in the Delta.

These analyses must consider the full range of economic and life safety consequences of service outages, the likelihood of such outages, and the proportionate share of the collective costs and benefits achievable under co-location strategies. The analyses must consider these costs and benefits over a time period commensurate with the expected lifespan of the

infrastructure in question, not the shorter planning horizon typically used in financial or regulatory processes.

These actions achieve emergency protection and preparedness commensurate with the risks the Delta faces:

Action 6.1.1: Complete a Delta-wide regional emergency response plan by 2010 that establishes legally binding regional coordination.

The plan must establish mechanisms for evacuation, animal control, and levee flood fighting, where needed. The plan must incorporate existing organizations and identify where regional coordination or management of common emergency functions would enhance overall response.

a. This collaboration must include the state and local Offices of Emergency Services (OES), the Delta Protection Commission (DPC), the Department of Water Resources (DWR), the Delta counties' Flood Response Group, the U.S. Army Corps of Engineers, the U.S. Department of Defense (DOD), the Federal Emergency Management Agency (FEMA), the U.S. Coast Guard and the Delta's utilities, railroads, reclamation districts and water purveyors, both public and private.

b. The entities with emergency responsibilities in the Delta should conduct periodic exercises together to determine where any regional coordination gaps exist following completion of the regional plan. Periodic scenario simulations that help in identifying gaps in response capabilities should supplement these exercises.

c. The DPC should partner with the emergency response agencies to identify gaps within existing plans and response processes.

d. The plan must establish automatic mechanisms to request mutual aid and protocols for communication among all responders.

Action 6.1.2: Immediately begin a comprehensive series of emergency management and preparation actions.

Include DWR, the state OES, the Delta counties' Flood Response Group, the Army Corps, the DOD, FEMA, and the Coast Guard. The actions, which should be undertaken include:

a. Establish unified command and multi-agency coordination systems to improve overall response.

b. Conduct an emergency disaster planning exercise in the Delta, involving all pertinent federal, state, and local agencies, to test multi-agency coordination.

c. Establish clear criteria for issuing mandatory evacuation orders. Also, establish a clear process for issuing public advisories on levee conditions.

d. Implement the Inland Region Mass Evacuation Plan—already developed, but not approved by the state—and harmonize local evacuation plans with its procedures.

e. Continue to conduct emergency response exercises and drills with citizens as well as emergency response personnel.

f. Stockpile supplies, including caches for citizen emergency response, flood fights, and levee failure prevention, at strategic locations in the Delta.

g. Earmark flood control bond money for emergencies. Make sure it can be easily accessed by the State Flood Operations Center or a local government to ensure that whatever agency is closest and best qualified to cope with a developing threat to levee integrity has the resources to stabilize the situation. All government agencies capable of managing flood fights must be able to stabilize a levee without time-consuming bureaucratic processes.

h. Sign contracts for barges along the entire West Coast to move people and supplies. In a major disaster, California will need help from other states. Any existing mutual aid agreements should be assessed and improved as needed.

i. Ensure that during a disaster there are enough people available and sufficiently mobile to repair breaches.

j. Create a Boat Search and Rescue Marshal Program for rapid evacuation of neighborhoods.

k. Change building codes to require exits to a building's roof in deep floodplains where the 100-year flood elevation for the area exceeds a depth of eight feet.

l. Paint lampposts on every block behind levees to show the 100-year flood or sea level.

m. Conduct additional school programs about emergency training.

Action 6.1.3: Conduct a comprehensive analysis of the costs and benefits of highway protection strategies, and adopt a policy based on its findings by 2012.

The California Department of Transportation should conduct a comparative analysis, beginning immediately, of the costs and benefits of:

a. Reinforcing levees to protect highways against seismic and other levee failure threats.

b. Armoring or raising individual highways or segments.

c. Fortifying highway corridors and adjacent infrastructure.

d. Relocating highways to areas with lower flood risks both now and in the future when the sea level is expected to rise.

Action 6.1.4: Complete a comprehensive analysis of the costs and benefits of infrastructure protection strategies. 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 begin immediately to examine the collective long-term costs and benefits of:

a. Reinforcing levees to protect infrastructure against seismic and other levee failure threats;

b. Locating infrastructure in fortified corridors;

c. Relocating infrastructure to areas with lower flood risks both now and in the future when the sea level is expected to rise; and

d. Tunneling infrastructure systems below the Delta.

Strategy 6.2: Discourage inappropriate land uses in the Delta region.

The Task Force's Vision strongly declared that it is irresponsible to continue permitting new development in deep floodplains within the Delta. Deep floodplains are sites in the floodplains of rivers (or below sea level) that are at least several feet below flood stage. Levee failures in such places result in deep inundation of people and property and can be catastrophic. Locations below sea level are especially risky as water will remain until levees are repaired and water pumped out.

Vision Recommendations Met

2, 10, 11, 12

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 (-)

Land use decisions in the Delta must be based on public safety. Even if new developments in flood-prone areas were to build their own levees, there would still be a considerable residual risk of flooding. Just as importantly, any new levees constructed to protect new developments in floodplains could actually increase failure risks for existing levees nearby. These risks will likely increase as climate change alters the flow patterns of the major rivers entering the Delta.

Despite the existence of the Delta Protection Act, and the Delta Protection Commission (DPC), development has continued to expand in the Delta, potentially threatening state interests and heightening safety risks in the region. Substantial population increases in the region are projected for the coming decades, increasing urbanization pressures in both the secondary zone—and the primary zone.

Besides increasing flood risks, urban development outside of the primary zone can also foreclose critical future ecosystem revitalization and climate change adaptation opportunities, as well as limit improvements to the existing water export system. Active floodplains are critical ecosystem revitalization sites, and should not be cut off by levees protecting new

development. Lands just above current tidal elevation are crucial sites to accommodate long-range sea level rise, and should be conserved for that reason. See Strategy 3.1.

The recommended governmental structure for the Delta, which would oversee land use, is described in greater detail in Strategy 7.1. The DPC should continue be the primary region-wide land use governance entity, but with increased authority. To ensure state interests in the region are fully protected over decades, all general plans of Delta counties and cities, and the DPC's Resource Management Plan, should be required to be consistent with the California Delta Ecosystem and Water (CDEW) Plan called for in Strategy 7.2.

Within this new governmental structure, the DPC should:

a. Revise all of its plans and policies, including the Resource Management Plan, and make them consistent with the CDEW Plan.

b. Review and certify all local city and county general plans for consistency with the DPC Resource Management Plan and the CDEW Plan.

c. Exercise direct consistency determination authority over development proposals in the primary zone. This means that DPC must make an affirmative determination that any project approved by local governments within the primary zone is consistent with the Resource Management Plan and the CDEW Plan.

d. Exercise appeal authority over selected portions of the secondary zone once local plans are created for those areas (see below). Until those local plans are created, DPC should possess direct consistency determination authority over development proposals in these areas.

e. Determine the consistency of the local plans in (d) with the CDEW Plan.

The local plans for the areas named below must bring land uses into consistency with the CDEW Plan. These plans should be prepared within three years and be submitted for consistency review to the DPC upon completion. The CDEW Council (see Strategy 7.1) may review local plans, or exercise consistency determination authority for individual projects in the primary or secondary zones, at its discretion.

The key actions to carry out this strategy include:

Action 6.2.1: Immediately strengthen land use oversight of the Cosumnes/Mokelumne floodway and the San Joaquin/South Delta lowlands.

Although outside the primary zone, both areas are critical to achieving the co-equal goals of the Vision. Local governments should adopt plans for these areas compatible with this Strategic Plan. Those plans should be submitted to the DPC for certification of consistency with the CDEW Plan. Pending certification, the DPC should have direct consistency determination authority over these areas in the secondary zone, just as in the primary zone. Upon plan certification, DPC should have appellate authority.

a. The Cosumnes River/Mokelumne River confluence is defined as the region generally east of Interstate 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. Land use oversight should protect and enhance river corridors and riparian vegetation, foster flood-tolerant land uses, improve floodplain management, restore the ecosystem and improve water quality.

b. 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, Paradise Cut, and Stewart Tract and Reclamation Districts R-2075, R-2064, R-2085, R-2094, R-2095, the portion of R-1007 generally north of Bethany Road, and the portion of R-2058 north of Interstate 205. Land use oversight should enhance flood safety and create a natural floodway for the San Joaquin River to accommodate restored river flows, climate change, and sea-level rise. Oversight should also improve floodplain management, protect and enhance river and slough corridors and riparian vegetation, restore fish habitat and facilitate fish passage. Flood-tolerant land uses should be promoted, water quality increased, diversions better managed, and recreation, boating, and waterway access improved.

Action 6.2.2: Immediately strengthen land use oversight for Bethel Island, the city of Isleton, and Brannan-Andrus Island.

Although located outside of the primary zone, safety risks from flood and sea level rise have persisted for decades in these locations, and can be expected to worsen. The respective local governments must adopt special plans that achieve risk reduction through some combination of emergency response and land use changes, including flood proofing, levee upgrade, and relocation of some assets. These local plans should specifically identify the necessary levee upgrades, potentially including full-island upgrades, island partitions, or ring levees, to improve flood protection for residents and property. See Strategy 6.3.

a. Isleton/Brannan-Andrus Island is defined as the entirety of Brannan-Andrus Island not currently in the primary zone. Oversight should protect life and property under current conditions as well as under sea level rise. Emergency services and access both under current conditions and multi-island failure conditions should be improved and response to levee failures strengthened. The seismic safety of the levees should be enhanced and the cost and benefit of different levee upgrade options addressed. An examination of the implications of a Brannan-Andrus levee failure on other islands, Delta hydrodynamics, and salinity intrusion should also be conducted.

b. Bethel Island oversight should protect life and property under current conditions as well as under sea level rise. Emergency services and access, both under current conditions and multi-island failure conditions, should be improved and response to levee failures strengthened. The seismic safety of the levees should be enhanced and the cost and benefit of different levee upgrade options assessed. An examination of the implications of a Bethel Island levee failure on other islands, Delta hydrodynamics, and salinity intrusion should also be conducted.

Action 6.2.3: Immediately prepare local plans for these five at-risk locations within the primary zone: Walnut Grove (including the residential area on Grand Island), Locke, Clarksburg, Courtland, and Terminous.

These areas were developed prior to the Delta Protection Act and remain at high risk without clear strategies for risk reduction and sustainability. The local plans must:

a. Identify ways to reduce risk to life and property through land use policies, or a combination of land use regulations and levee upgrades, including options for full-island upgrades, island partitions, or ring levees, recognizing that current PL84-99 type levees are not sufficient.

b. Consider the towns' historic internal needs, the towns' historic growth rates, and their architectural and cultural character.

c. Be reviewed by the DPC for consistency with the CDEW Plan.

d. Include a rationale for the state's participation in levee upgrades.

e. Potentially include common planning issues such as economic development, historic preservation, public services, and infrastructure, at the discretion of the localities.

