Appendix C
Policies and Recommendations of the Proposed Project and Alternatives

Appendix C Policies and Recommendations of the Proposed Project and Alternatives

This section contains the policies and recommendations for the Proposed Project and Alternatives 1A, 1B, 2, and 3.

C.1 Proposed Project

The Proposed Project Policies and Recommendations are based upon the Fifth Staff Draft Delta Plan, as presented in Tables C-1 through C-3.

Table C-1
Proposed Project Policies

Delta Plan Element	Policy Number	Policy
Governance	G P1	Certifications of consistency with the Delta Plan must address the following: ♦ A covered action must be consistent with the coequal goals and the inherent objectives. In addition, a covered action must be consistent with each of the policies contained in this Plan implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant policies may not be feasible. In those cases, covered action proponents must clearly identify areas where consistency is not feasible, explain the reasons, and describe how the covered action nevertheless, on whole, is consistent with the coequal goals and the inherent objectives. In those cases, the Delta Stewardship Council may determine, on appeal, that the covered action is consistent with the Delta Plan. ♦ All covered actions must be fully transparent by disclosing all potentially significant adverse environmental impacts and feasible mitigations of those adverse impacts. ♦ As relevant to the purpose and nature of the project, all covered actions must document use of best available science. ♦ Ecosystem restoration and water management covered actions must include adequate provisions, appropriate to the scope of the covered action, to assure continued implementation of adaptive management consistent with the Delta Plan. This requirement shall be satisfied through: • An adaptive management plan that describes the approach to be taken for each of the following nine steps of the adaptive management framework: – Define/Redefine the Problem. – Establish Goals and Objectives.

Table C-1
Proposed Project Policies

Delta Plan Element	Policy Number	Policy
		– Model Linkages Between Objectives and Proposed Action(s). – Select Action(s): Research, Pilot, or Full-Scale. – Design and Implement Action(s). – Design and Implement Monitoring Plan. – Analyze, Synthesize, and Evaluate. – Communicate Current Understanding. – Adapt. • Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process. ♦ All covered action proponents shall certify that the covered action shall comply at all times with existing applicable law.
Reliable Water Supply	WR P1	A covered action to export water from, transfer water through, or use water in the Delta is inconsistent with the Delta Plan if the covered action negatively impacts one or more of the coequal goals and one or more of the water suppliers[1] that receive water from the Delta significantly causes the need for the covered action by failing to comply with one or more of the following: ♦ Compliance with State law • Urban water suppliers2 – Adopt and implement an Urban Water Management Plan and all required elements and measures, meeting the standards and timelines established in Water Code section 10610 et seq. – Adopt and implement a plan to achieve 20 percent reduction in statewide urban per capita water use by December 31, 2020, meeting the standards and timelines established in Water Code section 10608 et seq. ♦ Agricultural water suppliers[3] • Adopt and implement Agricultural Efficient Water Management Practices including measurement of the volume of water delivered to customers, adoption of a pricing structure based in part on the quantity delivered, and implementation of specific conservation measures that are locally cost effective and technically feasible, meeting the standards and timelines established in Water Code section 10608 et. seq.

[1] Water suppliers, as used in this Delta Plan, refer to both “Urban water supplier” and “Agricultural water supplier” as defined in footnotes 2 and 3.

[2] “Urban water supplier” as used in this Delta Plan refers to both “urban retail water suppliers” and “urban wholesale water suppliers” under the Water Code. An “urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annual at retail for municipal purposes (Water Code section 10608.12(p)). An “urban wholesale water supplier “ means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of potable water annually at wholesale for municipal purposes (Water Code section 10608.12(r)).

[3] “Agricultural water supplier” as used in this Delta Plan refers to both “agricultural retail water suppliers” and “agricultural wholesale water suppliers” under the Water Code. An “agricultural water supplier” means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. An “agricultural water supplier” includes a supplier or contractor for water, regardless of the basis of right that distributes or sells water for ultimate resale to customers. “Agricultural water supplier” does not include DWR (Water Code section 10608.12(a)). Any agricultural water supplier than provides water to less than 25,000 irrigated acres is not required to comply with SBX7 7 requirements unless sufficient funding is provided to the supplier to implement these provisions (Water Code section 10853).

Table C-1
Proposed Project Policies

Delta Plan Element	Policy Number	Policy
		• Adopt and implement an Agricultural Water Management Plan and all required elements, meeting the standards and timelines established in Water Code section 10800 et seq.
		♦ Water Supply Reliability Element
		• To promote accountability throughout the state in achieving the coequal goals, water suppliers shall, no later than December 31, 2015, expand an existing or add a new Water Reliability Element in their Urban Water Management Plan and/or Agricultural Water Management Plan. Water suppliers may also meet this requirement by including a Water Reliability Element in an approved Integrated Regional Water Management Plan or other water plan that provides equivalent information.
		• The Water Reliability Element shall detail how water suppliers are sustaining and improving regional self-reliance and reducing reliance on the Delta through investments in local and regional programs and projects, and shall document actual or projected reduction in reliance on Delta exports. At a minimum, the Water Reliability Element shall include:
		– **A plan for possible interruption of Delta water supply due to catastrophic events:** Identify how reliable water service will be provided or shortages managed for minimum periods of 6 months, 18 months, and 36 months in the event that diversions or exports from the Delta are interrupted during an average water year, dry water year, and following three dry water years.
		– **Implementation of planned investments in water conservation, water efficiency, and water supply development:** Identify specific programs and projects that will be implemented over a 20-year planning period and how they are consistent with the coequal goals and will contribute to improved regional self-reliance and reduced reliance on the Delta, including, but not limited to, the following strategies[4]:
		▪ Water conservation ▪ Water use efficiency ▪ Local groundwater and surface storage ▪ Conjunctive use programs ▪ Water transfers ▪ Water recycling ▪ Treatment and use of currently non-potable groundwater ▪ Stormwater capture and recharge ▪ Saline water and brackish water desalination
		• **Evaluation of regional water balance:** Provide an assessment of the long-term sustainability of the water supplies available to meet projected demands within the supplier's hydrologic region, as defined by California Water Plan 2009 Update, over the 20-year planning period.[5] If the region's demand exceeds available supplies, identify the steps being taken through one or more of the Integrated Regional Water Management Plans to bring the region into long-term balance. If the region's demands exceed available supplies and it does not have an Integrated Regional Water Management Plan or the Plan does not address the steps being taken to bring the region into balance, then describe how the supplier's programs and projects are helping to bring the region into long term balance.

[4] The Department of Water Resources has identified 27 "resource management strategies" that water suppliers should consider as investments in water conservation, water efficiency, and water supply development.

[5] The purpose of a water balance is to provide an accounting of all water that enters and leaves a specific hydrologic region, how it is used, and how it is exchanged between regions. A water balance can be used to compare how water supplies and uses in a region can vary among wet, average, and dry hydrologic conditions and how each region's water balance compares with other regions and with the State's water balance. This is important to all water planning activities and provides a basis for evaluating unsustainable water management practices and making appropriate improvements.

Table C-1
Proposed Project Policies

Delta Plan Element	Policy Number	Policy
		• **Conservation-oriented water rate structure:** Evaluate the degree to which the supplier's current rate structure sustainably encourages and supports water conservation. ♦ Conservation-oriented Rate Structure • Water suppliers shall, by December 31, 2020, develop and implement a conservation-oriented rate structure, which may include consideration of a water-budget-based rate structure that sustainably encourages and supports more efficient water use without causing a shortfall in system revenues.[6]
Reliable Water Supply	WR P2	All new contracts, contract modifications, contract renewals and agreements to export water from, transfer water through, or use water in the Delta except transfers for up to one year in length, are not consistent with Delta Plan unless they have been developed in a transparent manner consistent with Department of Water Resources' revised policies adopted in 2003 for contract renewals and permanent transfers included in Attachment C-1 or comparable policies issued by the Bureau of Reclamation.
Delta Ecosystem Restoration	ER P1	Development, implementation and enforcement of new and updated flow requirements for the Delta and high priority tributaries is key to the achievement of the coequal goals. The State Water Resources Control Board should update the Bay-Delta Water Quality Control Plan objectives and establish flows as follows: a) By June 2, 2014, adopt and implement updated flow objectives for the Delta that are necessary to achieve the coequal goals.[7] b) By June 2, 2018, develop flow criteria for high-priority tributaries in the Delta watershed that are necessary to achieve the coequal goals.[8] Prior to the establishment of revised flow objectives criteria identified above, the existing Bay-Delta Water Quality Control Plan objectives shall be used to determine consistency with the Delta Plan. By June 30, 2013, the Delta Stewardship Council will request an update from the State Water Resources Control Board on items ER P1 (a) and (b). If the Board indicates the items (a) or (b) cannot be met by the dates provided, the Delta Stewardship Council will consider and may amend the Delta Plan to achieve progress on the coequal goals in place of the updated flow objectives. For example, the Delta Stewardship Council could: ♦ Determine that a covered action that would increase the capacity of any water system to store, divert, move, or export water from or through the Delta would not be consistent with the Delta Plan until the revised flow objectives are implemented. ♦ Recommend that the State Water Resources Control Board cease issuing water rights permits in the Delta and the Delta watershed (or, if the absence of flow criteria is specific to one or more of the major tributaries, then the recommendation could be focused on the impacted areas).

[6] A sustainable conservation-oriented rate structure has the following characteristics: encourages more efficient water use without causing a shortfall in system revenue; provides for the identification of waste, rewards efficient use, and penalizes excessive use; produces revenues from penalty rates that are used to fund conservation programs; is supported by a water bill that clearly communicates the cost of wasted water to the responsible person; and is supported by a person or staff who can respond to customers' calls for help in reducing usage.

[7] Flow requirements could be implemented through several mechanisms including water rights hearing, Federal Energy Regulatory Commission relicensing and negotiation and settlement. Implementation through hearings is expected to take longer than the deadline shown here.

[8] State Water Resources Control Board staff will work with the Delta Stewardship Council to determine priority streams. As an illustrative example, priority streams could include the Merced River, Tuolumne River, Stanislaus River, Lower San Joaquin River, Deer Creek (tributary to Sacramento River), Lower Butte Creek, Mill Creek (tributary to Sacramento River), Cosumnes River, and American River).

Table C-1
Proposed Project Policies

Delta Plan Element	Policy Number	Policy
Delta Ecosystem Restoration	ER P2	Habitat restoration actions shall be consistent with the habitat type locations shown on the elevation map in Attachment C-2, and accompanying text shown in Attachment C-3, based on the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions,* with minor alterations. The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the Ecosystem Restoration Program's Conservation Strategy as the strategy is revised.
Delta Ecosystem Restoration	ER P3	Actions other than habitat restoration, including new or amended local or regional land use plans, shall demonstrate that they have, in consultation with the Department of Fish and Game, avoided or mitigated within the Delta the adverse impacts to the opportunity for habitat restoration at the elevations shown in Attachment C-2. This policy does not apply within the following areas, defined as of January 1, 2012: ♦ Incorporated cities and their spheres of influence ♦ The Clarksburg Growth Boundary[9] ♦ The Contra Costa County Urban Limit Line[10] ♦ The Mountain House General Plan Community Boundary[11]
Delta Ecosystem Restoration	ER P4	State and local agencies constructing new levees, or substantially rehabilitating or reconstructing existing levees in the Delta shall evaluate , and, where feasible, incorporate alternatives (including use of setback levees) that would increase the extent of floodplain and riparian habitats. When available, criteria developed under RR R4 shall be used for determining appropriate locations for setback levees.
Delta Ecosystem Restoration	ER P5	Agencies proposing covered actions shall demonstrate that the potential for new introductions of or improved habitat conditions for nonnative invasive species have been fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.
Reduce Risk of Floods in the Delta	RR P1	Floodways[12] shall not be encroached[13] upon nor diminished without mitigating for future flood flows. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities unless they significantly decrease the existing level of flood protection.

[9] Yolo County. 2009. *Yolo County 2030 Countywide General Plan.* Land Use and Community Character Element. Adopted November 10. Woodland, CA.

[10] Contra Costa County. *Contra Costa County General Plan 2005-2020.* Land Use Element. Urban Limit Line Map as amended November 7, 2006.

[11] Mountain House Master Specific Plan Map, on file with the San Joaquin Community Development Department.

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

[13] As Described in the Department of Water Resources' "Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento-San Joaquin Valley": Encroachments and vegetation should be evaluated and managed so as to not impact levee safety, while recognizing their benefits.