Action 6.2.4: Immediately form a landowner consortium to create a new land use strategy that fosters recreation, increases habitat, reverses subsidence, sequesters carbon, improves handling of dredged material, and continues appropriate agriculture on Sherman, Twitchell, and Jersey Islands.

The western Delta islands face special challenges. They face higher seismic risks due to proximity to the major Bay Area earthquake faults, and rising sea levels will surround them with saltier Bay water more frequently. It has already become troublesome and costly for Delta flow managers to repel salinity around Sherman Island with upstream freshwater releases. As sea level rises, this problem will affect more of the west Delta, unless greater and greater freshwater releases are devoted to this purpose.

Three islands in the far west Delta—Sherman, Twitchell, and Jersey—are predominantly owned by public agencies. These agencies should form a landowner consortium to foster land use patterns that will be sustainable in the face of seismic risks and sea level rise impacts. Lessons from this work can inform work on other Delta islands.

Strategy 6.3: Prepare a comprehensive long-term levee investment strategy that matches the level of protection provided by Delta levees and the uses of land and water enabled by those levees.

The Delta and Suisun Marsh's 1,300 miles of levees are essential to the Delta now and critical to its future. Levees are the thin line of defense that secures the Delta's residents, its

Vision Recommendations Met

9, 11, 12

Performance Measure

Number of miles of levees that achieve compatibility between levee designs and land use, ecosystem, and water supply values protected by the levees. (+)

landscape, and the fresh water supply for millions of Californians from inundation by salt water. And yet the Delta levee system is steadily deteriorating and facing mounting risks of disaster.

New policies and priorities are needed to provide long-term support of state interests in the Delta's ecosystem, as well as to increase 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. Funding and financing of the levee system must become more strategic, based on the specifically identified services and values that Delta levees support.

Priorities must be established by a comprehensive, geographically specific plan, such as the California Delta Ecosystem and Water (CDEW) Plan proposed by the Task Force in Strategy 7.1. State funding should be directed primarily to levees that support state interests—especially ecosystem vitality, water quality and conveyance, and public use—and that support the cultural, historical, and aesthetic value of the Delta as a place. 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.

The recommendations of this Strategic Plan embody the following findings and principles:

1. The current configuration of Delta islands and waterways is 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. Different levee design types and standards should be used to anticipate sea level rise, river flooding, subsidence, and seismic risk, and provide levels of protection reflecting the uses and services at risk.
3. A range of environmental enhancements should be applied to fit site conditions and ecosystem goals.
4. Beneficiaries of levee protection should pay a share of the costs commensurate with the benefits received.
5. Levee improvements and repairs should be based on economic feasibility and a thorough evaluation of the services they provide.
6. In the event of a levee failure prior to the finalization of a new Delta-wide management plan, any response should consider not just immediate repair and pump-out, but also potentially "no action" or "breach-repair and rest" alternatives, depending on benefit/cost

analysis and consideration of the potential impact on the cultural and historical value of the Delta. Major actions and upgrades should await completion of a comprehensive plan.

The actions recommended to carry out this strategy are:

Action 6.3.1: Require the Department of Water Resources, in cooperation with local Reclamation Districts and other agencies, to develop a comprehensive plan for Delta levee investments.

The development of the plan must be overseen by the new CDEW Council proposed in Strategy 7.1. The levee plan must be consistent with the CDEW Plan proposed in Strategy 7.2. The other agencies involved must include the Delta Protection Commission, the Bay Conservation and Development Commission, the State Board, the Department of Fish and Game, and the five Delta counties.

The levee plan must include full consideration of the levees' role in protecting people, land, reliable water supplies, water quality, aquatic ecosystems, infrastructure, the aesthetic and cultural values of the Delta, and the capacity for the Delta to evolve over the long term. It must consider threats to the levees posed by climate change, seismicity, subsidence, and localized deterioration. It must also consider the potential consequences of levee removal for remaining levees, including increased wind and wave fetch.

Action 6.3.2: Prioritize the $750 million appropriated by Proposition 1E and Proposition 84 funds for the improvement of Delta levees, including in legacy towns.

Those funds should be dedicated to the improvements identified in the comprehensive plan, contingent upon the plan being completed by June 2010. Some portion of the funds, to be identified specifically in the plan, should be devoted to emergency levee repair and to the protection of Delta towns and communities.

Action 6.3.3: Require those preparing the comprehensive levee plan to incorporate the Delta Levees Classification Table to ensure consistency between levee designs and the uses of land and water enabled by those levees.

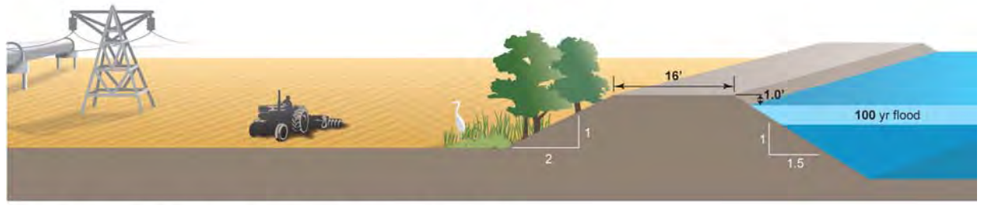
In achieving consistency with the CDEW Plan, the levee plan must ensure that levee improvements do not induce inappropriate new development in floodplains, lands below sea level, or other locations at risk of flooding in the primary or secondary zones. One barrier to setting levee standards has been the difficulty, both scientifically and politically, of making relatively simple guidelines for levees. The Task Force recommends use of Table 2-2, the Delta Levees Classification Table, as a starting point. (See Figure 2-7 for illustrations of levee types and compatible land uses.)

TABLE 2-2
Delta Levees Classifications

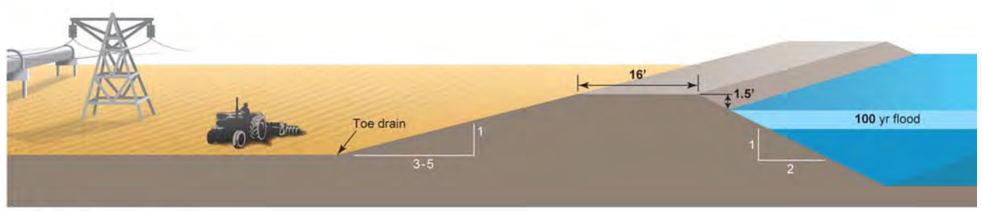
Levee Goals							
		Land Use					
Levee Classification	Description	Wetlands/ Habitat	Agricultural	Populated[d]	Infrastructure	Technical Characteristics	Estimated Cost per Mile (millions of 2005 $)[e]
Class 1	No specific goal[a]	✓	N/A	N/A	N/A	Typical height is less than 8 feet. Crest width is 12 feet or less. Exterior and interior slopes, assume 2H:1V. No seismic capability. Freeboard varies but levee is usually overtopped for water level with 1% annual frequency (i.e., 100-year return period or 100-year flood). Expect frequent failure.	For new levee is $0.2 to $0.3. Upgrade from existing levee would be less.[f]
Class 2[b]	HMP	✓	✓	N/A	✓	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.[f]
Class 3	PL84-99	N/A	✓	N/A	✓	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 feet of peat, $1.3 to $1.8. For thicker peat, up to $3.5.[f]
Class 4	FEMA – 100-year	N/A	N/A	✓[h]	✓	16 foot crest width. All-weather patrol road. Toe drain. Exterior Slope (2H:1V). Interior Slope (varies, stability/seepage, 3H: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 feet of peat, $9.1. For special local conditions, may be $4.0 or less.[f]
Class 5	FEMA – 200-year	N/A	N/A	✓	✓	Like Class 4 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 Class 4.[f]
Class 6	Seismic – fail/repair	N/A	N/A	N/A	✓	16 foot crest width. All-weather patrol road; toe drain. Exterior Slope (3H:1V to 5H:1V) Interior Slope (3H:1V to 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 feet of peat, $21.1. For thicker peat, up to $28.1.[f]
Class 7[c]	Seismic – no fail	N/A	N/A	✓	✓	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). Dynamic stability (Ky = 0.15 to 0.27). 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 feet of peat. $21.1 to $38.0. For thicker peat, up to $63.5.[f]
Class 8	Seismic super levee	N/A	N/A	✓	✓	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 and sand, short levee height (10 to 20 feet), use of local borrow.[g]

Notes:
[a] Class 1 levees are designed to serve the need of the habitat; there is no specific goal.
[b] Islands with a Class 2 goal are judged to have no Statewide interest and may not be reclaimed after a levee failure.
[c] For populated areas subject to deep flooding, only a Class 7 levee provides adequate protection of life and safety.
[d] Levee protection for legacy towns should be determined based on site specific needs (e.g., floodwalls) and financing available.
[e] Estimated cost depends on foundation material and other site construction factors.
[f] Based on DRMS estimated costs.
[g] Based on actual levees constructed.
[h] Levees for populated areas should ultimately upgrade to at least Class 5 (FEMA 200-year).

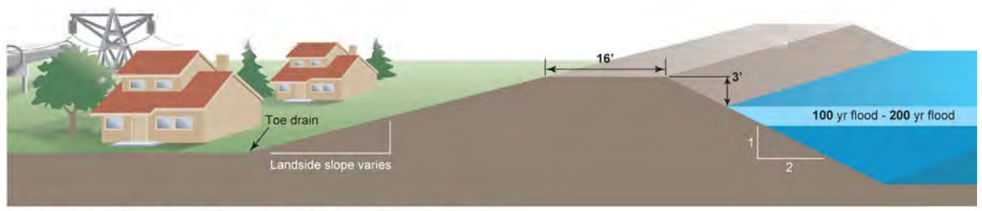
Class 1: Wetlands/Habitat



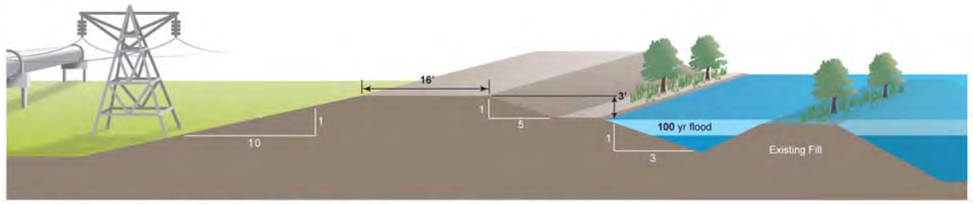
Class 2: Hazard Mitigation Plan (HMP) - Interim Standard



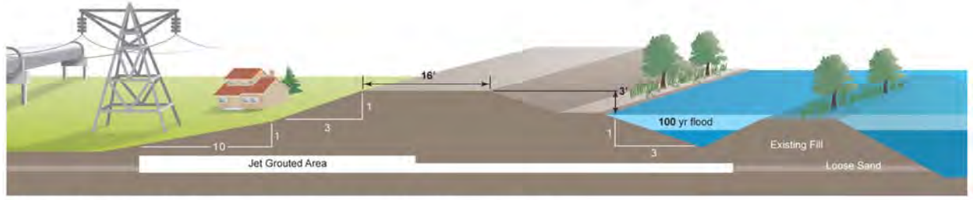
Class 3: PL 84-99



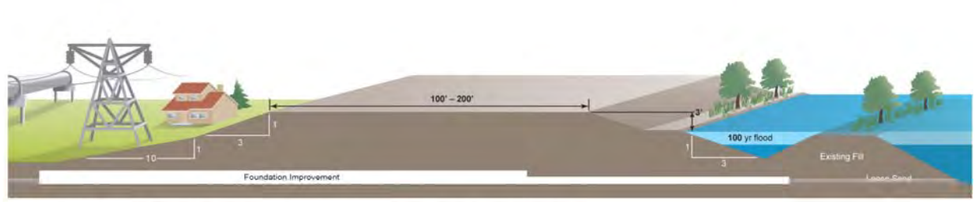
Class 4: (FEMA - 100 year) and Class 5: (FEMA - 200 year)



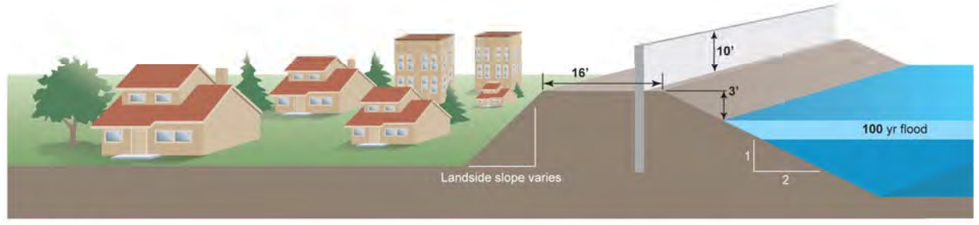
Class 6: Seismic - Fail/Repair (with environmental enhancement)



Class 7: Seismic - No Fail (with environmental enhancement)



Class 8: Seismic Super Levee (with environmental enhancement)



Floodwall

FIGURE 2-7
Delta Levee Types and Land Uses
Different levee designs are appropriate for different land uses. (Source: DWR 2008, Delta Risk Management Strategy Preliminary Studies)

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Action 6.3.4: Continue the existing Department of Water Resources levee subventions program until the comprehensive levee plan is completed.

In the interim period until the plan is completed, establish the Hazard Mitigation Plan (HMP) levee design as the minimum Delta levee standard.

Action 6.3.5: Vest continuing authority for levee priorities and funding with the proposed California Delta Ecosystem and Water Council to ensure a cost-effective and sustainable relationship between levee investments and management of the Delta over the long term.

See Strategy 7.1 regarding the roles of the proposed CDEW Council.

Goal 7: Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals

Strategy 7.1: Establish a new California Delta Ecosystem and Water Council as a policy making, planning, regulatory and oversight body. Abolish the existing California Bay-Delta Authority, transferring needed CALFED programs to the California Delta Ecosystem and Water Council. Establish a new Delta Conservancy to implement ecosystem restoration projects, and increase the powers of the existing Delta Protection Commission.

Attaining the co-equal goals is impossible without a new system of governance in the Delta. The new governance system must be capable of making difficult decisions and implementing effective policies.

Vision Recommendations Met

10, 12

Performance Measures

To be determined.

When viewing the current governance structures in the Delta three key points emerge: state interests are neither clearly expressed nor effectively pursued, literally hundreds of federal, state and local governmental entities share responsibility for the Delta and its resources, and no one entity is responsible for managing important state interests.

The Task Force's Vision called for a more effective governance structure that would "...ensure integrated action to implement this vision." In this Strategic Plan, the form of that governance is detailed.

The challenges of creating this new structure begin with a lack of unanimity over the proper goals to pursue and are compounded by climate change and sea level rise, as well as threats to the Delta and California's water supply system from earthquakes, floods, levee failures, and invasive species. But continuation of the current system of governance—a 'system' in name only—guarantees continued deadlock and inevitable litigation.

Accordingly, the Task Force proposes:

1. Creation of a California Delta Ecosystem and Water (CDEW) Council which will replace the existing California Bay-Delta Authority and subsume needed CALFED programs. See Figures 1-14 and 2-8. The CDEW Council will:

   a. Adopt a California Delta Ecosystem and Water (CDEW) Plan to achieve the goals of the Task Force's Vision and this Strategic Plan.

   b. Ensure proposed actions by any state agency are consistent with the CDEW Plan the CDEW Council creates.

   c. Use provisions of the Coastal Zone Management Act to address any inconsistencies by federal agencies.

   d. Allocate funds to programs and projects consistent with its CDEW Plan.

FIGURE 2-8
Co-equal Goals Supported by Linked Water Supply and Ecosystem Programs
Achieving the co-equal goals requires linking water supply and ecosystem programs across several dimensions. (Source: Delta Vision Staff 2008)

2. Creation of a California Delta Conservancy to coordinate restoration of the Delta ecosystem, consistent with the Task Force's Vision, this Strategic Plan, and the CDEW Plan.

3. Expansion of the responsibilities of the existing Delta Protection Commission (DPC), and giving it responsibility for managing the proposed National Heritage Area designation for the Delta.

   The Task Force is not seeking to create a sizable new government bureaucracy. On the contrary, this structure uses existing agencies and authorities to the greatest possible extent, but also seeks to ensure consistency and coordination among them through the creation of a single governing plan (the CDEW Plan) and a CDEW Council to oversee and enforce its implementation. Existing state agencies would retain their existing authorities but support development of the CDEW Council's plans and programs and exercise their authority in support of Council adopted policies and plans. The Department of Water Resources (DWR), the Department of Fish and Game (DFG), the State Board, other state agencies and local governments will exercise their authorities in the following areas, a critical part of the success of this recommended governance system:

   - For the science and regulatory implementation of species protection laws: DFG, U.S. Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS).

- For linkage of ecosystem policies and programs focused on the Delta with the larger Delta watershed: DFG, in cooperation with the USFWS and NMFS, through the CALFED Ecosystem Restoration Program and the successor programs established by the CDEW Council.
- For construction and ownership of water conveyance and storage facilities: DWR and the Bureau of Reclamation.
- For application of water rights and water quality laws: the State Board and Regional Water Quality Control Boards.
- For land use and resource management policies under the Delta Protection Act: the DPC.
- For municipal functions, including police powers and contributions to the value of the Delta as a place: Existing local governments.

The following actions should be undertaken to create this structure:

Action 7.1.1: Establish a California Delta Ecosystem and Water Council to replace the Bay-Delta Authority and take over CALFED programs.

CDEW Council operations should begin at the earliest date possible. If a wholly new agency is established, the effective date should be January 2010. If the legislation enacting the Bay-Delta Authority can be modified to establish the CDEW Council, it could be created possibly as early as the summer of 2009. Until creation of the CDEW Council, the roles and duties recommended here would fall under the responsibility of the California Secretary for Resources, unless otherwise provided.

The CDEW Council should have five to seven voting members, including a chair. CDEW Council members should be appointed by the Governor and confirmed by the State Senate.

No geographic, occupational, or representational criteria are proposed for these appointments. Proposing criteria for appointment 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 used for appointment of the Delta Vision Blue Ribbon Task Force in Executive Order S-17-06 are appropriate: members "to include diverse expertise and perspectives, policy and resource experts, strategic problem solvers, and individuals having successfully resolved multi-interest conflicts."

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

The CDEW Council should:

a. Develop and adopt a management CDEW Plan, incorporating the plans of other agencies, where appropriate, to meet the charge given to the CDEW Council. The statute authorizing the CDEW Plan should reiterate that other state agencies and local governments will still exercise their existing authority, but consistent with the CDEW Plan. The authority given to the CDEW Council should include ability to determine the

consistency of any project proposed by or approved by a state agency or local government with its adopted plan.

b. Assume responsibility for any conservation or habitat management plan developed for the Delta by the state or federal government.

c. Ensure federal and state consistency with the CDEW Plan.

d. Be designated a Trustee Agency pursuant to Public Resources Code Section 21000, et. seq., and participate in California Environmental Quality Act processes on that basis.

e. Determine the consistency of major water, road, railroad, utility, and levee infrastructure projects in the Delta with the CDEW Plan and communicate that determination to the responsible agencies.

f. Assess policies applied outside the Delta which are critical to meeting Delta Vision goals and convey the results of that assessment to the responsible agency.

g. Work with the Delta Science Program and the Delta Science and Engineering Board on adopting sound principles of adaptive management.

h. Receive and allocate funds to advance policies and programs related to the Delta.

i. Include issues of environmental justice in the CDEW Plan and in future Delta decision-making.

j. Empanel a Public Advisory Group of stakeholders to advise and make formal recommendations to the CDEW Council, and to issue a public biennial report on their activities.

k. Adopt procedures for use of alternative approaches to dispute resolution, such as joint fact finding and arbitration to reduce reliance on litigation and the courts.

l. Have the power to sue to ensure compliance with the CDEW Plan.

m. Establish policies and procedures that ensure that day-to-day operation of water export systems are consistent with the CDEW Plan.

Action 7.1.2: Establish a California Delta Conservancy as early as possible in the 2009 legislative session.

California has no entity responsible for implementing and coordinating Delta ecosystem enhancement and related revitalization projects. California has a long and successful history with conservancies, and there is widespread agreement that such an entity would succeed in the Delta.

The California Delta Conservancy should:

a. Be devoted solely to the statutory Delta and the Suisun Marsh.

b. Be governed by a body with 11 voting members, including both local and state officials serving staggered terms, with selected federal participation in non-voting roles. Five

members would represent the five Delta counties, selected by the Governor from nominees advanced by the DPC; four members would be state representatives, including the Secretary for Resources, the Director of the Department of Finance, and two public members with business or land trust experience, appointed by the Governor. Two additional public members, one appointed by the Senate Rules Committee and one by the Speaker of the Assembly, should be non-voting ex-officio members. The Governor should appoint the chair of the Conservancy.