Table C-1
Proposed Project Policies

Delta Plan Element	Policy Number	Policy
Reduce Risk of Floods in the Delta	RR P2	The following areas shall not be encroached upon because they are critical floodplains[14] and may also provide ecosystem benefit. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities, or maintenance and repair of existing infrastructure, unless they significantly decrease the existing level of flood protection. ♦ Areas located in the Yolo Bypass from Fremont Weir through Cache Slough to the Sacramento River including the confluence of Putah Creek into the bypass ♦ The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the Department of Water Resources or the U.S. Army Corps of Engineers. ♦ The Lower San Joaquin River Floodplain Bypass, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, RD 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.
Reduce Risk of Floods in the Delta	RR P3	Covered actions in the Delta must be consistent with Table C-2.
Reduce Risk of Floods in the Delta	RR P4	Prior to the completion of the Department of Water Resources' A Framework for Department of Water Resources Investments in Delta Integrated Flood Management, guidelines for the Delta Levee Special Flood Control Projects and Subventions programs (included as Attachment C-4) shall be used to determine consistency of projects using state funds with the Delta Plan. This Framework shall be completed by the Department of Water Resources, in consultation with the Central Valley Flood Protection Board and Delta Stewardship Council, by January 1, 2013. Upon completion, the Framework shall be considered by the Delta Stewardship Council for adoption to direct State investments for levee operation, maintenance, and improvements in the Delta. If this Framework is not completed by January 1, 2013, the Delta Stewardship Council will define a strategy for State investments.

Source: Fifth Staff Draft Delta Plan, August 2, 2011

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

Table C-2
Proposed Project RR P3: Levee Classifications for Covered Actions

	Basis for the Minimum Levee Design Classifications				
Covered Actions[a]	**Class 1: No Specified Level of Flood Protection**	**Class 2: HMP[b]**	**Class 3: PL 84-99[c]**	**Class 4: FEMA 100-Year[d]**	**Class 5: DWR 200-Year[e]**
Agriculture, recreation and ecosystem restoration actions designed to be periodically inundated	Designed on a site-specific basis to manage appropriate level of flood risk for individual projects				
Agriculture-related non-residential on-farm structures without substantial employees	Not acceptable	Acceptable	Acceptable	Acceptable	Acceptable
Above-ground utilities and transportation facilities	Not acceptable	Not acceptable	Acceptable	Acceptable	Acceptable
Development of subdivisions of four or fewer parcels in non-urbanized areas[f]	Not acceptable	Not acceptable	Not acceptable	Acceptable	Acceptable
Development of subdivisions of more than four parcels in non-urbanized areas within Legacy Towns[f][g]	Not acceptable	Not acceptable	Not acceptable	Currently, non-minor subdivision development in non-urbanized areas in the Delta requires at least Federal Emergency Management Agency 100-Year standards. For the Delta Plan, specific levee design standards for Legacy Towns to be developed following completion of the Delta Protection Commission Economic Sustainability Plan. The Council should review this issue by January 1, 2013, in coordination with the development of the Central Valley Flood Protection Plan.	
Development of subdivisions of more than four parcels in non-urbanized areas not within Legacy Towns[f][g][h]	Not acceptable	Not acceptable	Not acceptable	Not acceptable	Acceptable These developments are highly discouraged and may be inconsistent with the Delta Plan regarding protection of lands that are or could be used for agriculture and/or ecosystem[i]
All development in urban areas[h]	Not acceptable	Not acceptable	Not acceptable	Not acceptable	Acceptable[i]

[a] Minimum Levee Design Classifications would only apply to new projects undertaken following the adoption of the Delta Plan and are not retroactive. All levee standards would need

to be periodically modified to accommodate sea level rise and hydraulic effects of climate change.

[b] HMP (Hazard Mitigation Plan) standards are defined by geometric levee criteria were developed in the 1980s based upon historical flood elevations, and were to be interim standards through Hazard Mitigation Plans approved by Federal Emergency Management Agency. These standards have not been modified to reflect more recent flood events with higher elevations, such as the 100-year flood level.

[c] PL (Public Law) 84-99 standards as developed by U.S. Army Corps of Engineers. These standards are defined by geometric levee criteria developed in the 1980s based upon historical flood elevations for major rivers, such as the Mississippi River, and modified in the 1980s for Delta soil conditions. These standards have not been modified to reflect more recent flood events with higher elevations, such as the 100-year flood level.

[d] FEMA (Federal Emergency Management Agency) 100-Year Standards in accordance with Federal Emergency Management Agency and National Flood Insurance Program regulations, including criteria defined in 44 Code of Federal Regulations 65.10 for levees accredited by Federal Emergency Management Agency as providing 100-year flood protection.

Other actions which provide 100 year flood protection, such as floodproofing by elevating the structure above the flood elevation, may be considered on a project specific basis by appropriate local agencies.

[e] DWR (Department of Water Resources) 200-Year Standards based on current Department of Water Resources urban levee design criteria for the 200-year flood event water surface elevation, in accordance with the Central Valley Flood Protection Act of 2008 (Senate Bill 5, 2008).

[f] Urban Areas and Non-Urbanized Areas as defined in California Government Code section 65007(e, j). Developed area as defined in California Government Code section 65007(c).

[g] Legacy Towns are defined for the purposes of Table 7-1 as the following communities along the Sacramento River: Clarksburg, Courtland, Freeport, Hood, Isleton, Locke, Ryde, and Walnut Grove.

[h] Levees for non-urbanized and urban areas should comply with requirements contained in the Department of Water Resources *Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento–San Joaquin Valley*.

[i] Urbanized areas will be required to be fully compliant with DWR 200-Year standards by 2025 to be consistent with the deadline established for Urban Areas by Central Valley Flood Protection Act of 2008.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R1	The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and approve, by December 31, 2012, guidelines for the preparation of a Water Reliability Element that satisfies the criteria contained in WR P1.
Reliable Water Supply	WR R2	The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and include in the future California Water Plan updates the information needed to track the water supply reliability performance measures identified in the Delta Plan and assess improvements in regional self reliance, reduced reliance on the Delta, and statewide water supply reliability.
Reliable Water Supply	WR R3	The Department of Water Resources, the State Water Resources Control Board, the Department of Public Health, and other agencies, in consultation with the Delta Stewardship Council, should revise State grant and loan ranking criteria by December 31, 2012, to provide a priority for water suppliers that include a Water Reliability Element in their adopted Urban Water Management Plans, Agricultural Water Management Plans, and/or Integrated Regional Water Management Plans that satisfies the requirements of WR P1. The Delta Stewardship Council will also work with these agencies to identify additional funding and other incentives to catalyze implementation of local and regional water conservation, water use efficiency, conjunctive management, and other projects that will improve regional self-reliance and reduce reliance on the Delta.
Reliable Water Supply	WR R4	All state agencies should take a leadership role in designing new and retrofitted state owned and leased facilities, including buildings and Caltrans facilities, to increase water efficiency, use recycled water, incorporate stormwater runoff capture and low impact development strategies, and reduce reliance on the Delta. The Delta Stewardship Council will work with these agencies to identify regulations and other policies that will support the improved water efficiencies and new water supply strategies, such as completion of uniform recycling criteria for potable reuse for groundwater recharge, consistent with SB 918 (Water Code section 13521 et seq.).
Reliable Water Supply	WR R5	The State Water Resources Control Board and/or the Department of Water Resources should require that proponents requesting a new point of diversion, place of use, or purpose of use that results in new or increased use of water from the Delta watershed should demonstrate that the project proponents have evaluated and implemented all other feasible water supply alternatives.
Reliable Water Supply	WR R6	The Department of Water Resources should complete the Surface Water Storage Investigations of proposed off-stream surface storage projects by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the State's surface storage.
Reliable Water Supply	WR R7	The Department of Water Resources, in coordination with the California Water Commission , Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance facilities, and enhance opportunities for conjunctive use programs and water transfers. The California Water Commission should hold hearings and provide recommendations on priority projects. These recommendations should be used to support water supplier requests for state grants and loans and other sources of funding for these projects.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R8	The Department of Water Resources, in collaboration with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board and other state, Federal, and local agencies, should update Bulletin 118 using field data, California Statewide Groundwater Monitoring Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014. This Bulletin update should include a systematic evaluation of the major groundwater basins to determine sustainable yield and overdraft status, an evaluation of California's groundwater resources in 20 years if current groundwater management trends remain unchanged, the anticipated impacts of climate change on groundwater resources, and the recommendations for actions by state, Federal and local actions to improve groundwater management. In addition, the Bulletin update should identify groundwater basins in a critical condition of overdraft. This information should be available for inclusion in the Urban Water Management Plans and Agricultural Management Plans required to be submitted to the State by December 31, 2015.
Reliable Water Supply	WR R9	Water suppliers that receive water diverted or exported from the Delta watershed and that receive a significant percentage of their long-term average water supplies from groundwater should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003) by December 31, 2014.
Reliable Water Supply	WR R10	Local and regional agencies in groundwater basins that have been identified by the Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003), by December 31, 2014. If local or regional agencies fail to develop and implement these groundwater management plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2 prohibition on unreasonable use of water and whether a groundwater adjudication is needed to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code Section sections 2100-2101. [15]
Reliable Water Supply	WR R11	The Department of Water Resources, in coordination with the State Water Resources Control Board, the Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, Delta Stewardship Council, and other stakeholders should create by January 1, 2014, and maintain an integrated statewide system for water use monitoring. This new system should consolidate information into a single statewide data base that is in an electronic format and made available to the public online. It should be designed to simplify reporting, reduce the number of required reports, and be coordinated with the reporting requirements for the Urban Water Management Plans/Agricultural Water Management Plans and Integrated Regional Water Management Plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the data base when it becomes available. The Department of Water Resources should every 5 years summarize and incorporate the key information collected through the statewide integrated data base in the California Water Plan Update.
Reliable Water Supply	WR R12	The Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that require the implementation of WR P1.

[15] The State Water Resources Control Board anticipates the development of a Strategic Workplan for Groundwater by 2012 that will lay out the Board's plans to protect groundwater, including (1) application of the State Water Resources Control Board's water quality and water rights authorities to address the problems that have the greatest potential to impact beneficial uses of groundwater; (2) focus resources on the most important problems; and (3) encourage efforts to protect and management groundwater at the local or regional level.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R1	The Delta Stewardship Council acknowledges the importance of expediting habitat restoration in the Delta and its watershed and recommends the prioritization and implementation of habitat restoration projects in the following areas, shown in Attachment C-5. Habitat restoration projects should consider landscape elements including connectivity between areas to be restored and existing habitat areas needed for the full life cycle of species targeted to benefit from the restoration project. Where possible, restoration projects should emphasize the potential for water quality improvement. Restoration project proponents should coordinate with local vector control districts in implementing projects. ♦ **Cache Slough Complex.** The flood basins entering the Cache Slough Complex are the interface between river and tidally influenced portions of the Delta. A significant portion of the region should return to uplands with vernal pool and grassland habitats and broad nontidal, freshwater, emergent plant-dominated wetlands that grade into tidal freshwater wetlands, shallow subtidal and deep open water habitats. A restoration project in this area is the passively restoring Liberty Island. Projects in the planning stage include the Department of Water Resources' Prospect Island restoration project. ♦ **Cosumnes River–Mokelumne River Confluence.** Unregulated and minimally regulated rivers should allow frequent and regular winter and spring overbank flooding to create seasonal floodplain and riparian habitats grading into tidal marsh and shallow subtidal habitats. An existing restoration project is the Cosumnes River Preserve floodplain restoration. Projects in the planning stage include the Department of Water Resources' North Delta Flood and Ecosystem Restoration Project on McCormack-Williamson Tract. ♦ **Lower San Joaquin River Floodplain.** Historically, the south Delta and its connection to the lower San Joaquin River contained a complex network of channels with low natural berms, large woody debris, willows, and other shrubs with upland areas supporting open oak woodlands. Reconnection of significant portions of the floodplain, along with more natural flows, stimulates food webs that support native species. Projects in the planning stage include the Lower San Joaquin Flood Bypass proposed by the South Delta Levee Protection and Channel Maintenance Authority and partners. ♦ **Suisun Marsh.** The largest wetland area on the west coast of the contiguous United States, Suisun Marsh has been mostly disconnected from the estuary. Restoring significant portions of Suisun Marsh provides the brackish portion of the estuary with sea level rise accommodation space, opportunities for extensive land-water interface dynamics, and compressed chemical and biological gradients that support productive and complex food webs to which native species are adapted. An ongoing restoration project is the Department of Water Resources' Blacklock Restoration Project. Projects in the planning stage include the Department of Fish and Game's Hill Slough Restoration Project. ♦ **Yolo Bypass.** The current operation of the Yolo Bypass as a flood control project provides substantial ecosystem benefits for Sacramento splittail spawning and rearing and salmon rearing. Enhancing the ability of Yolo Bypass to be "activated" by higher-frequency, lower-magnitude flood levels provides more opportunity for migrating fish, especially Chinook salmon, to use this system as a migration corridor rich in refugia and food resources. Projects in the planning stage include fish passage improvements, and various approaches, such as notching the Fremont Weir, to increase the frequency and duration of inundation during times of year critical for spawning and rearing of native fish.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R2	As part of its Strategic Plan, and subsequent Implementation Plan or annual work plans, the Sacramento–San Joaquin Delta Conservancy should: ♦ Develop and adopt criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles. ♦ Develop and adopt processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration. ♦ Develop and adopt a formal mutual agreement with the Department of Water Resources, Department of Fish and Game, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh. ♦ Develop, in conjunction with the Wildlife Conservation Board, the Department of Water Resources, Department of Fish and Game, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program's Conservation Strategy. ♦ Lead an effort to develop a habitat credit program that provides credit for each of these steps: acquisition in preparation for future restoration; preservation, management, and enhancement of existing habitat; restoration of habitat; and monitoring and evaluation of habitat evolution and ecological outcomes. ♦ Work closely with the Delta Science Program to: • Incorporate the best available understanding of the scales, patterns, and processes of the historical landscape to guide land acquisition strategies and restoration design. • Apply the best understanding of landscape ecology as a unifying perspective for restoring processes and functions on degraded landscapes. • Construct landscape-level conceptual models for key regions of the Delta and Suisun Marsh to clarify how more natural flows and ecosystem restoration confer resilience to native species while promoting processes of self-repair of modified landscapes. Conceptual design models should engage hydrodynamics, transport, particle tracking, and food web models to support and integrate the interdisciplinary perspectives. • Study available habitat reference sites to increase understanding of well-functioning habitats and to inform performance measure metrics and trajectories.
Delta Ecosystem Restoration	ER R3	State and federal fish agencies (California Department of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service) should complete ongoing negotiations toward a habitat credit agreement with water supply agencies.
Delta Ecosystem Restoration	ER R4	Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should work with the Department of Fish and Game and the Department of Water Resources to develop and execute an agreed-upon variance process to exempt Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.
Delta Ecosystem Restoration	ER R5	The Department of Fish and Game and the U.S. Fish and Wildlife Service should develop rules for voluntary Safe Harbor agreements with property owners in the Delta whose actions contribute to the recovery of listed threatened or endangered species.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R6	The Department of Fish and Game and other appropriate agencies should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" and accompanying text shown in Attachment C-6 taken from the *Conservation Strategy for Restoration of the Sacramento San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*. The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* as the strategy is revised.
Delta Ecosystem Restoration	ER R7	The Delta Science Program, in conjunction with the Department of Fish and Game, the Department of Water Resources, the State Water Resources Control Board, and other relevant agencies and stakeholders, should conduct workshops to develop recommendations to the Delta Stewardship Council for measures to reduce stressor impacts on the Delta ecosystem that would support and be consistent with the coequal goals. For example, workshops would consider options for varying salinity to reduce impacts of nonnative invasive species while providing overall ecosystem benefits and minimally disrupting water supply. The recommended measures could be adopted as policies or recommendations by the Delta Stewardship Council into an amended Delta Plan. The resulting recommendations should be provided to the Delta Stewardship Council by January 1, 2013.
Delta Ecosystem Restoration	ER R8	The relevant federal, State, and local agencies should complete the Bay Delta Conservation Plan, consistent with the provisions of the Delta Reform Act, and receive required incidental take permits by December 31, 2014. If the Bay Delta Conservation Plan process is not completed by this date, the Delta Stewardship Council will consider how to proceed with an alternative approach to develop and complete the ecosystem and conveyance planning process.
Improve Water Quality	WQ R1	The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy by July 2013, with implementation to follow.
Improve Water Quality	WQ R2	The Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project EIR by July 1, 2012, and begin construction as soon as possible thereafter.
Improve Water Quality	WQ R3	The State Water Resources Control Board and/or Central Valley Regional Water Quality Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.
Improve Water Quality	WQ R4	The Department of Public Health, State Water Resources Control Board, and Department of Water Resources should prioritize funding for small and disadvantaged communities that lack access to safe drinking water supplies or resources for adequate wastewater treatment.
Improve Water Quality	WQ R5	The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should require all recipient regions that are supplied water from the Delta or the Delta Watershed or discharge wastewater to the Delta or the Delta Watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program (CV-SALTS).

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R6	The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and if possible accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that: ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should develop and adopt objectives, either narrative or numeric, where appropriate, for nutrients in the Delta and Delta watershed by January 1, 2014. ♦ The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013. ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016. ♦ The San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for selenium and methylmercury and efforts to support their implementation should be coordinated. ♦ The State Water Resources Control Board and San Francisco Bay and Central Valley Regional Water Quality Control Boards should continue to participate in efforts revise water quality objectives for selenium.
Improve Water Quality	WQ R7	The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the Department of Water Resources, Department of Fish and Game, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis.
Improve Water Quality	WQ R8	The Central Valley Regional Water Quality Control Board, consistent with existing Water Quality Control Plan policies and water rights law, should require responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.
Improve Water Quality	WQ R9	The State Water Resources Control Board and Regional Water Quality Control Boards should conduct or require special studies of pollutants including emerging contaminants and causes of toxicity in Delta waters and sediments by January 1, 2014.
Improve Water Quality	WQ R10	To comply with the San Francisco Bay Conservation and Development Commission water quality policies and facilitate the commission's impact determination, proponents of actions potentially affecting water quality in Suisun Marsh should consult with the San Francisco Bay Regional Water Quality Control Board and obtain all necessary authorizations early in the process.
Improve Water Quality	RR R1	The Legislature should fund the Department of Water Resources and the Central Valley Flood Protection Board to evaluate and implement a bypass and floodways on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstem San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c).

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	RR R2	The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the *Delta Dredged Sediment Long-Term Management Strategy* (Attachment C-7), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals.
Improve Water Quality	RR R3	The Delta Stewardship Council should coordinate with the Department of Water Resources, Department of Parks and Recreation, and other appropriate local agencies to develop a plan identifying appropriate levels of flood protection relating to specific land and recreation uses for State recreation facilities in the Delta. This plan should address emergency response and notification procedures for recreational users.
Reduce Risk of Floods in the Delta	RR R4	The Department of Water Resources, in conjunction with the Department of Fish and Game and Delta Conservancy, should develop criteria to define locations for future setback levees in the Delta and Delta watershed. Until then, the siting of future permanent structures should provide adequate area to accommodate future setback levees.
Reduce Risk of Floods in the Delta	RR R5	The Department of Water Resources' *A Framework for Department of Water Resources Investments in Delta Integrated Flood Management* should: ♦ Define State interests related to flood and levee management in the Delta. These State interests should, at a minimum, include: • Reducing risk of loss of life. • Protecting water supply. This should address identifying and assessing critical water supply corridor levee operations, maintenance, and improvements for all existing municipal and industrial water diversions in the Delta. • Protecting water quality and the ecosystem. • Protecting critical infrastructure of statewide importance (including pipelines, energy transmission facilities, aqueducts, and State highways). • Protecting property. ♦ Define a long-term levee policy for the Delta, which, at a minimum, should determine those levees critical for protecting State interests. ♦ Recognize the wide variability of conditions across the Delta including depth of inundation upon failure; current condition of existing levees; and degree of exposure to seismicity, sea level rise, climate change, and river flood levels. ♦ Define a methodology for assessing existing Delta levee conditions, as well as on a systematic, routine, and coordinated basis, to develop a sound technical understanding and assessment capability to base levee related decisions. This information should be collected and reported in a transparent manner, and shall include the production of a Delta levee conditions map. ♦ Define a methodology for proactively identifying, developing, prioritizing, and scheduling specific levee operations, maintenance, and improvement projects. ♦ Define a method for determining project costs, cost share, and project partners, if appropriate. ♦ Define procedures that distinguish Delta Levees Special Flood Control Projects from routine levee maintenance projects.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R6	The following actions should be taken by January 1, 2013, to promote effective emergency preparedness and response in the Delta: ♦ Responsible local, State, and federal agencies with emergency response authority should consider and implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta. ♦ The California Emergency Management Agency, Department of Water Resources, U.S. Army Corps of Engineers, appropriate Operational Areas and other State and local partners should cooperatively participate in Delta-specific emergency preparedness activities. These activities should include but not be limited to the development and maintenance of a Sacramento-San Joaquin Delta Flood Catastrophic Incident Plan, a Regional Mass Evacuation Plan and an Interoperable Communications Plan; adoption and implementation of a Delta Multi-Agency Coordination System (MACS); participation in federal and State flood and evacuation contingency mapping; and regularly scheduled all-hazards drills and exercises. Public education and outreach program topics should include flood risk awareness, emergency preparedness, alert and notification. ♦ Cal EMA in collaboration with local, State and federal emergency response agencies in the Delta region should develop a training plan that is consistent with SEMS and NIMS requirements and compliments the development of plans, procedures and protocols that address all hazards that pose a threat to the Delta. ♦ In consultation with local agencies, the Department of Water Resources should expand its emergency stockpiles to make them regional in nature and usable by a larger number of agencies in accordance with Department of Water Resources' plans and procedures. The Department of Water Resources, as a part of this plan, should evaluate the potential of creating stored material sites by "over-reinforcing" west Delta levees. ♦ State and local agencies and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.
Reduce Risk of Floods in the Delta	RR R7	The Delta Stewardship Council should convene a working group to develop and evaluate recommendations to the Department of Water Resources to address appropriate response actions to both routine and catastrophic Delta levee failures. The working group should include the Delta Protection Commission and other interested parties, and the recommendations should be completed by January 1, 2013.
Reduce Risk of Floods in the Delta	RR R8	The Legislature should provide specific immunity for public safety flood protection activities, similar to that provided for police and fire protection services.[16]
Reduce Risk of Floods in the Delta	RR R9	The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in flood-prone areas.

[16] Sections 850 – 850.8 (Fire Protection Services). Section 850 provides immunity for the government not providing fire protection services. Sections 850.2 through 850.8 provide governmental immunity related to the actual provision of fire protection services (i.e., failure to maintain sufficient fire protection facilities, injuries sustained while transporting a person from a fire to medical facility, etc.).