The California Delta Conservancy should be responsible for:

c. Coordinating state ecosystem-related and urban waterfront projects in the Delta, Suisun Marsh, and local plan areas. The Suisun Marsh area is regulated by the Bay Conservation and Development Commission, so integration of its authority and that of the Conservancy should be given first priority.

d. Acquiring or managing such land as needed to implement the CDEW Plan. The Conservancy should have the power to enter into contracts, to buy and sell land and other property, and the power to acquire property through the State Public Works Board. The Conservancy should be exempt from approval processes of the Department of General Services.

e. Assuming responsibility, when offered, for lands currently in state, federal, or local governmental ownership, or non-profit or private ownership.

f. Receiving funding from the State of California, the CDEW Council, or any other source, and allocating those funds on its authority to purposes consistent with policies and plans adopted by the Council.

g. Supporting appropriate recreation and ecosystem activities in the Delta, including bolstering the local economy and National Heritage Area designation consistent with the CDEW Plan.

h. Creating incentives for mutually beneficial mixtures of traditional agriculture, habitat, and recreation, including agri-tourism, wildlife-friendly agriculture practices, bird watching, and hunting.

Action 7.1.3: Strengthen the DPC through legislation.

The DPC should continue to be composed of representatives from Delta counties, cities, and reclamation districts, and directors or designees from several state departments. A membership slot for the Central Valley Flood Protection Board should be added. Federal agencies such as the U.S. Army Corps of Engineers, the USFWS, and the Bureau of Reclamation should be invited to participate in non-voting liaison capacities to better assess and coordinate flood protection, water supply, and ecosystem protection issues.

The DPC was created in 1992 and given appellate review of proposed land uses in the Delta primary zone. The Delta Protection Act and the actions of the DPC have protected the primary zone effectively to date. Despite this past success, three factors support changes in the future:

- The state's interests in the primary zone—already large as evidenced by policies focused on water and the ecosystem, land ownership, and funds for levees—will continue to grow. Improved conveyance and ecosystem restoration projects anticipated in the next decades will both impact the primary zone. Additionally, the primary zone includes 880 miles of levees, a majority of levees in the Delta, and integrated approaches to their maintenance will be increasingly important.
- As reflected by the miles of levees in the primary zone, this is the area most at risk from sea level rise or seismic events.
- Land uses in the primary and secondary zones are becoming more critical to state interests regarding flood protection and ecosystem function.

To address these changed state interests, this Strategic Plan recommends expanding the responsibilities of the DPC. To ensure state interests in the region are fully protected over decades, all general plans of Delta counties and cities—and the DPC's Resource Management Plan—should be required to be consistent with the CDEW Plan. Within this structure, the DPC should:

a. Revise all of its plans and policies, including the Resource Management Plan, to be consistent with the CDEW Plan.

b. Review and certify all local city and county general plans for consistency with the DPC Resource Management Plan and the CDEW Plan.

c. Exercise direct consistency determination authority over development proposals in the primary zone. This means that DPC must make an affirmative determination that any project approved by local governments within the primary zone is consistent with the Resource Management Plan and the CDEW Plan.

d. Exercise appeal authority over selected portions of the secondary zone once local plans are created for those areas (see Strategy 6.2). Until those local plans are created, DPC should possess direct consistency determination authority over development proposals in these areas.

e. Determine the consistency of the local plans in (d) with the CDEW Plan.

The local plans for the areas named in Strategy 6.2 must bring land uses into consistency with the CDEW Plan. These plans should be prepared within three years and be submitted for consistency review to the DPC upon completion. The CDEW Council may review local plans, or exercise consistency determination authority for individual projects in the primary or secondary zones, at its discretion.

Action 7.1.4: Require the California Delta Ecosystem and Water Council to create a Delta Science and Engineering Program and a Delta Science and Engineering Board by September 1, 2009.

California must maintain a strong and consistent investment in science and engineering important to the Delta. There needs to be a more direct link between scientific investigation

and real-world management and policy. To achieve this, the CDEW Council will need both a permanent Science and Engineering Program staff and an independent Science and Engineering Board that reviews Council actions. Both must receive stable, adequate funding.

The Delta Science and Engineering Board should consist of between 12 and 20 individuals with natural science, social science, engineering, and policy expertise appointed by the CDEW Council to a maximum of two five-year terms. Lead scientists appointed by the CDEW Council should have a rotating appointment of 3 years. To ensure independence, the current practice in which lead scientists are formally engaged by an agency other than the state, such as the United States Geological Survey, should continue.

The Science and Engineering Program should be a replacement for, and a successor to, the successful CALFED Science Program, and the Delta Science and Engineering Board is a replacement for the CALFED Independent Science Board. The Science and Engineering Program should have the following responsibilities and authorities:

a. Research critical scientific issues of both the physical Delta and elsewhere in the state relevant to Delta management.

b. Organize, assess, and synthesize the best available science for policy makers and the CDEW Council.

c. Review all major projects undertaken to advance the goals of Delta Vision.

d. Conduct independent science and engineering reviews of the work of government agencies or consultant work upon the request of the CDEW Council, the Conservancy or other state agencies.

e. Establish communication channels to effectively transmit science and engineering results to broader and more diverse audiences, coordinating with the CDEW Council's Public Advisory Group. Develop discussion papers and interactive lectures.

Action 7.1.5: Improve the compliance of diversions and water use with all applicable laws.

Effective enforcement of existing laws and regulations regarding diversions and use of water is an important foundation for improved governance. In order to protect and enhance the co-equal values over time, the state must create an integrated policy system among state agencies with jurisdictional authority affecting the use of water from the Delta watershed. This system involves establishing clear roles and responsibilities for state agencies regarding the approval, monitoring, and enforcement of water diversions, and the management of impacts of diversions to resources and values protected by the state. Information currently is not adequate for properly informed policy making.

The critical elements for improved information include:

a. Coordinate the authoritative oversight of the State Water Board and the Regional Boards to ensure compliance with the reasonable use and public trust doctrines and applicable

water quality requirements by water diverters within, and exporting from, the Delta watershed.

The State Board will require secure annual funding for additional positions to investigate water rights compliance, illegal diversions, waste, and unreasonable use. The State Board's capacity should be expanded to be able to:

i. Require monitoring by all water diverters, including those within the Delta who are currently not required to report diversions

ii. Authorize monetary penalties for monitoring and reporting violations

iii. Create adequate penalties for unauthorized diversions and violations

iv. Possess provisions for interim relief

b. The State Board should develop an integrated Supervisory Control and Data Acquisition (SCADA) network that covers all significant permitted and licensed surface water diversions and permitted discharges to provide real-time information into a database linked to water rights permits. The SCADA would enable the state to flag and achieve redress for any excess diversions beyond permit terms.

c. Plainly said, the information about current diversions and use in the current water system is inadequate to the task of managing the co-equal values. More comprehensive data from throughout the Delta watershed would provide a better foundation for changes in water diversion timing. California must also develop and use comprehensive information on the local, regional and statewide availability, quality, use, and management of groundwater and surface water resources to help improve opportunities for regional self-sufficiency.

d. Install stream gauging stations at critical outflow points associated with the DWR planning area boundaries to aid in the DWR regional "water budgeting" used to help develop the California Water Plan.

e. Require DWR to continue to regularly and systematically collect groundwater elevation data in all groundwater basins and sub-basins in the Delta Watershed, and make the resulting information readily and widely available.

f. Require DWR to expand its current network of monitoring wells, including groundwater elevation and groundwater quality monitoring wells, and continue to coordinate data monitoring and interpretation with local entities.

Strategy 7.2: Require the California Delta Ecosystem and Water Council to prepare a California Delta Ecosystem and Water Plan to ensure sustained focus and enforceability among state, federal, and local entities.

The California Delta Ecosystem and Water (CDEW) Plan is intended to guide and shape management of the Delta to ensure its revitalization and create a statewide reliable water delivery system.

The current lack of a legally binding, cohesive plan has caused agencies and Delta stakeholders to work in a vacuum, developing policies and programs that lack context. 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.

In addition, all parties recognize that the management of the Delta is rife with uncertainty. Any functional governance structure must be flexible and adaptable to changing circumstances. A governance structure built around a plan can achieve this flexibility by incorporating periodic revisions, and grounding management directions in adaptive management principles. Importantly, management and scientific understanding must evolve together. Management decisions and plan provisions must incorporate the best available science, and be formulated in such a way that scientific knowledge can be generated through direct observation of the Delta's response to various actions.

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 (-)

The key elements of this strategy are:

Action 7.2.1: Develop a legally enforceable California Delta Ecosystem and Water Plan.

The CDEW Plan is intended to achieve the co-equal goals of Delta Vision. It will build upon and integrate other plans, modifying and extending them as needed to meet its responsibilities. 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 (DPC), 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 DWR, and the Conservation Program resulting from the Bay Delta Conservation Plan. Those responsible for implementing these other plans shall do so in a manner to support achieving the adopted CDEW Plan.[13]

Existing policies and programs in the Delta lack cohesion and integration. The aim of this proposed CDEW Plan is to remedy those two faults. The CDEW Plan should be developed and adopted in less than five years. The CDEW Council should be authorized to adopt this strategic plan or another interim plan until completion of the final plan.

All state, regional and local agencies with planning responsibilities should be required to carry out their actions in conformity with the CDEW Plan, while providing the flexibility needed to meet the Delta's management challenges. Approving a CDEW Plan governing the Delta thereby ensures consistency among existing state, federal, regional, and local agencies and provides the flexibility needed to meet the Delta's management challenges. Local governments and other state and federal agencies will continue planning, decision-making, and operations—consistent with the CDEW Plan.

The CDEW Plan must:

- Incorporate any species protection requirements that impact Delta resources.
- Incorporate requirements for water flow and water quality in the Delta that achieve the co-equal goals.
- Define state land use interests in the Delta, especially those that impact the ecosystem, water supply reliability and flood concerns. The DPC and local governments will provide the oversight to protect those interests in consistency with the CDEW Plan. In the case that these state interests extend from the Delta into adjacent areas, they will work with relevant local governments to address the linkages.
- Provide principles and procedures for adaptive management.
- Provide for the modeling, data collection, management, monitoring, analysis, and interpretation to support policy decision-making.

13. Examples of how to achieve this result are found in the Tahoe regional planning experience, among others.

- Ensure flexibility and resiliency in managing the Delta.
- Incorporate the recommendations of this Strategic Plan.
- Articulate a detailed financing plan that identifies costs, benefits, and revenue sources.
- Serve as a foundational document for a programmatic Environmental Impact Statement or Environmental Impact Report, as well as any projects undertaken requiring California Environmental Quality Act and/or National Environmental Policy Act permits.