Section 845 (Police Protection Services). Section 845 provides governmental immunity for the failure to provide police protection services or the provision of insufficient police protection services.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R10	The Legislature should create a Delta Flood Risk Management Assessment District with fee assessment authority (including over State infrastructure) to provide adequate flood control protection and emergency response for the regional benefit of all beneficiaries, including landowners, infrastructure owners, and other entities that benefit from the maintenance of the levees, such as water users who rely on the levees to protect water quality. This district should be authorized to: ♦ Develop, fund, and implement a regional plan of flood management for both Project and non project levees of the Delta in cooperation with the existing reclamation districts, cities, counties, and owners of infrastructure and other interests protected by the levees; ♦ Conduct levee elevation surveys and inspections at least every 5 years, and report data to Department of Water Resources; ♦ In coordination with Department of Water Resources and the U.S. Army Corps of Engineers, establish standardized flood risk measurement data. This data should support the development of Expected Annual Damage and loss of life values for the Delta, to be conducted by the District annually. Expected Annual Damage is a measure of risk that integrates the likelihood and consequences of flooding, and is a standard measure of the benefits of reducing flood risk. The U.S. Army Corps of Engineers is currently developing a levee risk management system, including means to evaluate and rank risk of loss of life and flood damages for levee systems; ♦ Notify residents and landowners of flood risk, personal safety information, and available systems for obtaining emergency information before and during a disaster on an annual basis; and ♦ Potentially implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) in conjunction with local, State, and federal agencies and maintain the resulting regional response system and components and procedures on behalf of SEMS jurisdictions (reclamation district, city, county, and State) that would jointly implement the regional system in response to a disaster event. ♦ Identify and assess critical water supply corridor levee operations, maintenance, and improvements.
Reduce Risk of Floods in the Delta	RR R11	State agencies should not renew or enter into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence-reversal or reduction programs.
Reduce Risk of Floods in the Delta	RR R12	U.S. Army Corps of Engineers, Bureau of Reclamation, Department of Water Resources, and local agencies and hydropower utilities should evaluate and modify flood control management procedures for reservoirs upstream of the Delta with consideration for sea level rise, changes in timing and form of precipitation, and changes in water supply operations to alleviate potential Delta flooding.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R1	The Economic Sustainability Plan should include, but not be limited to, planning for the following items: ♦ Public safety recommendations, such as flood protection recommendations ♦ The economic goals, policies, and objectives in local general plans and other local economic efforts, including recommendations on continued socioeconomic sustainability of Delta agriculture and its infrastructure to support the proposed economic strategies and legacy communities in the Delta ♦ Comments and recommendations to the Department of Water Resources concerning its periodic update of the flood management plan for the Delta. ♦ Identification of ways to encourage recreational investment along the key river corridors, as appropriate
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R2	The Delta Protection Commission should complete the evaluation and initiate recommendations related to designation of the Delta and Suisun Marsh as a National Heritage Area. If the recommendation is to proceed with the designation, the federal government should complete the process in a timely manner.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R3	The Department of Transportation should partner with local cities and counties to establish major gateways and improve connecting transportation routes, bike lanes, sidewalks, and trails to promote the Delta's identity, visibility, and access.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R4	The Department of Parks and Recreation should develop funding sources and partner with other State and federal agencies, counties, conservancies, and nonprofits to conduct definitive and consistent recreation use surveys every 5 years and add and/or improve recreation facilities in the Delta, including facilities to meet public recreational needs as part of State Water Project facilities, and add three new parks at Barker Slough, Elkhorn Basin, and in the Southern Delta.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R5	The Department of Fish and Game should collaborate with other agencies and nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R6	The Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.
Finance Plan Framework	FP R1	Public and private agencies with infrastructure crossing the Delta should protect their assets from flooding and other natural disasters. ♦ The Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The Delta Stewardship Council, in consultation with the Public Utilities Commission and the Delta Protection Commission, should allocate these funds between State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency. ♦ The Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, in order to minimize the impact on the State's economy. ♦ The Governor, by Executive Order, should direct State agencies with projects or infrastructure in the Delta to set aside a reasonable amount of funding to pay for flood protection and disaster prevention. The local share of these funds should be allocated as described above.
Finance Plan Framework	FP R2	A Delta Flood Risk Management Assessment District (as described for RR R9) should be created and initially funded with $10 million dollars to develop a benefit assessment plan for the Delta. The Council also recommends an additional $100 million for implementation of flood management improvements to be funded by Propositions 1E and 84 and matched up to 50 percent with non-State funding.
Finance Plan Framework	FP R3	The Legislature should appropriate $50 million of Proposition 1E funds to the Department of Water Resources and direct the Department of Water Resources to begin the acquisition of land and easements for the proposed San Joaquin/South Delta Flood Plain.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R4	Long-term non-General Fund and non-general obligation bonds stable funding should be established to support the Department of Water Resources' Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board. Until this long-term funding is secure, the existing funding for the Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board should be provided until the bonds funds are completely allocated by extending the deadline of July 1, 2013.
Finance Plan Framework	FP R5	As part of the California Water Plan Update, the Department of Water Resources should prepare an assessment of the state's water infrastructure needs. This should include an assessment of the existing infrastructure's rehabilitation/replacement costs, as well as new improvements to meet projected demands over the planning period. The Department of Water Resources should consider a survey of agencies requesting information on small-scale projects (such as storage or conveyance) that allow the State to improve water supply reliability. In the future, a provision should be added to Urban Water Management Plans and Agricultural Water Management Plans to include information on potential local water reliability projects. This could form the basis of future State bond funding decisions and be used to inform the Legislature and the public of systemwide needs.
Finance Plan Framework	FP R6	User Fees/Stressors Fees should support the coequal goals and the Delta Plan. ♦ The Legislature should authorize the Delta Stewardship Council to develop reasonable fees for beneficial uses and reasonable fees for those who stress the Delta ecosystem, and apply these fees to the operational costs of the Delta Stewardship Council, the Delta Conservancy, and the Delta Protection Commission to allow implementation of the Delta Plan. These fees would be developed in an open and transparent process. Operating costs of the Delta Stewardship Council, Delta Conservancy, and Delta Protection Commission should be pre-funded for a period of 10 years. As previously discussed, the annual budget of the new governance structure is approximately $50 million. ♦ Repayment of these costs, with interest, would be made annually commencing in 2022 from collected fees. Repayment could begin sooner if revenue from fees were available before 2022. Repayment should be completed no later than 2032. ♦ Revenue bond authority should be granted to implement the Delta Plan should a fiscal partner be found.
Finance Plan Framework	FP R7	The Legislature should amend AB 3030 and SB 1938 to allow local agencies to assess fees under Proposition 218.
Finance Plan Framework	FP R8	Sufficient funding should be provided to the Delta Conservancy to commence implementation of the ecosystem restoration portion of the Delta Plan. This would include building the capabilities to administer and monitor the Conservancy's projects, as well as funding initial early start projects approved by the Conservancy Board. Funding should be no less than $50 million and should be allocated from existing bond funds, or from any new funds authorized by voters. Total dollar amount allocated for this purpose will depend on all available funding sources and may well exceed $50 million.
Finance Plan Framework	FP R9	The Delta Conservancy, in conjunction with other appropriate agencies, should investigate carbon offsets as a revenue source for Delta islands.
Finance Plan Framework	FP R10	The Legislature should consider appropriate funding for implementation of the Economic Sustainability Plan consistent with the Delta Plan.
Finance Plan Framework	FP R11	The Legislature should consider reasonable payments-in-lieu-of-taxes to replace lost local government revenues resulting from the removal of properties from property tax rolls for ecosystem habitat or water supply purposes in the Delta.

Table C-3
Proposed Project Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R12	Establish a statewide public goods charge (or broad-based user fee) for water. The Legislature should create a public goods charge (similar to the energy public goods charge created in 1996) on urban water users and agricultural users. This charge could provide for ecosystem costs that were once paid with general obligation bonds, or could be used for State water management costs such as developing the California Water Plan Update or science programs. Before the charge would be put in place, efforts would be necessary to determine administrative details of the program, including how the charge would be assessed, who would be assessed, what type of costs would be recovered, and how revenues collected would be applied. These efforts would take place in an open and transparent process.
Finance Plan Framework	FP R13	By January 2015, the Department of Water Resources should complete a Delta-wide comparative benefit/cost analysis based on recommendations for prioritized State investments for levee operations, maintenance, and improvements in the Delta developed in accordance with RR P4. Benefits should be specifically identifiable and calculable, and include an analysis of the value of lands behind levees. Such a report should be developed in collaboration with the Delta Stewardship Council, local agencies, federal agencies, and the proposed new Delta Flood Risk Management Assessment District.

Source: Fifth Staff Draft Delta Plan, August 2, 2011

C.2 Alternative 1A

Alternative 1A was developed based in large part upon comment letters submitted by water users located outside of the Delta that used Delta water with comments that emphasized continued use of Delta exports and Delta levee improvements to protect water supply corridors and had did not emphasize water supply agencies developing local and regional self-reliance.

The policies and recommendations for Alternative 1A are presented in Tables C-4 and C-5, respectively. Alternative 1A includes all of the issues addressed by the Proposed Project policies and recommendations except Policy WR P2. The Proposed Project WR P1 is included in Alternative 1A as WR R1. Alternative 1A also includes two additional Water Supply Reliability recommendations, WR R9 and WR R10. Additions and deletions to Proposed Project policies and recommendations are shown as underlined and strikeout text.

Table C-4
Alternative 1A Policies

Delta Plan Element	Policy Number	Policy
Governance	G P1 (addresses similar issues as Proposed Project G P1)	Certifications of consistency with the Delta Plan must address the following: ♦ A covered action must be consistent with the coequal goals and the inherent objectives. In addition, a covered action must be consistent with each of the policies contained in this Plan implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant policies may not be feasible. In those cases, covered action proponents must clearly identify areas where consistency is not feasible, explain the reasons, and describe how the covered action nevertheless, on whole, is consistent with the coequal goals and the inherent objectives. In those cases, the Delta Stewardship Council may determine, on appeal, that the covered action is consistent with the Delta Plan. ♦ All covered actions must be fully transparent by disclosing all potentially significant adverse environmental impacts and feasible mitigations of those adverse impacts. ♦ As relevant to the purpose and nature of the project, all covered actions must document use of best available science. ~~♦~~ Ecosystem restoration and water management covered actions must ~~include adequate provisions, appropriate to the scope of the covered action, to assure~~ <u>describe the process that will provide</u> continued implementation of adaptive management consistent with the Delta Plan. ~~This requirement shall be satisfied through:~~ ~~• An adaptive management plan that describes the approach to be taken for each of the following nine steps of the adaptive management framework:~~ ~~– Define/Redefine the Problem.~~ ~~– Establish Goals and Objectives.~~ ~~– Model Linkages Between Objectives and Proposed Action(s).~~ ~~– Select Action(s): Research, Pilot, or Full-Scale.~~ ~~– Design and Implement Action(s).~~ ~~– Design and Implement Monitoring Plan.~~ ~~– Analyze, Synthesize, and Evaluate.~~ ~~– Communicate Current Understanding.~~ ~~– Adapt.~~ ~~• Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process.~~ ♦ All covered action proponents shall certify that the covered action shall comply at all times with existing applicable law.

Table C-4
Alternative 1A Policies

Delta Plan Element	Policy Number	Policy
Delta Ecosystem Restoration	ER P1 (addresses similar issues as Proposed Project ER P1)	Development, implementation and enforcement of new and updated flow requirements for the Delta and high priority tributaries is key to the achievement of the coequal goals. The State Water Resources Control Board should update the Bay-Delta Water Quality Control Plan objectives and ~~establish~~ flows as follows: a) By June 2, 2014, adopt and implement updated flow ~~objectives~~ criteria for the Delta that are necessary to achieve the coequal goals.[17] b) By June 2, 2018, develop flow criteria for high-priority tributaries in the Delta watershed that are necessary to achieve the coequal goals.[18] c) Flow requirements and water quality objectives will be developed in the future. Prior to the establishment of revised flow ~~objectives criteria~~ requirements and water quality objectives identified above, the existing Bay-Delta Water Quality Control Plan objectives shall be used to determine consistency with the Delta Plan. By June 30, 2013, the Delta Stewardship Council will request an update from the State Water Resources Control Board on items ER P1 (a) and (b). If the Board indicates the items (a) or (b) cannot be met by the dates provided, the Delta Stewardship Council will consider and may amend the Delta Plan if necessary to achieve progress on the coequal goals ~~in place of the updated flow objectives~~. For example, the Delta Stewardship Council could: ~~♦ Determine that a covered action that would increase the capacity of any water system to store, divert, move, or export water from or through the Delta would not be consistent with the Delta Plan until the revised flow objectives are implemented.~~ ♦ In an appeal of a consistency certification, consider an argument by the appealing party that a covered action that would increase the capacity of any water system to store, divert, move, or export water from or through the Delta would not be consistent with the Delta Plan because existing flow objectives are inadequate. ♦ Recommend that the State Water Resources Control Board cease issuing water rights permits in the Delta and the Delta watershed (or, if the absence of flow criteria is specific to one or more of the major tributaries, then the recommendation could be focused on the impacted areas).
Delta Ecosystem Restoration	ER P2 (same as Proposed Project ER P2)	Habitat restoration actions shall be consistent with the habitat type locations shown on the elevation map in Attachment C-2, and accompanying text shown in Attachment C-3, based on the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*, with minor alterations. The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the Ecosystem Restoration Program's Conservation Strategy as the strategy is revised.

[17] Flow requirements could be implemented through several mechanisms including water rights hearing, Federal Energy Regulatory Commission relicensing and negotiation and settlement. Implementation through hearings is expected to take longer than the deadline shown here.

[18] State Water Resources Control Board staff will work with the Delta Stewardship Council to determine priority streams. As an illustrative example, priority streams could include the Merced River, Tuolumne River, Stanislaus River, Lower San Joaquin River, Deer Creek (tributary to Sacramento River), Lower Butte Creek, Mill Creek (tributary to Sacramento River), Cosumnes River, and American River.

Table C-4
Alternative 1A Policies

Delta Plan Element	Policy Number	Policy
Delta Ecosystem Restoration	ER P3 (same as Proposed Project ER P3)	Actions other than habitat restoration, including new or amended local or regional land use plans, shall demonstrate that they have, in consultation with the Department of Fish and Game, avoided or mitigated within the Delta the adverse impacts to the opportunity for habitat restoration at the elevations shown in Attachment C-2. This policy does not apply within the following areas, defined as of January 1, 2012: ♦ Incorporated cities and their spheres of influence ♦ The Clarksburg Growth Boundary[19] ♦ The Contra Costa County Urban Limit Line[20] ♦ The Mountain House General Plan Community Boundary[21]
Delta Ecosystem Restoration	ER P4 (addresses similar issues as Proposed Project ER P4)	State and local agencies constructing new levees, or substantially rehabilitating or reconstructing existing levees in the Delta shall evaluate , and, where feasible, incorporate alternatives (including use of setback levees) that would increase the extent of floodplain and riparian habitats <u>and avoid or substantially minimize the adverse impacts to the opportunity for habitat restoration.</u> When available, criteria developed under RR R4 shall be used for determining appropriate locations for setback levees.
Delta Ecosystem Restoration	ER P5 (same as Proposed Project ER P5)	Agencies proposing covered actions shall demonstrate that the potential for new introductions of or improved habitat conditions for nonnative invasive species have been fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.
Reduce Risk of Floods in the Delta	RR P1 (same as Proposed Project RR P1)	Floodways[22] shall not be encroached[23] upon nor diminished without mitigating for future flood flows. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities unless they significantly decrease the existing level of flood protection.

[19] Yolo County. 2009. *Yolo County 2030 Countywide General Plan.* Land Use and Community Character Element. Adopted November 10. Woodland, CA.

[20] Contra Costa County. *Contra Costa County General Plan 2005-2020.* Land Use Element. Urban Limit Line Map as amended November 7, 2006.

[21] Mountain House Master Specific Plan Map, on file with the San Joaquin Community Development Department.

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

[23] As Described in the Department of Water Resources' "Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento-San Joaquin Valley": Encroachments and vegetation should be evaluated and managed so as to not impact levee safety, while recognizing their benefits.