The Task Force recommends the state Legislature and the CDEW Council carry out the following actions to develop and adopt the CDEW Plan:

a. By May 2009, adopt this Delta Vision Strategic Plan legislatively as the Interim Plan for the Delta.

b. Develop by August 2009, through the CDEW Council, a legal and procedural outline for adopting the CDEW Plan.

c. Prepare a list of all applicable legal requirements in the Delta that must be incorporated into the new CDEW Plan by August 2009. Included in this list will be federal and state Endangered Species Acts management actions and plans.

d. Have the CDEW Council begin developing the CDEW Plan by September 2009 consistent with the procedural and substantive requirements of the Coastal Zone Management Act. Coordinate with stakeholders as well as state, federal and local agencies. Start by assessing existing plans and planning efforts and use elements which are consistent with the goals of Delta Vision. Strong participation of local, state, and federal agencies will help to better integrate their responsibilities and capacities into the CDEW Plan.

e. Seek the counsel of the CDEW Council's Public Advisory Group to enhance stakeholder participation and actively address environmental justice concerns.

f. Set a goal to have the CDEW Council adopt the new CDEW Plan by December 2010. If the complete CDEW Plan is not ready, the Council should adopt an interim plan. Activities not covered in the interim plan shall be guided by this Strategic Plan until the full CDEW Plan is adopted.

g. Identify and address, by December 2010, any inconsistencies in the State Board's Water Quality Control Plans and the CDEW Plan.

h. Require the CDEW Council to review and if necessary, amend the CDEW Plan at least every five years.

Action 7.2.2: Institutionalize adaptive management through updates to the California Delta Ecosystem and Water Plan every five years.

The Delta is not only complex, but its future is uncertain. Recognizing both uncertainty in knowledge and uncertainty about policy outcomes is important to shaping future Delta

management. That's one reason why adaptive management must be at the center of Delta governance and decision-making.

Adaptive management is defined by the federal government as follows:

> *A type of natural resource management in which decisions are made as part of an ongoing science-based process, adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.*

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

The adaptive management cycle is repeated over time, incorporating changes in the underlying systems, advances in scientific understanding, new policy tools, and changing policy decisions. To gain the advantages of local knowledge and increased stakeholder commitment to not only particular decisions, but also to the iterative character of adaptive management, considerable attention must be given to effectively incorporating stakeholders over long periods of time. Authority for making and/or implementing relevant policies is often fragmented among several states, federal and local agencies, so similar attention must be given to effectively linking multiple agencies over long periods of time.

The recommended CDEW Plan integrates the actions of many relevant agencies and would be regularly revised every 5 years. These regular reviews and updates provide a schedule of review activities involving stakeholder participation. This rhythm of review cycles also requires organizing scientific understanding and program assessment to a point where they can inform policy making.

Action 7.2.3: Charge the Delta Science and Engineering Board, with support of the Delta Science and Engineering Program, to develop a science-based adaptive management program to provide for continued learning of, and adaptation to, actions implemented by state, federal, and local agencies in the Delta.

The CDEW Plan should clearly recognize the uncertainty that pervades Delta decision making, and design an adaptive management plan to ensure that ongoing Delta management builds knowledge about the ecosystem and provides information for improved decision making.

The Delta Science and Engineering Board, with the support of the Science and Engineering Program, are the appropriate entities to design and implement this program. As part of the

preparation of this adaptive management strategy, they should build upon the work of the CALFED Science Program to:

- Synthesize existing knowledge about the Delta as a physical system;
- Carefully state expectations—hypotheses—about the effects of management actions recommended in the CDEW Plan on the ecosystem, water supply and other values;
- Recommend to the CDEW Council additional management actions expected to yield desired ecosystem or water supply outcomes or designed to generate useful knowledge about the Delta;
- Design monitoring programs to systematically gather needed data;
- Identify and put in place the processes by which the data will be synthesized, hypotheses evaluated, and new management actions recommended.

All results of these activities should be reported to the CDEW Council on a regular basis. On the five year cycles on which the CDEW Plan is reviewed and updated, the results must be integrated into a report on (a) knowledge of the Delta, (b) assessment of the success of current policies and management, and (c) identification, assessment, and recommendation of possible changes in policies or management.

Strategy 7.3: Finance the activities called for in the California Delta Ecosystem and Water Plan from multiple sources.

Successful governance of the Delta depends on a coherent, effective, and reliable financing structure.

That is anything but the case today. Existing funding is woefully short of accomplishing either part of the co-equal goals—let alone both.

New funding sources and strategies are needed to cover capital costs, make habitat improvements, buttress levees, and improve the wheeling of water. This new system of financing must be premised on beneficiaries of improvements paying commensurate to their benefit.

Any financing system will require flexibility. The benefits, costs, obligations, and risks in the Delta have not been quantified nor can they be with certainty. However the price tag is certainly in the tens of billions.

Vision Recommendations Met

9, 10, 12

Performance Measures

Finance tools deployed efficiently (+)

Projects and programs implemented with reliable funding (+)

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

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

The range of estimated costs for alternative conveyance provided by the Department of Water Resources (DWR), for example, is $4.2 billion for an eastern alignment to $7.2 billion for a western alignment. DWR estimates through-Delta improvements could cost from $1.2 billion to $9.6 billion depending on the seismic issues. Earlier Delta Risk Management Study analyses projected much larger costs: $26 billion for alternative conveyance and $32 billion for armored through-Delta conveyance.

A late 2007 summary of cost estimates of proposed Delta ecosystem revitalization projects totaled $2.5 billion. Levee improvements could cost as much $20 billion, according to the risk management study.

These estimates by entities other than the Task Force suggest that capital expenditures required for the Delta in the next 10 to15 years could range from $12 billion to $24 billion, with a high estimate of $80 billion. The annual operating costs of the California Delta Ecosystem and Water (CDEW) Council are unknown.

Bond funds are available for some of these capital investments and water contractors are prepared to pay the capital costs of alternative conveyance. But it is still a very large price tag.

Given the size of the price tag—and the uncertainty over ultimate costs—it is all the more important to ensure commitments to transparency and cost effectiveness as well as to generating broader sources of revenues. New participants will be identified and new funding sources developed over time. Californians must also maximize the availability and use of federal funding, and ensure access to all current and future bond funding.

Action 7.3.1: Enact a series of principles regarding design of financing into legislation authorizing the California Delta Ecosystem and Water Council.

These principles include:

a. Employ as wide a range of financing instruments as possible. Multiple revenue streams are always more effective than relying on a single source.

b. Assess beneficiaries of capital improvements a share of the costs and of the risks and liabilities. The state of California should be responsible for activities of broader benefit.

c. Ensure consistency and smart prioritization of spending by having revenues allocated by the CDEW Council. Provide effective mechanisms to protect revenues against diversion in tight budget years and also to ensure that all elements of the CDEW Plan advance together.

d. Create no expectation of public payment for any water required for ecosystem revitalization.

e. Make access to state funding contingent on a project contractor or a water right holder demonstrating full compliance with all aspects of California resources laws and policies, including complying with the CDEW Plan, possessing a legal right to divert, store,

convey, and use water and satisfying all applicable water quality and ecosystem regulations determined to protect the resources and values of the state.

f. Authorize terminating or reducing funding for any federal, state, or local agency that conducts activities inconsistent with the CDEW Plan or the policies of the CDEW Council.

Action 7.3.2: Establish a base of revenues outside the state General Fund for the work of the California Delta Ecosystem and Water Council, the Delta Conservancy, the Delta Protection Commission, and related core activities of the Department of Fish and Game, the Department of Water Resources, and the State Water Resources Control Board.

Those revenue sources should include:

a. Levy a per-acre-foot fee on water diversions within the Delta watershed, and a separate fee on any water conveyed through or around the Delta. These fees could be specific to activities recommended here or be undertaken on a broader basis to provide core funding for ecosystem and water resource policies statewide. In the latter approach, a sufficiently large fraction of revenues should be dedicated to the activities recommended here.

b. Protect revenues against diversion to other purposes in tight budget years and ensure that all elements of the CDEW Plan advance together by prohibiting use of funds for any purpose other than activities approved in the CDEW Plan. If no other effective approach is available, include a provision to halt conveyance of water through the Delta for the State Water Project if revenues earmarked to implementing the CDEW Plan are diverted to another purpose.

c. Require integrated action consistent with the CDEW Plan in any Delta-related bond or financing instrument. Similar provisions should be included in all contracts.

d. Require local interests to develop a finance plan to pay for the local share of a capital project. Local cost shares should be linked to the benefits received and the cost of services provided. Require a completed finance plan as a precondition for the design and construction phases of a major capital projects.

e. Impose the following conditions on any public and private beneficiaries of any CDEW Council financing:

i. Affirm that all actions by them support the CDEW Council's adopted CDEW Plan.

ii. Ensure full transparency in all fiscal arrangements.

iii. Comply with all existing policies and programs.

iv. Guarantee constancy through specific bond control language and contract provisions.

v. Use life-cycle costing and benefit-cost calculations.

vi. Require full allocation of costs and risks, in proportion to benefits received.

vii. Allow no subsidized use of California resources.

viii. Structure water rates to encourage conservation by greater use of variable rates, tiered rates, and connection fees.

ix. Develop a comprehensive funding plan for capital projects anticipated over the next 30 years, including operation and maintenance costs and assess the beneficiaries of each project.

x. Link any bond and/or appropriation of state funds ecosystem revitalization success and improved water supply reliability.

Action 7.3.3: Find new revenue sources beyond the traditional bond funds or public allocations.

Some possible sources include generating revenues through conservation, mitigation banking, sequestering carbon, and reducing carbon emissions to pay for ecosystem restoration.

a. Mitigation and Conservation Banking

Mitigation and conservation banking could provide important funds to help ecosystem restoration. A conservation bank generally protects threatened and endangered species habitat. Credits are established for the endangered or threatened species on the site. Conservation banks must be approved by the State and federal wildlife agencies. Mitigation banking is conservation banking except it applies specifically to wetland restoration, creation, and enhancement undertaken to compensate for unavoidable wetland losses.

b. Carbon Offsets

Established carbon markets are readily available and are increasingly accepted by State and federal authorities. On the Chicago Climate Exchange, contracts representing tonnage of carbon dioxide equivalent are traded. Converting farmed Delta islands with peat soils to natural wetlands could provide two types of offsets. The first comes from a reduction in subsidence. The Delta's peat subsides at a rate of one to three inches a year, mostly in the form of carbon dioxide releases. Another offset would come from the additional carbon dioxide sequestered by cattails or tules. The future carbon price is very uncertain but it appears that carbon dioxide offsets might repay a significant share of Delta island acquisition and wetland restoration costs.

c. Private and voluntary contributions

Contributions from landowners can help pay for ecosystem projects. Landowners can sometimes reduce their estate taxes by donations of fee simple or land easements. Financing campaigns can also garner private voluntary contributions for both broad purposes, which also enhance visibility and support such as a "Friends of the Delta"

effort or specific projects such as “Help Protect Critical Habitat for Aleutian Canadian Geese”).

Possible additional new sources of revenue include charging more for water of higher quality or reliability or assessing the value of levee improvements to navigation and recreation and charging appropriate fees for those uses.

Strategy 7.4: Optimize use of the CALFED Record of Decision and Coastal Zone Management Act to maximize participation of federal agencies in implementation of the California Delta Ecosystem and Water Plan.