Table C-4
Alternative 1A Policies

Delta Plan Element	Policy Number	Policy
Reduce Risk of Floods in the Delta	RR P2 (same as Proposed Project RR P2)	The following areas shall not be encroached upon because they are critical floodplains[24] and may also provide ecosystem benefit. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities, or maintenance and repair of existing infrastructure, unless they significantly decrease the existing level of flood protection. ♦ Areas located in the Yolo Bypass from Fremont Weir through Cache Slough to the Sacramento River including the confluence of Putah Creek into the bypass ♦ The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the Department of Water Resources or the U.S. Army Corps of Engineers. ♦ The Lower San Joaquin River Floodplain Bypass, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, RD 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.
Reduce Risk of Floods in the Delta	RR P3 (addresses similar issues as Proposed Project RR P3)	Once a new levee criteria have been established, covered actions in the Delta must be consistent with Table C-2.
Reduce Risk of Floods in the Delta	RR P4 (same as Proposed Project RR P4)	Prior to the completion of the Department of Water Resources' A Framework for Department of Water Resources Investments in Delta Integrated Flood Management, guidelines for the Delta Levee Special Flood Control Projects and Subventions programs (included as Attachment C-4) shall be used to determine consistency of projects using state funds with the Delta Plan. This Framework shall be completed by the Department of Water Resources, in consultation with the Central Valley Flood Protection Board and Delta Stewardship Council, by January 1, 2013. Upon completion, the Framework shall be considered by the Delta Stewardship Council for adoption to direct State investments for levee operation, maintenance, and improvements in the Delta. If this Framework is not completed by January 1, 2013, the Delta Stewardship Council will define a strategy for State investments.

Source: Adapted from comment letters received from water users located outside of the Delta that use Delta water.

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

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R1 (addresses similar issues as Proposed Project WR P1)	~~A covered action to export water from, transfer water through, or use water in the Delta is inconsistent with the Delta Plan if the covered action negatively impacts one or more of the coequal goals and one or more of the water suppliers that receive water from the Delta significantly causes the need for the covered action by failing to comply with one or more of the following:~~ This recommendation can apply for the purposes of the consistency review process if the public agency that initiated the consistency review process approves, funds, or carries out a covered action that involves the export of water from the Delta or involves the transfer of water through the Delta and an appeal is filed alleging the need for that covered action due to the failure to comply with this recommendation; or the covered action involves the use of water in the Delta and an appeal is filed alleging the need for that covered action is caused by a significant failure of the public agency that initiated the consistency review to comply with this policy. If these conditions are met, the Council may consider an argument by the appealing party that the consistency determination's finding is incorrect because of a failure to meet these recommendations as a policy. In all other situations, this is a recommendation and not a policy. Water suppliers[25] should demonstrate compliance with existing State laws promoting water supply planning, conservation, and efficiency measures (same as existing law): ♦ Compliance with State law • Urban water suppliers[26] – Adopt and implement an Urban Water Management Plan and all required elements and measures, meeting the standards and timelines established in Water Code section 10610 et seq. – Adopt and implement a plan to achieve 20 percent reduction in statewide urban per capita water use by December 31, 2020, meeting the standards and timelines established in Water Code section 10608 et seq. ♦ Agricultural water suppliers[27] • Adopt and implement Agricultural Efficient Water Management Practices including measurement of the volume of water delivered to customers, adoption of a pricing structure based in part on the quantity delivered, and implementation of specific conservation measures that are locally cost effective and technically feasible, meeting the standards and timelines established in Water Code section 10608 et. seq. • Adopt and implement an Agricultural Water Management Plan and all required elements, meeting the standards and timelines established in Water Code

[25] Water suppliers, as used in this Delta Plan, refer to both “Urban water supplier” and “Agricultural water supplier” as defined in footnotes 26 and 27.

[26] “Urban water supplier” as used in this Delta Plan refers to both “urban retail water suppliers” and “urban wholesale water suppliers” under the Water Code. An “urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annual at retail for municipal purposes (Water Code section 10608.12(p)). An “urban wholesale water supplier “ means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of potable water annually at wholesale for municipal purposes (Water Code section 10608.12(r)).

[27] “Agricultural water supplier” as used in this Delta Plan refers to both “agricultural retail water suppliers” and “agricultural wholesale water suppliers” under the Water Code. An “agricultural water supplier” means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. An “agricultural water supplier” includes a supplier or contractor for water, regardless of the basis of right that distributes or sells water for ultimate resale to customers. “Agricultural water supplier” does not include DWR (Water Code section 10608.12(a)). Any agricultural water supplier than provides water to less than 25,000 irrigated acres is not required to comply with SBX7 7 requirements unless sufficient funding is provided to the supplier to implement these provisions (Water Code section 10853).

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		section 10800 et seq. ♦ Water Supply Reliability Element • To promote accountability throughout the state in achieving the coequal goals, water suppliers shall, no later than December 31, 2015, expand an existing or add a new Water Reliability Element in their Urban Water Management Plan and/or Agricultural Water Management Plan. Water suppliers may also meet this requirement by including a Water Reliability Element in an approved Integrated Regional Water Management Plan or other water plan that provides equivalent information. • The Water Reliability Element should detail how water suppliers are sustaining and improving regional self-reliance and reducing reliance on the Delta in meeting future water supply needs through investments in local and regional programs and projects, and ~~shall~~ should document the manner in which the element contributes to ~~actual or~~ projected reduction in reliance on the Delta in meeting California's future water supply needs ~~exports~~. At a minimum, the Water Reliability Element ~~shall~~ should include: – **A plan for possible interruption of Delta water supply due to catastrophic events:** Identify how reliable water service will be provided or shortages managed for minimum periods of 6 months, 18 months, and 36 months in the event that diversions or exports from, or use of water in, the Delta are interrupted during an average water year, dry water year, and following three dry water years. – **Implementation of planned investments in water conservation, water efficiency, and water supply development:** Identify specific programs and projects that will be implemented over a 20-year planning period and how they are consistent with the coequal goals and will contribute to improved regional self-reliance and reduced reliance on the Delta in meeting future water supply needs, including, but not limited to, the following strategies[28]: ▪ Water conservation ▪ Water use efficiency ▪ Local groundwater and surface storage ▪ Conjunctive use programs ▪ Water transfers ▪ Water recycling ▪ Treatment and use of currently non-potable groundwater ▪ Stormwater capture and recharge ▪ Saline water and brackish water desalination • **Evaluation of regional water balance:** Provide an assessment of the long-term sustainability of the water supplies available to meet projected demands within the supplier's hydrologic region, as defined by California Water Plan 2009 Update, over the 20-year planning period.[29] If the region's demand exceeds available supplies, identify the steps being taken through one or more of the Integrated Regional Water Management Plans to bring the region into long-term balance. If the region's demands exceed available supplies and it does not have an Integrated Regional Water Management Plan or the Plan does not address the steps being taken to bring the region into balance, then describe how the supplier's programs and projects are

[28] The Department of Water Resources has identified 27 "resource management strategies" that water suppliers should consider as investments in water conservation, water efficiency, and water supply development.

[29] The purpose of a water balance is to provide an accounting of all water that enters and leaves a specific hydrologic region, how it is used, and how it is exchanged between regions. A water balance can be used to compare how water supplies and uses in a region can vary among wet, average, and dry hydrologic conditions and how each region's water balance compares with other regions and with the State's water balance. This is important to all water planning activities and provides a basis for evaluating unsustainable water management practices and making appropriate improvements.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		helping to bring the region into long term balance. • **Conservation-oriented water rate structure:** Evaluate the degree to which the supplier's current rate structure sustainably encourages and supports water conservation. ♦ Conservation-oriented Rate Structure • Water suppliers should, by December 31, 2020, develop and implement a conservation-oriented rate structure, which may include consideration of a water-budget-based rate structure that sustainably encourages and supports more efficient water use without causing a shortfall in system revenues.[30]
Reliable Water Supply	WR R2 (addresses similar issues as Proposed Project WR R1)	The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop ~~and include in the future California Water Plan updates the information needed to track the water supply reliability performance measures identified in the Delta Plan and assess improvements in regional self reliance, reduced reliance on the Delta, and statewide water supply reliability~~ and approve, by December 31, 2012, guidelines for the preparation of a Water Reliability Element that satisfies the criteria contained in WR R1.
Reliable Water Supply	WR R3 (same as Proposed Project WR R2)	The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and include in the future California Water Plan updates the information needed to track the water supply reliability performance measures identified in the Delta Plan and assess improvements in regional self reliance, reduced reliance on the Delta, and statewide water supply reliability.
Reliable Water Supply	WR R4 (addresses similar issues as Proposed Project WR R3)	The Department of Water Resources, the State Water Resources Control Board, the Department of Public Health, and other agencies, in consultation with the Delta Stewardship Council, should revise State grant and loan ranking criteria by December 31, 2012, to provide a priority for water suppliers that include a Water Reliability Element in their adopted Urban Water Management Plans, Agricultural Water Management Plans, and/or Integrated Regional Water Management Plans that satisfies the requirements of ~~WR P1~~ WR R1. The Delta Stewardship Council will also work with these agencies to identify additional funding and other incentives to catalyze implementation of local and regional water conservation, water use efficiency, conjunctive management, and other projects that will improve regional self-reliance and reduce reliance on the Delta.
Reliable Water Supply	WR R5 (same as Proposed Project WR R4)	All state agencies should take a leadership role in designing new and retrofitted state owned and leased facilities, including buildings and Caltrans facilities, to increase water efficiency, use recycled water, incorporate stormwater runoff capture and low impact development strategies, and reduce reliance on the Delta. The Delta Stewardship Council will work with these agencies to identify regulations and other policies that will support the improved water efficiencies and new water supply strategies, such as completion of uniform recycling criteria for potable reuse for groundwater recharge, consistent with SB 918 (Water Code section 13521 et seq.).
Reliable Water Supply	WR R6 (same as Proposed Project WR R5)	The State Water Resources Control Board and/or the Department of Water Resources should require that proponents requesting a new point of diversion, place of use, or purpose of use that results in new or increased use of water from the Delta watershed should demonstrate that the project proponents have evaluated and implemented all other feasible water supply alternatives.

[30] A sustainable conservation-oriented rate structure has the following characteristics: encourages more efficient water use without causing a shortfall in system revenue; provides for the identification of waste, rewards efficient use, and penalizes excessive use; produces revenues from penalty rates that are used to fund conservation programs; is supported by a water bill that clearly communicates the cost of wasted water to the responsible person; and is supported by a person or staff who can respond to customers' calls for help in reducing usage.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R7 (addresses similar issues to Proposed Project WR R6)	The Department of Water Resources should complete the Surface Water Storage Investigations of proposed off-stream surface storage projects by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the State's surface storage. Consideration should be provided for implementation of one or more of the storage projects being considered by the Surface Water Storage Investigations.
Reliable Water Supply	WR R8 (same as Proposed Project WR R7)	The Department of Water Resources, in coordination with the California Water Commission , Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance facilities, and enhance opportunities for conjunctive use programs and water transfers. The California Water Commission should hold hearings and provide recommendations on priority projects. These recommendations should be used to support water supplier requests for state grants and loans and other sources of funding for these projects.
Reliable Water Supply	WR R9 (addresses issues not included in Proposed Project)	The Legislature should consider amendments to the Water Code to standardize the collection and compilation of data regarding diversion and use of water from the Delta and its watershed.
Reliable Water Supply	WR R10 (addresses issues not included in Proposed Project)	The Legislature should consider amendments to the Water Code to expand the State's ability to enforce water rights by explicitly authorizing State Water Resources Control Board to hire administrative law judges or similar hearing officers with authority to review and enforce proscriptions against illegal diversions. Funding should be designated to provide adequate resources to support these investigations and adjudications.
Reliable Water Supply	WR R11 (same as Proposed Project WR R8)	The Department of Water Resources, in collaboration with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board and other state, Federal, and local agencies, should update Bulletin 118 using field data, California Statewide Groundwater Monitoring Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014. This Bulletin update should include a systematic evaluation of the major groundwater basins to determine sustainable yield and overdraft status, an evaluation of California's groundwater resources in 20 years if current groundwater management trends remain unchanged, the anticipated impacts of climate change on groundwater resources, and the recommendations for actions by state, Federal and local actions to improve groundwater management. In addition, the Bulletin update should identify groundwater basins in a critical condition of overdraft. This information should be available for inclusion in the Urban Water Management Plans and Agricultural Management Plans required to be submitted to the State by December 31, 2015.
Reliable Water Supply	WR R12 (same as Proposed Project WR R9)	Water suppliers that receive water diverted or exported from the Delta watershed and that receive a significant percentage of their long-term average water supplies from groundwater should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003) by December 31, 2014.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R13 (same as Proposed Project WR R10)	Local and regional agencies in groundwater basins that have been identified by the Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003), by December 31, 2014. If local or regional agencies fail to develop and implement these groundwater management plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2 prohibition on unreasonable use of water and whether a groundwater adjudication is needed to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code Section sections 2100-2101. [31]
Reliable Water Supply	WR R14 (same as Proposed Project WR R11)	The Department of Water Resources, in coordination with the State Water Resources Control Board, the Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, Delta Stewardship Council, and other stakeholders should create by January 1, 2014, and maintain an integrated statewide system for water use monitoring. This new system should consolidate information into a single statewide data base that is in an electronic format and made available to the public online. It should be designed to simplify reporting, reduce the number of required reports, and be coordinated with the reporting requirements for the Urban Water Management Plans/Agricultural Water Management Plans and Integrated Regional Water Management Plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the data base when it becomes available. The Department of Water Resources should every 5 years summarize and incorporate the key information collected through the statewide integrated data base in the California Water Plan Update.
Reliable Water Supply	WR R15 (addresses similar issues as Proposed Project WR R12)	The Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that require the implementation of ~~WR P1~~ WR R1.