Vision Recommendations Met

10, 12

Performance Measures

Approval of CDEW Plan under CZMA by Secretary of Commerce (+)

Number of federal agency actions that are not consistent with the CDEW Plan (-)

The federal government plays a major role in the management and regulation of the Delta. The Central Valley Project, run by the Bureau of Reclamation, stores and diverts millions of acre-feet of water in the Delta watershed each year. The Army Corps of Engineers maintains or regulates hundreds of miles of levees and other flood control facilities in the Delta and its tributary rivers. And the U.S. Fish and Wildlife Service and the National Marine Fisheries Service both enforce the federal Endangered Species Act to protect fish and other key species in the Delta. These are just the most prominent of the many federal agencies that influence the Delta.

Because Delta Vision is a state process, initiated by the Governor of California, it is critical to identify mechanisms to ensure effective federal participation in state-level plans. There are two primary means to achieve this on an integrated, comprehensive basis: the existing CALFED Record of Decision (ROD), and the Coastal Zone Management Act (CZMA) federal consistency provisions.

The CALFED process was formally initiated through a Record of Decision, signed by state and federal agencies in 2000. It is a legally binding document that identified CALFED plans and programs and defined specific roles for various agencies. The ROD continues to have legal force until it is rejected in a final court action, repealed legislatively, or “sunsets” without re-authorization. Even if that occurs at the state level, federal agencies would continue to be bound by it until equivalent federal decisions terminated their responsibilities under the ROD.

California has already adopted a Coastal Zone Management Program under provisions of the CZMA. The State must demonstrate capacity to implement its adopted Program and Federal agencies must act consistently with the adopted Program after it has been approved within

the federal government. California now has two major independent segments in its state adopted and federally approved Coastal Zone Management Program: one for the California Coastal Commission and one for the Bay Conservation Development Commission. These segments were developed independently at different times. The Delta appears to meet the legal definition of a coastal zone under CZMA. California can develop the CDEW Plan with processes which conform to the CZMA procedural requirements and submit it for federal approval as another independent segment of the Coastal Zone Management Program.[14]

The critical actions of this strategy are:

Action 7.4.1: Use existing authority under the CALFED Record of Decision to maximize participation of federal agencies in implementation of the Delta Vision Strategic Plan until the California Delta Ecosystem and Water Plan is completed.

a. CALFED should analyze the ROD to determine the extent to which federal agency roles and responsibilities under the ROD are compatible with the actions and strategies recommended in this Strategic Plan.

b. In the interim period before the CDEW Plan is completed to ensure federal agency consistency, CALFED agencies should use these existing authorities to begin implementation of actions and strategies recommended in this Strategic Plan, to the maximum feasible extent.

c. The CDEW Plan should consider the potential value of extending authorities granted to state and federal agencies by the CALFED ROD for implementation of the CDEW Plan.

Action 7.4.2: Prepare the CDEW Plan according to guidelines of the Coastal Zone Management Act, in order to achieve ongoing federal consistency.

See Strategy 7.2 for further discussion.

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Selected Meeting Materials

All meeting materials were important to the Delta Vision process. A selected handful is listed below to give the reader an idea of the information available to the Task Force. Meeting materials are available on the Delta Vision website at: http://www.deltavision.ca.gov/index.shtml.

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Appendix A
Executive Order S-17-06

APPENDIX A

Executive Order S-17-06

09/28/2006

WHEREAS the Sacramento-San Joaquin Delta estuary, including Suisun Bay and Marsh (hereafter "Delta"), supports a unique and irreplaceable combination of environmental and economic resources. The Delta is a source of water for farmlands, growing communities and businesses and provides a unique estuarine habitat for many resident and migratory fish and birds, some listed as threatened or endangered species. It is an area that supports vital energy, transportation, communications and water facilities, and important agricultural, recreational and cultural resources. The Delta is of state and national significance and must be protected and managed effectively for the future well being of the people and the environment; and

WHEREAS the Delta is intersected by highways, roads, and utility lines critical to regional, state and interstate commerce and economy; and

WHEREAS the Delta is the hub of California's two largest water distribution systems, the federal Central Valley Project and State Water Project, and at least 7,000 other permitted water diverters have developed water supplies from the watershed feeding the Bay-Delta estuary, providing drinking water to about 23 million people and irrigation water to about 7 million acres of highly productive agricultural lands; and

WHEREAS recent events like the Lower Jones Tract levee failure and Hurricane Katrina, and recent findings that indicate a two in three chance of a major earthquake occurring in or near the Delta in the next fifty years, have raised awareness and concerns about the vulnerability of Delta levees. Failure of Delta levees can have devastating consequences on farms, communities, roads, railways, power and fuel transmission lines, water conveyance and quality, wildlife resources, and the local and state economy; and

WHEREAS threats such as an aging levee system, regional climate change, rising sea levels, seismic events and urbanization pose an imminent threat to the Delta; and

WHEREAS recent legislation, a number of planning efforts and scientists have affirmed that current uses and ecosystem health in the Delta are unsustainable over the long-term; and

WHEREAS there is growing recognition that prior Delta and Suisun strategic planning efforts have been too narrowly focused on only a few of the Delta's many uses and resources; and

WHEREAS the combined threats and changing conditions within the Delta require immediate attention because of the potentially catastrophic environmental and economic consequences if timely action is not planned for and undertaken; and

WHEREAS the existing complex system of Delta governance has been criticized because no one level of government is fully in charge, or capable of responding in an orderly and effective way to address and mitigate the range of threats to the Delta.

NOW, THEREFORE, I, ARNOLD SCHWARZENEGGER, Governor of the State of California, by virtue of the power vested in me by the Constitution and statutes of the State of California, do hereby order effective immediately:

1. I hereby initiate the Delta Vision and establish an independent Blue Ribbon Task Force to develop a durable vision for sustainable management of the Delta. Making the Delta more sustainable will require a concerted, coordinated and creative response from leaders at all levels of government, stakeholders, academia and affected communities, and will require significant private and public partnerships and investments. The Delta Vision is designed to accomplish these goals:

(a) Meet the requirements of Assembly Bill 1200 (Water Code Sections 139.2 and 139.4), Assembly Bill 1803 (Water Code Section 79473) and SB 1574.

(b) Coordinate and build on the many ongoing but separate Delta planning efforts.

(c) Assess the risks and consequences to the Delta's many uses and resources in light of changing climatic, hydrologic, environmental, seismic, and land use conditions. This assessment will look at:

- The environment, including aquatic and terrestrial functions and biodiversity.
- Land use and land use patterns, including agriculture, urbanization, and housing.
- Transportation, including streets, roads, highways, waterways, and ship channels.
- Utilities, including aqueducts, pipelines, and gas/electric transmission corridors.
- Water supply and quality, municipal/industrial discharges and urban and agricultural runoff.
- Recreation and tourism, including boating, fishing, and hunting.
- Flood risk management, including levee maintenance.
- Emergency response.
- Local and state economies.

(d) Develop a program for sustainable management of the Delta's multiple uses, resources and ecosystem. Sustainable management of the Delta means managing the Delta over the long term to restore and maintain identified functions and values that are determined to be important to the environmental quality of the Delta and the economic and social well being of the people of the state. As part of the Delta Vision, priority functions and values will be identified, and measures necessary to provide long-term protection and management will be evaluated.

(e) Develop a Strategic Plan to implement findings and recommendations for public policy changes, public and private investment strategies, Delta-Suisun preparedness and emergency response plans for near-term catastrophic events, levee maintenance options, and how to monitor and report performance.

(f) Develop recommendations on institutional changes and funding mechanisms necessary for sustainable management of the Delta. Recommendations may include a discussion of oversight, land use and implementation authorities.

(g) Inform and be informed by current and future Delta planning decisions such as those pertaining to the CALFED Bay-Delta Program, Bay Delta Conservation Plan, Suisun Marsh Plan, Water Plan, updates of related General Plans, transportation and utilities infrastructure plans, integrated regional water management plans, and other resource plans.

2. The Secretary of the Resources Agency as chair, and the Secretaries of the Business, Transportation and Housing Agency, Department of Food and Agriculture and the California Environmental Protection Agency, along with the President of the Public Utilities Commission shall be the Delta Vision Committee, for the Delta Vision. They shall undertake the following:

(a) Explore entering into agreements with private and non-governmental organizations to receive funding for Delta Vision. In addition, the Director of Finance may also accept monetary and in kind contributions to support the activities of the Delta Vision.

(b) Create a Stakeholder Coordination Group to involve local government, stakeholders, scientists, engineers, and members of the public in this effort to develop a Delta Vision.

(c) Select Delta Science Advisors from diverse scientific disciplines to provide independent review and advice to the Blue Ribbon Task Force on technical, scientific, and engineering data, analyses, and reports.

(d) Report to the Governor and the Legislature by December 31, 2008 with recommendations for implementing the Delta Vision and Strategic Plan.

3. I will appoint the members of a Blue Ribbon Task Force to include diverse expertise and perspectives, policy and resource experts, strategic problem solvers, and individuals having successfully resolved multi-interest conflicts. The Task Force will seek input from a broad array of public officials, stakeholders, scientists, and engineers. The Task Force will prepare an independent public report that will be submitted to the Delta Vision Committee and Governor that sets forth its findings and recommendations on the sustainable management of the Delta by January 1, 2008 and a Strategic Plan to implement the Delta Vision by October 31, 2008.

4. Upon submittal of the Delta Vision Committee's recommendations to the Governor and Legislature, the Delta Vision initiative shall terminate unless extended by another executive order.

5. This order is not intended to create, and does not create, any right or benefit, whether substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, agents, or any other person.

IN WITNESS WHEREOF I have here unto set my hand and caused the Great Seal of the State of California to be affixed this 28th day of September 2006.

Appendix B
Recommendations by Agency

APPENDIX B

Action Recommendations by Agency

The following table identifies the State agencies responsible for taking the actions recommended and mobilizing others as needed. Agency names are abbreviated as follows:

BTH	California Business, Transportation, and Housing Agency
CCWD	Contra Costa Water District
CDEW Council	California Delta Ecosystem and Water Council
CVRWQCB	Central Valley Regional Water Quality Control Board
DFG	California Department of Fish and Game
DPC	Delta Protection Commission
DWR	California Department of Water Resources
OES	Office of Emergency Services
SWRCB	California State Water Resources Control Board

Goals, Strategies and Actions	**Responsible State Agency** (Assignment to a strategy applies to all related actions unless otherwise indicated)
Goal 1: Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California	
Strategy 1.1: Make the co-equal goals the foundation of Delta and water policy making.	Governor and Legislature
Action 1.1.1: Write the co-equal goals into the California Constitution or into statute.	
Action 1.1.2: Incorporate the co-equal goals into the mandated duties and responsibilities of all state agencies with significant involvement in the Delta.	
Action 1.1.3: Require the achievement or advancement of the co-equal goals in all water, environmental, and other bonds, and operational agreements and water contracts or water rights permits, that directly or indirectly fund activities in the Delta.	
Goal 2: Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals	
Strategy 2.1: Apply for federal designation of the Delta as a National Heritage Area, and expand the State Recreation Area network in the Delta.	Resources Agency with DPC
Action 2.1.1: Apply by 2010 for the designation of the Delta as a federally recognized National Heritage Area.	
Action 2.1.2: Expand by 2010 the State Recreation Area network in the Delta, combining existing and newly designated areas.	
Strategy 2.2: Establish market incentives and infrastructure to protect, refocus, and enhance the economic and public values of Delta agriculture.	California Department of Food and Agriculture
Action 2.2.1: Establish special Delta designations within existing federal and state agricultural support programs.	