[31] The State Water Resources Control Board anticipates the development of a Strategic Workplan for Groundwater by 2012 that will lay out the Board's plans to protect groundwater, including (1) application of the State Water Resources Control Board's water quality and water rights authorities to address the problems that have the greatest potential to impact beneficial uses of groundwater; (2) focus resources on the most important problems; and (3) encourage efforts to protect and management groundwater at the local or regional level.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R1 (addresses similar issues as Proposed Project ER R1)	The Delta Stewardship Council acknowledges the importance of expediting habitat restoration in the Delta and its watershed and recommends the prioritization and implementation of habitat restoration projects in the following areas, shown in Attachment C-5. Habitat restoration projects should consider landscape elements including connectivity between areas to be restored and existing habitat areas needed for the full life cycle of species targeted to benefit from the restoration project. Where possible, restoration projects should emphasize the potential for water quality improvement. Restoration project proponents should coordinate with local vector control districts in implementing projects. ♦ **Cache Slough Complex.** The flood basins entering the Cache Slough Complex are the interface between river and tidally influenced portions of the Delta. A significant portion of the region should return to uplands with vernal pool and grassland habitats and broad nontidal, freshwater, emergent plant-dominated wetlands that grade into tidal freshwater wetlands, shallow subtidal and deep open water habitats. A restoration project in this area is the passively restoring Liberty Island. Projects in the planning stage include the Department of Water Resources' Prospect Island restoration project. ♦ **Cosumnes River–Mokelumne River Confluence.** Unregulated and minimally regulated rivers should allow frequent and regular winter and spring overbank flooding to create seasonal floodplain and riparian habitats grading into tidal marsh and shallow subtidal habitats. An existing restoration project is the Cosumnes River Preserve floodplain restoration. Projects in the planning stage include the Department of Water Resources' North Delta Flood and Ecosystem Restoration Project on McCormack-Williamson Tract. ♦ **Lower San Joaquin River Floodplain.** Historically, the south Delta and its connection to the lower San Joaquin River contained a complex network of channels with low natural berms, large woody debris, willows, and other shrubs with upland areas supporting open oak woodlands. Reconnection of significant portions of the floodplain, along with more natural flows, stimulates food webs that support native species. Projects in the planning stage include the Lower San Joaquin Flood Bypass proposed by the South Delta Levee Protection and Channel Maintenance Authority and partners. ♦ **Suisun Marsh.** The largest wetland area on the west coast of the contiguous United States, Suisun Marsh has been mostly disconnected from the estuary. Restoring significant portions of Suisun Marsh provides the brackish portion of the estuary with sea level rise accommodation space, opportunities for extensive land-water interface dynamics, and compressed chemical and biological gradients that support productive and complex food webs to which native species are adapted. An ongoing restoration project is the Department of Water Resources' Blacklock Restoration Project. Projects in the planning stage include the Department of Fish and Game's Hill Slough Restoration Project. ♦ **Yolo Bypass.** The current operation of the Yolo Bypass as a flood control project provides substantial ecosystem benefits for Sacramento splittail spawning and rearing and salmon rearing. Enhancing the ability of Yolo Bypass to be "activated" by higher-frequency, lower-magnitude flood levels provides more opportunity for migrating fish, especially Chinook salmon, to use this system as a migration corridor rich in refugia and food resources. Projects in the planning stage include fish passage improvements, and various approaches, such as notching the Fremont Weir, to increase the frequency and duration of inundation during times of year critical for spawning and rearing of native fish. The Council should develop a restoration strategy and suite of specific actions for habitat restoration in the priority areas and throughout the Delta to meet the objectives defined in Water Code Sections 85022(d) and 85302(e). Specific measures should be incorporated in the Delta Plan for the development of new or improved habitat, protection of existing habitat, and to facilitate the restoration of large areas of interconnected habitat within the Delta and the Delta watershed.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R2 (same as Proposed Project ER R2)	As part of its Strategic Plan, and subsequent Implementation Plan or annual work plans, the Sacramento–San Joaquin Delta Conservancy should: ♦ Develop and adopt criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles. ♦ Develop and adopt processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration. ♦ Develop and adopt a formal mutual agreement with the Department of Water Resources, Department of Fish and Game, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh. ♦ Develop, in conjunction with the Wildlife Conservation Board, the Department of Water Resources, Department of Fish and Game, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program's Conservation Strategy. ♦ Lead an effort to develop a habitat credit program that provides credit for each of these steps: acquisition in preparation for future restoration; preservation, management, and enhancement of existing habitat; restoration of habitat; and monitoring and evaluation of habitat evolution and ecological outcomes. ♦ Work closely with the Delta Science Program to: • Incorporate the best available understanding of the scales, patterns, and processes of the historical landscape to guide land acquisition strategies and restoration design. • Apply the best understanding of landscape ecology as a unifying perspective for restoring processes and functions on degraded landscapes. • Construct landscape-level conceptual models for key regions of the Delta and Suisun Marsh to clarify how more natural flows and ecosystem restoration confer resilience to native species while promoting processes of self-repair of modified landscapes. Conceptual design models should engage hydrodynamics, transport, particle tracking, and food web models to support and integrate the interdisciplinary perspectives. • Study available habitat reference sites to increase understanding of well-functioning habitats and to inform performance measure metrics and trajectories.
Delta Ecosystem Restoration	ER R3 (same as Proposed Project ER R3)	State and federal fish agencies (California Department of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service) should complete ongoing negotiations toward a habitat credit agreement with water supply agencies.
Delta Ecosystem Restoration	ER R4 (same as Proposed Project ER R4)	Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should work with the Department of Fish and Game and the Department of Water Resources to develop and execute an agreed-upon variance process to exempt Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.
Delta Ecosystem Restoration	ER R5 (same as Proposed Project ER R5)	The Department of Fish and Game and the U.S. Fish and Wildlife Service should develop rules for voluntary Safe Harbor agreements with property owners in the Delta whose actions contribute to the recovery of listed threatened or endangered species.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R6 (same as Proposed Project ER R6)	The Department of Fish and Game and other appropriate agencies should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" and accompanying text shown in Attachment C-6 taken from the *Conservation Strategy for Restoration of the Sacramento San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*. The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* as the strategy is revised.
Delta Ecosystem Restoration	ER R7 (same as Proposed Project ER R7)	The Delta Science Program, in conjunction with the Department of Fish and Game, the Department of Water Resources, the State Water Resources Control Board, and other relevant agencies and stakeholders, should conduct workshops to develop recommendations to the Delta Stewardship Council for measures to reduce stressor impacts on the Delta ecosystem that would support and be consistent with the coequal goals. For example, workshops would consider options for varying salinity to reduce impacts of nonnative invasive species while providing overall ecosystem benefits and minimally disrupting water supply. The recommended measures could be adopted as policies or recommendations by the Delta Stewardship Council into an amended Delta Plan. The resulting recommendations should be provided to the Delta Stewardship Council by January 1, 2013.
Delta Ecosystem Restoration	ER R8 (addresses similar issues as Proposed Project ER R8)	~~The relevant federal, State, and local agencies should complete the Bay Delta Conservation Plan, consistent with the provisions of the Delta Reform Act, and receive required incidental take permits by December 31, 2014. If the Bay Delta Conservation Plan process is not completed by this date, the Delta Stewardship Council will consider how to proceed with an alternative approach to develop and complete the ecosystem and conveyance planning process.~~ The Council should monitor the progress of the Bay Delta Conservation Plan. When the Bay Delta Conservation Plan is finalized and if is incorporated into the Delta Plan consistent with Water Code Section 85320, the Council, Sacramento-San Joaquin Delta Conservancy, and Bay Delta Conservation Plan proponents should coordinate on efficiently implementing adopted actions to achieve the coequal goals. If the Bay Delta Conservation Plan process is not completed consistent with the Delta Reform Act, the Delta Stewardship Council will consider how to proceed with developing ecosystem stressor reduction actions identified in the Delta Plan independently of the Bay Delta Conservation Plan.
Improve Water Quality	WQ R1 (same as Proposed Project WQ R1)	The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy as part of the ongoing Basin Plan Amendment process by July 2013, with appropriate protections for the Delta water quality and anti-degradation.
Improve Water Quality	WQ R2 (same as Proposed Project WQ R2)	The Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project EIR by July 1, 2012, and begin construction as soon as possible thereafter.
Improve Water Quality	WQ R3 (same as Proposed Project WQ R3)	The State Water Resources Control Board and/or Central Valley Regional Water Quality Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.
Improve Water Quality	WQ R4 (same as Proposed Project WQ R4)	The Department of Public Health, State Water Resources Control Board, and Department of Water Resources should prioritize funding for small and disadvantaged communities that lack access to safe drinking water supplies or resources for adequate wastewater treatment.
Improve Water Quality	WQ R5 (same as Proposed Project WQ R5)	The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should require all recipient regions that are supplied water from the Delta or the Delta Watershed or discharge wastewater to the Delta or the Delta Watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program (CV-SALTS).

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R6 (same as Proposed Project WQ R6)	The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and if possible accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that: ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should develop and adopt objectives to protect sensitive species, either narrative or numeric, where appropriate, for nutrients (including ammonia) in the Delta and Delta watershed by January 1, 2014. ♦ The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013. ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016. ♦ The San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for selenium and methylmercury and efforts to support their implementation should be coordinated. ♦ The State Water Resources Control Board and San Francisco Bay and Central Valley Regional Water Quality Control Boards should continue to participate in efforts revise water quality objectives for selenium.
Improve Water Quality	WQ R7 (same as Proposed Project WQ R7)	The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the Department of Water Resources, Department of Fish and Game, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis.
Improve Water Quality	WQ R8 (same as Proposed Project WQ R8)	The Central Valley Regional Water Quality Control Board, consistent with existing Water Quality Control Plan policies and water rights law, should require all dischargers to the Delta and Delta watershed to improve quality of discharged water to the extent feasible through treatment or best management practices. R~~r~~esponsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.
Improve Water Quality	WQ R9 (same as Proposed Project WQ R9)	The State Water Resources Control Board and Regional Water Quality Control Boards should conduct or require special studies of pollutants including emerging contaminants and causes of toxicity in Delta waters and sediments by January 1, 2014.
Improve Water Quality	WQ R10 (same as Proposed Project WQ R10)	To comply with the San Francisco Bay Conservation and Development Commission water quality policies and facilitate the commission's impact determination, proponents of actions potentially affecting water quality in Suisun Marsh should consult with the San Francisco Bay Regional Water Quality Control Board and obtain all necessary authorizations early in the process.
Improve Water Quality	RR R1 (same as Proposed Project RR R1)	The Legislature should fund the Department of Water Resources and the Central Valley Flood Protection Board to evaluate and implement a bypass and floodways on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstem San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c).