Goals, Strategies and Actions	Responsible State Agency (Assignment to a strategy applies to all related actions unless otherwise indicated)
Action 2.2.2: Conduct needed research and development for agricultural sustainability in the Delta.	
Action 2.2.3: Establish new markets for innovative agricultural products and enterprises in the Delta.	
Strategy 2.3: Develop a regional economic plan to support increased investment in agriculture, recreation, tourism, and other resilient land uses.	Governor and Legislature authorize; DPC and local governments implement
Action 2.3.1: Charge the Delta Protection Commission with facilitating a consortium of local governments to create a regional economic development plan that addresses agriculture, recreation, tourism, and other innovative land uses.	
Action 2.3.2: Establish special enterprise zones at the major "gateways" to the Delta as part of the economic development plan.	
Strategy 2.4: Establish a Delta Investment Fund to provide funds for regional economic development and adaptation.	Governor and Legislature authorize and fund; DPC and local governments implement
Action 2.4.1: Initiate the Delta Investment Fund with state funding.	
Action 2.4.2: Structure the Fund so that it can accept revenues from federal, state, local, and private sources.	
Action 2.4.3: Place the Fund under the joint management of the Delta Protection Commission and a consortium of local governments.	
Strategy 2.5: Adopt land use policies that enhance the Delta's unique values, and that are compatible with the public safety, levee, and infrastructure strategies of Goal 6.	
Actions: See Goals 3 and 6 for actions to address this Strategy.	
Goal 3: Restore the Delta ecosystem as the heart of a healthy estuary	
Strategy 3.1: Restore large areas of interconnected habitats—on the order of 100,000 acres—within the Delta and its watershed by 2100.	Delta Conservancy, with DFG and DWR
Action 3.1.1: Increase the frequency of floodplain inundation and establish new floodplains.	
Action 3.1.2: Restore tidal habitats and protect adjacent grasslands and farmlands throughout the Delta, with active near-term pursuit of restoration targets.	
Strategy 3.2: Establish migratory corridors for fish, birds, and other animals along selected Delta river channels.	DFG, SWRCB, Delta Conservancy
Action 3.2.1: Improve physical habitats along selected corridors by 2015.	
Action 3.2.2: Provide adequate flows at the right times to support fish migrations, and reduce conflicts between conveyance and migration, by 2012.	
Action 3.2.3: Immediately use the Central Valley Flood Protection Plan to identify areas of the San Joaquin River within and upstream of the Delta where flood conveyance capacity can be expanded.	DWR
Action 3.2.4: Using the National Heritage Area and regional economic development planning efforts, begin immediately to identify ways to encourage recreational investment along the key river corridors.	DPC and local governments

Goals, Strategies and Actions	Responsible State Agency (Assignment to a strategy applies to all related actions unless otherwise indicated)
Strategy 3.3: Promote viable, diverse populations of native and valued species by reducing risks of fish kills and harm from invasive species.	DWR
Action 3.3.1: Reduce fish kills in Delta pumps by instituting diversion management measures by 2009, implementing near-term conveyance improvements by 2015, and relocating diversions.	
Action 3.3.2: Control harmful invasive species at existing locations by 2012, and minimize or preclude new introductions and colonization of new restoration areas to non-significant levels.	DFG, DWR, and SWRCB
Strategy 3.4: Restore Delta flows and channels to support a healthy Delta estuary.	Governor and Legislature provide direction and funding
Action 3.4.1: Charge the Department of Fish and Game with completing recommendations for in-stream flows for the Delta and high priority rivers and streams in the Delta watershed by 2012 and for all major rivers and streams by 2018.	DFG
Action 3.4.2: Develop and adopt management policies supporting increased diversion during wet periods, a joint effort of the State Water Resources Control Board, the Department of Fish and Game, the Department of Water Resources, and related federal agencies, to be completed by 2012.	SWRCB, DFG, and DWR
Action 3.4.3: Adopt new State Water Resources Control Board requirements by 2012 to increase spring Delta outflow. Commence implementation no later than 2015.	SWRCB
Action 3.4.4: Adopt new State Water Resources Control Board requirements by 2012 to reintroduce fall outflow variability no later than 2015.	SWRCB
Action 3.4.5: Increase San Joaquin River flows between February and June by revising the State Water Resources Control Board's Vernalis flow objectives and the state and federal water projects' export criteria. Revise the flow objectives and criteria no later than 2012 and commence implementation as soon as possible thereafter.	SWRCB
Action 3.4.6: Provide short-duration San Joaquin River pulse flows in the fall starting in 2015.	SWRCB
Action 3.4.7: Reconfigure Delta waterway geometry by 2015 to increase variability in estuarine circulation patterns.	DWR
Strategy 3.5: Improve water quality to meet drinking water, agriculture, and ecosystem long-term goals.	CVRWQCB
Action 3.5.1: Require the Central Valley Regional Water Quality Control Board to conduct three actions: Immediately re-evaluate wastewater treatment plant discharges into Delta waterways and upstream rivers and set discharge requirements at levels that are fully protective of human health and ecosystem needs. Adopt by 2010 a long-term program to regulate discharges from irrigated agricultural lands. Review by 2012 the impacts of urban runoff on Delta water quality and adopt a plan to reduce or eliminate those impacts.	CVRWQCB
Action 3.5.2: Relocate as many Delta drinking water intakes as feasible away from sensitive habitats and to channels where water quality is higher.	DWR and local water agencies
Action 3.5.3: Establish Total Maximum Daily Load programs by 2012 for upstream areas to reduce organic and inorganic mercury entering the Delta from tributary watersheds.	CVRWQCB

Goals, Strategies and Actions	Responsible State Agency (Assignment to a strategy applies to all related actions unless otherwise indicated)
Action 3.5.4: Begin comprehensive monitoring of water quality and Delta fish and wildlife health in 2009.	CVRWQCB, DFG
Goal 4: Promote statewide water conservation, efficiency, and sustainable use	
Strategy 4.1: Reduce urban, residential, industrial, and agricultural water demand through improved water use efficiency and conservation, starting by achieving a statewide 20 percent per capita reduction in water use by 2020.	Governor and Legislature provide direction and funding; DWR leads implementation
Action 4.1.1: Improve statewide water use efficiency and conservation.	
Action 4.1.2: Reduce urban per-capita water demand through specific recommended actions.	
Action 4.1.3: Ensure the most efficient use of water in agriculture.	
Strategy 4.2: Increase reliability through diverse regional water supply portfolios.	DWR leads, working with regions
Action 4.2.1: Modify the Water Recycling Act of 1991 to add a statewide target to recycle on the order of 1.5 million acre-feet of water annually by 2020.	
Action 4.2.2: Enact legislation now to encourage local water agencies to at least triple the current statewide capacity for generating new water supplies through ocean and brackish water desalination by 2020.	Governor and Legislature
Action 4.2.3: Request that the State Water Resources Control Board set goals by 2015 for infiltration and direct use of urban storm water runoff throughout the Delta watershed and its export areas.	Governor and Legislature
Action 4.2.4: Request agencies to ensure that accurate and timely information is collected and reported on all surface water and groundwater diversions in California by 2012.	SWRCB
Action 4.2.5: Require that all water purveyors develop an integrated contingency plan by 2015 in case of Delta water supply curtailments or drought.	DWR
Action 4.2.6: Establish a regulatory framework that encourages efficient and integrated management of water resources at local, regional, and statewide levels, with a focus on specific actions.	DWR and SWRCB
Goal 5: Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals	
Strategy 5.1: Expand options for water conveyance, storage, and improved reservoir operations.	DWR
Action 5.1.1: Direct the Department of Water Resources and other allied agencies to further investigate the feasibility of a dual conveyance facility, building upon the Bay-Delta Conservation Plan effort.	
Action 5.1.2: Direct the Department of Water Resources, the Department of Fish and Game, and other allied agencies to recommend the size and location of new storage and conveyance facilities by the end of 2010. Develop a long-term action plan to guide design, construction, and operation, and present the recommendation and plan to the California Delta Ecosystem and Water Council for a consistency determination.	
Action 5.1.3: Complete substantial development and construction of new surface and groundwater storage and associated conveyance facilities by 2020, with the goal of completing all planned facilities by 2030.	

Goals, Strategies and Actions	Responsible State Agency (Assignment to a strategy applies to all related actions unless otherwise indicated)
Strategy 5.2: Integrate Central Valley flood management with water supply planning.	DWR
Action 5.2.1: Change the operating rules of existing reservoirs to incorporate and reflect modern forecasting capabilities.	
Action 5.2.2: Require the Department of Water Resources to immediately create a flood bypass along the lower San Joaquin River.	
Action 5.2.3: Request that the Department of Water Resources encourage greater infiltration as part of watershed management planning.	
Goal 6: Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments	
Strategy 6.1: Significantly improve levels of emergency protection for people, assets, and resources.	OES, DPC, DWR and local governments
Action 6.1.1: Complete a Delta-wide regional emergency response plan by 2010 that establishes legally binding regional coordination.	
Action 6.1.2: Immediately begin a comprehensive series of emergency management and preparation actions.	
Action 6.1.3: Conduct a comprehensive analysis of the costs and benefits of highway protection strategies, and adopt a policy based on its findings by 2012.	CALTRANS
Action 6.1.4: Complete a comprehensive analysis of the costs and benefits of infrastructure protection strategies. Adopt a policy based on its findings by 2012.	BTH
Strategy 6.2: Discourage inappropriate land uses in the Delta region.	Local governments and DPC
Action 6.2.1: Immediately strengthen land use oversight of the Cosumnes/Mokelumne floodway and the San Joaquin/South Delta lowlands.	
Action 6.2.2: Immediately strengthen land use oversight for Bethel Island, the city of Isleton, and Brannan-Andrus Island.	
Action 6.2.3: Immediately prepare local plans for these five at-risk locations within the primary zone: Walnut Grove (including the residential area on Grand Island), Locke, Clarksburg, Courtland, and Terminous.	
Action 6.2.4: Immediately form a landowner consortium to create a new land use strategy that fosters recreation, increases habitat, reverses subsidence, sequesters carbon, improves handling of dredged material, and continues appropriate agriculture on Sherman, Twitchell, and Jersey Islands.	
Strategy 6.3: Prepare a comprehensive long-term levee investment strategy that matches the level of protection provided by Delta levees and the uses of land and water enabled by those levees.	DWR
Action 6.3.1: Require the Department of Water Resources, in cooperation with local Reclamation Districts and other agencies, to develop a comprehensive plan for Delta levee investments.	Governor and Legislature provide direction and funding
Action 6.3.2: Prioritize the $750 million appropriated by Proposition 1E and Proposition 84 funds for the improvement of Delta levees, including in legacy towns.	DWR
Action 6.3.3: Require those preparing the comprehensive levee plan to incorporate the Delta Levees Classification Table to ensure consistency between levee designs and the uses of land and water enabled by those levees.	Governor and Legislature provide direction