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	RR R2 (same as Proposed Project RR R2)	The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the *Delta Dredged Sediment Long-Term Management Strategy* (Attachment C-7), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals.
Improve Water Quality	RR R3 (same as Proposed Project RR R3)	The Delta Stewardship Council should coordinate with the Department of Water Resources, Department of Parks and Recreation, and other appropriate local agencies to develop a plan identifying appropriate levels of flood protection relating to specific land and recreation uses for State recreation facilities in the Delta. This plan should address emergency response and notification procedures for recreational users.
Reduce Risk of Floods in the Delta	RR R4 (same as Proposed Project RR R4)	The Department of Water Resources, in conjunction with the Department of Fish and Game and Delta Conservancy, should develop criteria to define locations for future setback levees in the Delta and Delta watershed. Until then, the siting of future permanent structures should provide adequate area to accommodate future setback levees.
Reduce Risk of Floods in the Delta	RR R5 (addresses similar issues as Proposed Project RR R5)	~~The Department of Water Resources' *A Framework for Department of Water Resources Investments in Delta Integrated Flood Management* should:~~ ~~♦ Define State interests related to flood and levee management in the Delta. These State interests should, at a minimum, include:~~ ~~• Reducing risk of loss of life.~~ ~~• Protecting water supply. This should address identifying and assessing critical water supply corridor levee operations, maintenance, and improvements for all existing municipal and industrial water diversions in the Delta.~~ ~~• Protecting water quality and the ecosystem.~~ ~~• Protecting critical infrastructure of statewide importance (including pipelines, energy transmission facilities, aqueducts, and State highways).~~ ~~• Protecting property.~~ ~~♦ Define a long-term levee policy for the Delta, which, at a minimum, should determine those levees critical for protecting State interests.~~ ~~♦ Recognize the wide variability of conditions across the Delta including depth of inundation upon failure; current condition of existing levees; and degree of exposure to seismicity, sea level rise, climate change, and river flood levels.~~ ~~♦ Define a methodology for assessing existing Delta levee conditions, as well as on a systematic, routine, and coordinated basis, to develop a sound technical understanding and assessment capability to base levee related decisions. This information should be collected and reported in a transparent manner, and shall include the production of a Delta levee conditions map.~~ ~~♦ Define a methodology for proactively identifying, developing, prioritizing, and scheduling specific levee operations, maintenance, and improvement projects.~~ ~~♦ Define a method for determining project costs, cost share, and project partners, if appropriate.~~ ~~♦ Define procedures that distinguish Delta Levees Special Flood Control Projects from routine levee maintenance projects.~~ In consultation with the Central Valley Flood Protection Board, the Council shall develop a strategic risk reduction investment plan that will identify potential improvements with the greatest public benefit, is economically sustainable, and contributes to the achievement of

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		coequal goals. The strategic investment plan shall: ♦ Not result in an increase in the number of people at risk. ♦ Recognize the wide variability of conditions across the Delta, including depth of inundation upon failure; current condition of existing levees; degree of exposure to seismicity, sea level rise, climate change, and river flood levels; the ability of land uses to recover from short or long-term inundation, and the consequences to water quality, critical utilities and transportation corridors. ♦ Evaluate investment in alternative risk reduction strategies, comparing levee upgrade to flood-proofing, acquisition and conversion to habitat, subsidence reversal, relocation of infrastructure, and flood insurance. ♦ Evaluate long-term drivers of change and economic sustainability before establishing funding priorities. ♦ Integrate risk reduction investments with the coequal goals through the coordinated evolution of some islands to habitat.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R6 (addresses similar issues as Proposed Project RR R6)	The following actions should be taken by January 1, 2013, to promote effective emergency preparedness and response in the Delta: ♦ Responsible local, State, and federal agencies with emergency response authority should consider and implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta. ♦ The California Emergency Management Agency, Department of Water Resources, U.S. Army Corps of Engineers, appropriate Operational Areas and other State and local partners should cooperatively participate in Delta-specific emergency preparedness activities. These activities should include but not be limited to the development and maintenance of a Sacramento-San Joaquin Delta Flood Catastrophic Incident Plan, a Regional Mass Evacuation Plan and an Interoperable Communications Plan; adoption and implementation of a Delta Multi-Agency Coordination System (MACS); participation in federal and State flood and evacuation contingency mapping; and regularly scheduled all-hazards drills and exercises. Public education and outreach program topics should include flood risk awareness, emergency preparedness, alert and notification. ♦ Cal EMA in collaboration with local, State and federal emergency response agencies in the Delta region should develop a training plan that is consistent with SEMS and NIMS requirements and compliments the development of plans, procedures and protocols that address all hazards that pose a threat to the Delta. ♦ The Department of Water Resources and local flood management agencies should prepare and regularly update Delta Multi-Hazard Coordination Plans and Inland Mass Evacuation Plans; and participate in "Golden Guardian"-like emergency response exercises, Inland Mass Evacuation exercises, and emergency preparedness public training, notification, and outreach programs. ♦ The Department of Water Resources should complete their Delta Emergency Preparedness, Response and Recovery Program addressing a wide range of emergency response strategies, being undertaken in coordination with the Corps of Engineers Delta Emergency Operations Plan, local emergency operations plans and water stakeholders. The Program would improve response and recovery time for impacts to life, property, critical infrastructure and environment in the Delta, and water supply interests reliant on the Delta. ♦ The Department of Water Resources should coordinate with state and federal agencies and water interests reliant on the Delta to implement an emergency freshwater pathway to export facilities considering unique needs and priorities in the event of a catastrophic multi-island failure. ♦ In consultation with local agencies, the Department of Water Resources should expand its emergency stockpiles for repair of levee breaches and seismically-induced levee slumping in response to catastrophic levee failures, and to make them regional in nature and usable by a larger number of agencies ~~in accordance with Department of Water Resources' plans and procedures. The Department of Water Resources, as a part of this plan, should evaluate the potential of creating stored material sites by "over reinforcing" west Delta levees.~~ ♦ State and local agencies and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.
Reduce Risk of Floods in the Delta	RR R7 (same as Proposed Project RR R7)	The Delta Stewardship Council should convene a working group to develop and evaluate recommendations to the Department of Water Resources to address appropriate response actions to both routine and catastrophic Delta levee failures. The working group should include the Delta Protection Commission and other interested parties, and the recommendations should be completed by January 1, 2013.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R8 (same as Proposed Project RR R10)	The Legislature should provide specific immunity for public safety flood protection activities, similar to that provided for police and fire protection services.[32]
Reduce Risk of Floods in the Delta	RR R9 (same as Proposed Project RR R9)	The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in flood-prone areas.
Reduce Risk of Floods in the Delta	RR R10 (addresses similar issues as Proposed Project RR R10)	The Legislature should create a Delta Flood Risk Management Assessment District with fee assessment authority (including over State infrastructure) to provide ~~adequate flood control protection and emergency response for the~~ economically-based risk reduction measures and emergency response for the local and regional benefit of all beneficiaries, including landowners, infrastructure owners, and other entities that benefit from the maintenance of the levees, such as water users who rely on the levees to protect water quality. This district should be authorized to: ♦ Develop, fund, and implement a regional plan ~~flood management for both Project and non project levees of the Delta~~ economically-based risk reduction for the Delta in cooperation with the existing reclamation districts, cities, counties, and owners of infrastructure and other interests protected by the levees; ♦ Conduct levee elevation surveys and inspections at least every 5 years, and report data to Department of Water Resources; ♦ Perform a beneficiary pay analysis for on-going anthropogenic changes which are increasing flood risk ♦ In coordination with Department of Water Resources and the U.S. Army Corps of Engineers, establish standardized flood risk measurement data. This data should support the development of Expected Annual Damage and loss of life values for the Delta, to be conducted by the District annually. Expected Annual Damage is a measure of risk that integrates the likelihood and consequences of flooding, and is a standard measure of the benefits of reducing flood risk. Expected Annual Damage estimates will include a comparative analyses of losses from on-going subsidence, water quality degradation and foregone ecosystem opportunities associated with maintaining the existing plan form versus a more economically sustainable form. The U.S. Army Corps of Engineers is currently developing a levee risk management system, including means to evaluate and rank risk of loss of life and flood damages for levee systems; ♦ Notify residents and landowners of flood risk, personal safety information, and available systems for obtaining emergency information before and during a disaster on an annual basis; and ♦ Potentially implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) in conjunction with local, State, and federal agencies and maintain the resulting regional response system and components and procedures on behalf of SEMS jurisdictions (reclamation district, city, county, and State) that would jointly implement the regional system in response to a disaster event. ♦ Identify and assess critical water supply corridor levee operations, maintenance, and improvements.

[32] Sections 850 – 850.8 (Fire Protection Services). Section 850 provides immunity for the government not providing fire protection services. Sections 850.2 through 850.8 provide governmental immunity related to the actual provision of fire protection services (i.e., failure to maintain sufficient fire protection facilities, injuries sustained while transporting a person from a fire to medical facility, etc.).

Section 845 (Police Protection Services). Section 845 provides governmental immunity for the failure to provide police protection services or the provision of insufficient police protection services.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R11 (addresses similar issues as Proposed Project RR R11)	State agencies should ~~not renew or enter into~~ consider not renewing or entering into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence-reversal or reduction programs and perform a beneficiary pay analysis for ongoing anthropogenic changes which are increasing economic and ecological risks.
Reduce Risk of Floods in the Delta	RR R12 (same as Proposed Project RR R12)	U.S. Army Corps of Engineers, Bureau of Reclamation, Department of Water Resources, and local agencies and hydropower utilities should evaluate and modify flood control management procedures for reservoirs upstream of the Delta with consideration for sea level rise, changes in timing and form of precipitation, and changes in water supply operations to alleviate potential Delta flooding.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R1 (same as Proposed Project DP R1)	The Economic Sustainability Plan should include, but not be limited to, planning for the following items: ♦ Public safety recommendations, such as flood protection recommendations ♦ The economic goals, policies, and objectives in local general plans and other local economic efforts, including recommendations on continued socioeconomic sustainability of Delta agriculture and its infrastructure to support the proposed economic strategies and legacy communities in the Delta ♦ Comments and recommendations to the Department of Water Resources concerning its periodic update of the flood management plan for the Delta. ♦ Identification of ways to encourage recreational investment along the key river corridors, as appropriate
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R2 (same as Proposed Project DP R2)	The Delta Protection Commission should complete the evaluation and initiate recommendations related to designation of the Delta and Suisun Marsh as a National Heritage Area. If the recommendation is to proceed with the designation, the federal government should complete the process in a timely manner.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R3 (same as Proposed Project DP R3)	The Department of Transportation should partner with local cities and counties to establish major gateways and improve connecting transportation routes, bike lanes, sidewalks, and trails to promote the Delta's identity, visibility, and access.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R4 (same as Proposed Project DP R4)	The Department of Parks and Recreation should develop funding sources and partner with other State and federal agencies, counties, conservancies, and nonprofits to conduct definitive and consistent recreation use surveys every 5 years and add and/or improve recreation facilities in the Delta, including facilities to meet public recreational needs as part of State Water Project facilities, and add three new parks at Barker Slough, Elkhorn Basin, and in the Southern Delta.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R5 (same as Proposed Project DP R5)	The Department of Fish and Game should collaborate with other agencies and nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R6 (same as Proposed Project DP R6)	The Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.
Finance Plan Framework	FP R1 (same as Proposed Project FP R1)	Public and private agencies with infrastructure crossing the Delta should protect their assets from flooding and other natural disasters. ♦ The Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The Delta Stewardship Council, in consultation with the Public Utilities Commission and the Delta Protection Commission, should allocate these funds between State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency. ♦ The Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, in order to minimize the impact on the State's economy. ♦ The Governor, by Executive Order, should direct State agencies with projects or infrastructure in the Delta to set aside a reasonable amount of funding to pay for flood protection and disaster prevention. The local share of these funds should be allocated as described above.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R2 (addresses similar issues as Proposed Project FP R2)	A Delta Flood Risk Management Assessment District (as described for RR R9) should be created and initially funded with $10 million dollars to develop a ~~a benefit assessment plan~~ strategic risk reduction investment plan that will identify potential improvements with the greatest public benefits, is economically and ecologically sustainable, and contributes to the achievement of the coequal goals plan for the Delta. The Council also recommends an additional $100 million for implementation of flood management improvements to be funded by Propositions 1E and 84 and matched up to 50 percent with non-State funding.
Finance Plan Framework	FP R3 (same as Proposed Project FP R3)	The Legislature should appropriate $50 million of Proposition 1E funds to the Department of Water Resources and direct the Department of Water Resources to begin the acquisition of land and easements for the proposed San Joaquin/South Delta Flood Plain.
Finance Plan Framework	FP R4 (same as Proposed Project FP R4)	Long-term non-General Fund and non-general obligation bonds stable funding should be established to support the Department of Water Resources' Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board. Until this long-term funding is secure, the existing funding for the Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board should be provided until the bonds funds are completely allocated by extending the deadline of July 1, 2013.
Finance Plan Framework	FP R5 (same as Proposed Project FP R5)	As part of the California Water Plan Update, the Department of Water Resources should prepare an assessment of the state's water infrastructure needs. This should include an assessment of the existing infrastructure's rehabilitation/replacement costs, as well as new improvements to meet projected demands over the planning period. The Department of Water Resources should consider a survey of agencies requesting information on small-scale projects (such as storage or conveyance) that allow the State to improve water supply reliability. In the future, a provision should be added to Urban Water Management Plans and Agricultural Water Management Plans to include information on potential local water reliability projects. This could form the basis of future State bond funding decisions and be used to inform the Legislature and the public of systemwide needs.
Finance Plan Framework	FP R6 (same as Proposed Project FP R6)	User Fees/Stressors Fees should support the coequal goals and the Delta Plan. ♦ The Legislature should authorize the Delta Stewardship Council to develop reasonable fees for beneficial uses and reasonable fees for those who stress the Delta ecosystem, and apply these fees to the operational costs of the Delta Stewardship Council, the Delta Conservancy, and the Delta Protection Commission to allow implementation of the Delta Plan. These fees would be developed in an open and transparent process. Operating costs of the Delta Stewardship Council, Delta Conservancy, and Delta Protection Commission should be pre-funded for a period of 10 years. As previously discussed, the annual budget of the new governance structure is approximately $50 million. ♦ Repayment of these costs, with interest, would be made annually commencing in 2022 from collected fees. Repayment could begin sooner if revenue from fees were available before 2022. Repayment should be completed no later than 2032. ♦ Revenue bond authority should be granted to implement the Delta Plan should a fiscal partner be found.
Finance Plan Framework	FP R7 (same as Proposed Project FP R7)	The Legislature should amend AB 3030 and SB 1938 to allow local agencies to assess fees under Proposition 218.
Finance Plan Framework	FP R8 (same as Proposed Project FP R8)	Sufficient funding should be provided to the Delta Conservancy to commence implementation of the ecosystem restoration portion of the Delta Plan. This would include building the capabilities to administer and monitor the Conservancy's projects, as well as funding initial early start projects approved by the Conservancy Board. Funding should be no less than $50 million and should be allocated from existing bond funds, or from any new funds authorized by voters. Total dollar amount allocated for this purpose will depend on all available funding sources and may well exceed $50 million.