Goals, Strategies and Actions	Responsible State Agency (Assignment to a strategy applies to all related actions unless otherwise indicated)
Action 6.3.4: Continue the existing Department of Water Resources levee subventions program until the comprehensive levee plan is completed.	DWR
Action 6.3.5: Vest continuing authority for levee priorities and funding with the California Delta Ecosystem and Water Council to ensure a cost-effective and sustainable relationship between levee investments and management of the Delta over the long term.	CDEW Council
Goal 7: Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals	
Strategy 7.1: Establish a new California Delta Ecosystem and Water Council as a policy making, planning, regulatory, and oversight body. Abolish the existing California Bay-Delta Authority, transferring needed CALFED programs to the Council. Establish a new Delta Conservancy to implement ecosystem restoration projects, and increase the powers of the existing Delta Protection Commission.	Governor and Legislature
Action 7.1.1: Establish a California Delta Ecosystem and Water Council to replace the Bay-Delta Authority and take over CALFED programs.	
Action 7.1.2: Establish a California Delta Conservancy as early as possible in the 2009 legislative session.	
Action 7.1.3: Strengthen the Delta Protection Commission through legislation.	
Action 7.1.4: Require the California Delta Ecosystem and Water Council to create a Delta Science and Engineering Program and a Delta Science and Engineering Board by September 1, 2009.	
Action 7.1.5: Improve the compliance of diversions water use with all applicable laws.	
Strategy 7.2: Require the California Delta Ecosystem and Water Council to prepare a California Delta Ecosystem and Water Plan to ensure sustained focus and enforceability among state, federal, and local entities.	Governor and Legislature provide direction and funding; CDEW Council implements
Action 7.2.1: Develop a legally enforceable California Delta Ecosystem and Water Plan.	
Action 7.2.2: Institutionalize adaptive management through updates to the California Delta Ecosystem and Water Plan every five years.	
Action 7.2.3: Charge the Delta Science and Engineering Board, with support of the Delta Science and Engineering Program, to develop a science-based adaptive management program to provide for continued learning of, and adaptation to, actions implemented by state, federal, and local agencies in the Delta.	
Strategy 7.3: Finance the activities called for in the California Delta Ecosystem and Water Plan from multiple sources.	Governor and Legislature provide direction and authorization; CDEW Council implements
Action 7.3.1: Enact a series of principles regarding design of financing into legislation authorizing the California Delta Ecosystem and Water Council.	
Action 7.3.2: Establish a base of revenues outside the state General Fund for the work of the California Delta Ecosystem and Water Council, the Delta Conservancy, the Delta Protection Commission and related core activities of the Department of Fish and Game, the Department of Water Resources, and the State Water Resources Control Board.	

Goals, Strategies and Actions	Responsible State Agency (Assignment to a strategy applies to all related actions unless otherwise indicated)
Action 7.3.3: Find new revenue sources beyond the traditional bond funds or public allocations.	
Strategy 7.4: Optimize use of the CALFED Record of Decision and Coastal Zone Management Act to maximize participation of federal agencies in implementation of the California Delta Ecosystem and Water Plan.	CDEW Council
Action 7.4.1: Use existing authority under the CALFED Record of Decision to maximize participation of federal agencies in implementation of the Delta Vision Strategic Plan until the California Delta Ecosystem and Water Plan is completed.	
Action 7.4.2: Prepare the California Delta Ecosystem and Water Plan according to guidelines of the Coastal Zone Management Act, in order to achieve ongoing federal consistency.	
Near-Term Actions	
1. Obtain needed information on water diversion and use.	SWRCB
2. Initiate collection of improved socio-economic, ecosystem, and physical structure data about the Delta to inform policy processes and project level decision making by all public agencies, local, state, and federal.	DWR, DFG, DPC and local governments
3. Accelerate completion of in-stream flow analyses for the Delta watershed by the Department of Fish and Game.	DFG
4. Conduct a Middle River Corridor Two Barrier pilot project.	DWR
5. Complete construction of an alternative intake for the Contra Costa Water District.	CCWD
6. Evaluate the effectiveness of a Three Mile Slough Barrier project.	DWR
7. Construct a demonstration fish protection screen at Clifton Court Forebay.	DWR
8. Advance near-term ecosystem restoration opportunities.	DFG until Delta Conservancy created
9. Stockpile rock and other emergency response materials.	DWR
10. Assess and improve state capacity to respond to catastrophic events in the Delta.	OES

Appendix C
Delta Vision Process

APPENDIX C

Delta Vision Strategic Plan Process

History of Delta Vision Process

The Delta Vision process began in early 2007 after the Governor released his Executive Order S-17-06. Four groups, each with a distinct charge, were established under the Executive Order: the Blue Ribbon Task Force, the Delta Vision Committee, the Stakeholder Coordination Group, and the Delta Vision Science Advisors.

The seven-member independent Blue Ribbon Task Force completed its first charge, to develop the Delta Vision by 2007. This done, the Task Force spent most of 2008 completing its second charge, a Strategic Plan to carry out the Vision. In their meetings, the Task Force members heard statements from scientists, stakeholders, government officials, and the general public to assist in forming their strategic plan. The Task Force also requested and received ideas for the Strategic Plan from the general public. The Task Force held thirty-three days of meetings between March 1, 2007 and October 17, 2008.

The Delta Vision process coordinates with and builds upon many of the ongoing but separate Delta planning efforts. Among these are:

- The Bay-Delta Conservation Plan
- Delta Risk Management Strategy
- Delta Regional Ecosystem Restoration Implementation Plan
- Ecosystem Restoration Program's Conservation Strategy
- Suisun Marsh Plan

The five-member Delta Vision Committee is chaired by the Secretary for Resources; other members include the secretaries for the California Environmental Protection Agency; the Business, Transportation, and Housing Agency; the Department of Food and Agriculture; and the president of the Public Utilities Commission. These cabinet members will report to the Governor about the Vision and Strategic Plan in late 2008.

The 43-member Stakeholder Coordination Group was appointed by the chair of the Delta Vision Committee, and consists of representatives from major interests using or living in California's Delta. The Stakeholder Coordination Group presented the Task Force with two emerging visions for California's Delta and a list of near-term actions in August 2007. These emerging visions contributed greatly to forming the Vision. The Stakeholder Coordination Group met a few times in 2008 to provide constructive feedback to the Task Force regarding Strategic Plan development.

Two science advisors, Dr. Michael Healey and Dr. Jeffrey Mount, were appointed in 2007. They continue to consult with the Task Force and the Delta Vision Committee and to give advice about the scientific issues regarding the Delta. The science advisors formed an assessment team to review the scientific and technical issues related to carrying out the Strategic Plan.

Strategic Plan Process

After Our Vision for the California Delta was released in January 2008, work quickly began to complete the Delta Vision Strategic Plan. Developing the Strategic Plan is the second half of the charge given to the Blue Ribbon Task Force under Executive Order S-17-06. The Task Force relied on the assistance from work groups, external submissions from the public, consultants and public comments received on draft Strategic Plans and at outreach meetings during development of the final Strategic Plan.

Work Groups

To assist the Task Force in accomplishing the Strategic Plan, four work groups were assembled:

- Delta Ecosystem
- Delta-as-Place
- Water Supply and Reliability
- Governance and Strategic Finance

Each work group received a specific charge from the Blue Ribbon Task Force that built directly on the 12 Recommendations found in the Vision. Each work group charge included specific questions and issues the Task Force needed to address in order to develop the Strategic Plan. This approach helped to integrate the activities of the work groups.

Work groups members were named by the Task Force, and included government agency staff, consultants, Stakeholder Coordination Group members with noted relevant expertise, and others with similar experience. Work group membership was limited to ensure their ability to work quickly in the four months allotted for their respective tasks. Most work groups met five times, with the exception being the Governance and Finance workgroup which met seven times. There were two joint meetings between members from all the work groups to exchange and integrate ideas.

External Submissions

In April 2008, the Task Force issued an invitation to interested parties for proposals to include in the Strategic Plan. The invitation emphasized three areas: (1) governance and strategic finance, (2) reliable water for California, and (3) appropriately incorporating the principles of reasonable use and public trust in California water policy making. Submissions were accepted that addressed a single area, two areas, or all three areas. Integrated proposals addressing more than a single area were encouraged.

Eighteen external submissions were delivered and reviewed between April and June 2008. Submissions varied in length and technical detail; all were reviewed for inclusion in the Strategic Plan. Seven of the submissions focused on reliable water for California, four submissions focused on governance and finance, three focused on reasonable use and public trust, and four addressed multiple areas.

Public Participation

In addition to the public comments solicited at every Task Force meeting, the public were encouraged to provide written comments to the five drafts of the Strategic Plan. Well over 200 written comments were received on the various Strategic Plan draft documents. Nearly 80 comments were received about the Strategic Plan process in general.

Members of the public also had several opportunities to speak directly either to Task Force members or Delta Vision staff at a series of meetings held in the Delta and around the state. The first series of meetings, called "Delta Town Hall" meetings, were held between June 23-25, 2008, in Suisun City, Walnut Grove, and Stockton, respectively.

The Delta town hall meetings were designed to start an ongoing conversation between Delta residents and representatives of the many projects and programs run by various state agencies that have the Delta as their central focus. Some of the major projects that were discussed at those meetings were Delta Vision, the Bay-Delta Conservation Plan environmental documents, FloodSAFE California effort, Delta emergency response planning, Delta risk management, and habitat restoration efforts throughout the Delta region. More than 300 people attended these town hall meetings.

The Task Force held Delta Vision Strategic Plan outreach meetings to provide information, answer questions, and hear public comment about the plan from citizens throughout the state. These meetings took place throughout the state between August 18-28, 2008. The first meeting was in San Diego, followed by Los Angeles, Oakland, Chico, Fresno, Ryde, and Stockton. A member of the Task Force or the Delta Vision Executive Director was on hand at each meeting to listen and answer questions. Although attendance varied, the questions and insights provided by the citizens were helpful to the Task Force.