Table C-5
Alternative 1A Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R9 (same as Proposed Project FP R9)	The Delta Conservancy, in conjunction with other appropriate agencies, should investigate carbon offsets as a revenue source for Delta islands.
Finance Plan Framework	FP R10 (same as Proposed Project FP R10)	The Legislature should consider appropriate funding for implementation of the Economic Sustainability Plan consistent with the Delta Plan.
Finance Plan Framework	FP R11 (same as Proposed Project FP R11)	The Legislature should consider reasonable payments-in-lieu-of-taxes to replace lost local government revenues resulting from the removal of properties from property tax rolls for ecosystem habitat or water supply purposes in the Delta.
Finance Plan Framework	FP R12 (same as Proposed Project FP R2)	Establish a statewide public goods charge (or broad-based user fee) for water. The Legislature should create a public goods charge (similar to the energy public goods charge created in 1996) on urban water users and agricultural users. This charge could provide for ecosystem costs that were once paid with general obligation bonds, or could be used for State water management costs such as developing the California Water Plan Update or science programs. Before the charge would be put in place, efforts would be necessary to determine administrative details of the program, including how the charge would be assessed, who would be assessed, what type of costs would be recovered, and how revenues collected would be applied. These efforts would take place in an open and transparent process.
Finance Plan Framework	FP R13 (same as Proposed Project FP R13)	By January 2015, the Department of Water Resources should complete a Delta-wide comparative benefit/cost analysis based on recommendations for prioritized State investments for levee operations, maintenance, and improvements in the Delta developed in accordance with RR P4. Benefits should be specifically identifiable and calculable, and include an analysis of the value of lands behind levees. Such a report should be developed in collaboration with the Delta Stewardship Council, local agencies, federal agencies, and the proposed new Delta Flood Risk Management Assessment District.

Source: Adapted from comment letters received from water users located outside of the Delta that use Delta water.

C.3 Alternative 1B

Alternative 1B was developed based in large part upon the *Draft Alternate Delta Plan - Ag-Urban II Coalition Alternate Delta Plan* submitted by the Association of California Water Agencies in a comment letter to the Delta Stewardship Council dated June 10, 2011. Alternative 1B emphasized continued use of Delta exports, reduced conservation and water efficiency measures, only voluntary actions by state and local agencies, coordination but not regulation, and large number of additional-studies before actions.

Alternative 1B contains recommendations only, and not policies, and is presented in Table C-6. Alternative 1B does not include any of the text included in the Proposed Project policies and recommendations, although Alternative 1B does address many of the same or similar issues (as noted in Table C-6). Alternative 1B does not address the following Proposed Project policies and recommendations: G P1, WR P2, ER P3 - 4, RR P2 - P3, WR R4 - R5, WR R10, WR R12, ER R3 - R4, WQ R2, WQ R5, WQ R8 - R9, RR R1- R4, RR R8 - R11, DP P2 - P6, FP R1 - FP R13. Alternative 1B includes additional recommendations that address issues not included in the Proposed Project in G R1 - R3, WR R7, ER R3, and FP R1. Alternative 1B deleted all of the Proposed Project policies and recommendations and replaced the text with recommendations shown as underlined text.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Governance	G R1 (addresses issues not included in Proposed Project)	The Delta Plan is enforceable through the Council's authority to hear appeals on consistency determinations of covered actions, as defined by Water Code section 85057.5. State or local agencies proposing to undertake a covered action must submit to the Council a written certification that the covered action is consistent with the Delta Plan. The Council shall work with state and local agencies to provide early consultation and guidance to assist the agencies in making the determination of whether a covered action is consistent with the Delta Plan. Any person who claims that a proposed covered action is inconsistent with the Delta Plan and, as a result of that inconsistency, the action will have a significant adverse impact on the achievement of one or both of the coequal goals, may appeal the consistency determination to the Council. The appeal must be filed within 30 days after the submission of the certification of consistency and must clearly set forth the basis of the appeal. The burden of producing evidence is on the party appealing a covered act ion to the Council, consistent with the Delta Reform Act. The Act specifically states, in Water Code section 85225.25, that consistency appeals will be determined under the "substantial evidence" standard. Decades of California administrative law have interpreted the "substantial evidence" standard to require that the person challenging an agency's decision produce the evidence necessary to support its case. Otherwise, the agency's decision is valid. Upon such appeal, the Council will consider a covered action to be inconsistent with the Delta Plan if it would significantly interfere with, or hinder, the implementation of a policy, action or program recommended by or incorporated into the Delta Plan. The Council must uphold a determination of consistency, so long as the determination is supported by substantial evidence. ♦ Near Term • Amend existing administrative procedures governing appeals to be consistent with Water Code section 85225 et seq. and the long-standing substantial evidence standard by December 31, 20 12. • No later than June 30, 2013 develop procedures for early consultation on covered action consistency. ♦ Medium Term • Provide project proponents with early consultation on consistency.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		• Review appeals challenging consistency determinations.
Governance	G R2 (addresses issues not included in Proposed Project)	♦ Near Term Actions: by January 1, 2013 • No later than June 30, 2012, convene and chair an advisory committee comprised of key federal, state and local agencies that have jurisdictional authority with in the Delta to develop strategic recommendations to facilitate coordination amongst the agencies, and identify opportunities to integrate programs to efficiently and effectively advance the coequal goals. • No later than June 30, 20 12, convene a working group of experts (e.g. ecologists, biologists, economists, engineers, and water managers) from academia, various levels of government, and the public and private sectors to research and develop a set of metrics for measuring success in terms of achieving the coequal goals. ♦ Medium Term Actions: by January 1, 2018 • Direct the advisory committee composed of key federal state and local agencies to submit its recommendations to the Council no later than December 31, 2013. • Convene a public workshop to receive input on the advisory committee's report and recommendations, and will take action on the recommendations no later than June 30, 2014. • Direct the expert working group to report its findings and recommendations to the Council no later than December 31, 2013. The Council will determine whether additional expert review is warranted. • Conduct a public workshop and take final action on the proposed metrics no later than June 30, 2014. • No later than December 31, 2015, and annually thereafter, prepare and issue an evaluation of progress in implementing the Delta Plan. The annual report will evaluate at least the following areas: (i) coordination and cooperation among federal, state and local agencies to achieve the coequal goals that include preservation of the unique values of the Delta, (ii) measurement (preferably using quantitative measures) of progress toward the coequal goals that include preservation of the unique values of the Delta, (iii) impediments encountered during the prior year as agencies have attempted to make progress toward achieving the coequal goals in a manner that includes the preservation of the unique values of the Delta, and (iv) recommendations for modifying existing programs based on progress towards meeting the coequal goals that include the preservation of (he unique values of the Delta. As an appendix to the annual report, the Council will post the data used in preparing the annual report on its website to promote transparency and accountability. • Adjust deadlines in the Delta Plan that are based on other agencies' actions (e.g., preparation of the Central Valley Flood Protection Plan) as may be needed so as to respect those parallel processes. ♦ Long-Term Actions: after January 1, 2018 • Continued preparation of the annual report. • Update the Delta Plan to reflect new scientific information and the experience of implementing the Delta Plan by means of adaptive management.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Governance	G R3 (addresses issues not included in Proposed Project)	Science Plan ♦ Near Term • Direct the Delta Science Program to identify all life cycle modeling available for each salmon, steelhead, and smelt species dependent on the Delta by February 1, 2012; • Direct the Delta Science Program to present to the Council by May 1, 2012, a report that (1) prioritizes life cycle models that should be developed; (2) identifies statistical analyses of existing data, and makes recommendations on the need for additional data, that will either improve existing life cycle models or assist with the development of new life cycle models; (3) identifies hypotheses, which, when tested, will improve existing life cycle models or assist with the development of new life cycle models; and (4) describes how the results of analyses from life cycle models can be integrated with hydrologic analyses to ensure that the effects of actions are considered in context with the many species that are dependent upon the Delta during at least part of their lives. • Recommend the Independent Science Board to review the Delta Science Program's report and provide feedback and recommendations to the Council by July 1, 2012. • Direct the Delta Science Program to develop, through a public process with stakeholder input, a long-term Delta Science Plan by August 1, 2012. The Delta Science Plan will include, among other subjects to be determined by the Delta Science Program: (1) a prioritized list of new life cycle models that should be developed; (2) investigation of the relationship between reducing various stressors on the system and the efficacy of flow management decisions for the purpose of ecosystem improvements; (3) identification of needed statistical analyses of existing data, studies to develop and analyze additional data, hypotheses to be tested; and (4) the manner in which the Council will provide adequate and reliable funding for implementation of the Delta Science Plan. • Recommend the Independent Science Board to review the work of the Delta Science Plan and make recommendations for improvement by October 1, 2012. • Direct the Delta Science Program to develop and implement annual work-plans consistent with the Delta Science Plan. ♦ Medium Term and Long Term • Monitor the Delta Science Program's implementation of the Delta Science Plan. • Direct the Delta Science Program, in collaboration with the review conducted by the Independent Science Board, to update the Delta Science Plan as necessary, but at least every four (4) years. • Transmit results of Delta Science Plan implementation to local, state and federal agencies for use in their planning and regulatory processes, including the State Water Resources Control Board for consideration in the development of Delta water quality objectives.
Governance	G R4 (addresses issues not included in Proposed Project)	Adaptive Management Plan ♦ Near Term, Medium Term, and Long Term • Utilize information obtained through Delta Science Plan implementation to revise the Delta Plan as appropriate.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R1 (addresses similar issues as Proposed Project WR R2)	Water users and water agencies report a significant amount of water data to local and state agencies pursuant to existing regulations. Volumes of data are generated through Urban Water Management Plans, public water system statistics reports, monthly and annual water quality reports to the Department of Public Health, statements of water diversion and use and permittee and licensee progress reports to the State Water Resources Control Board, California Urban Water Conservation Council annual conservation reports, Central Valley Project water service contractor water conservation plans, Waste Discharge Requirement reports, National Pollutant Discharge Elimination System reports, Surface Water Ambient Monitoring Program reports, California Data Exchange Center water flow data, United States Geological Survey water flow data, and Well Completion reports. This data is scattered among agencies and rarely coordinated, integrated, or analyzed to make water planning decisions. The state's understanding of how water resources are managed would be improved greatly if all of the existing data were integrated and made available to the public. ♦ Near Term • Recommend the Department of Water Resources to create and maintain a statewide database of integrated water information. In compiling the database, Department of Water Resources should consult with the federal Bureau of Reclamation, Department of Water Resources, the State Water Resources Control Board, the Regional Water Quality Control Boards, the Department of Public Health, the U.S. Geological Survey and the California Urban Water Conservation Council and other agencies and associations, and use the information reported to them by local water and wastewater agencies. ♦ Medium Term • Conduct oversight over these agencies' and entities' integration of existing information sources. • Direct Department of Water Resources to make any necessary changes to integrated water data system. ♦ Long Term • Identify any additional sources of information that may be necessary following integration of existing sources of information available to the state.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R2 (addresses similar issues as Proposed Project WR P1 and WR R1)	The conservation and efficient use of water can be an effective tool to manage water supply reliability, but it alone cannot resolve California's water supply challenges. The Public Policy Institute of California dispelled the myth that California can conserve its way out of its water problems, recognizing "water conservation is important, but its effectiveness is often overstated."[33] While there have been significant investments and improvements of water use efficiency in the vast majority of the state's agricultural sector, water use efficiency practices lag in certain agricultural areas. Similarly, many of the State's urban centers have implemented highly effective water conservation programs and have reduced the per capita use of water, but may still benefit from improvements in certain areas. The Council should use its coordination function to promote continuous improvement in cost-effective statewide water conservation. ♦ Near Term • Recommend that Department of Water Resources to collate results of 2011 Urban Water Management Plans to provide estimate of water conservation planned to occur by 2020. • Consult with Department of Water Resources, State Water Resources Control Board, other agencies and stakeholders to identify programs to promote additional local water conservation and water use efficiency projects that are not locally cost effective without additional financial incentives. Complete the consultation and hold a public hearing by June 2012. Prepare a report summarizing recommendations by September 2012, and begin implementation thereafter. ♦ Medium Term • Recommend that Department of Water Resources convene public meetings in 2016 in conjunction with development of its report on implementation of SB 7. (Water Code section 10608.42.) • Recommend that Department of Water Resources convene public stakeholder meetings concerning Department of Water Resources's update of urban conservation option 4, which SB 7 requires by December 31, 2014. (Water Code section 1060S.20(d).) • Reconsult with Department of Water Resources, State Water Resources Control Board, other agencies and stakeholders, and update the relevant report as necessary to identify programs to promote additional local water conservation and water use efficiency projects that are not locally cost effective without additional financial incentives.
Reliable Water Supply	WR R3 (addresses similar issues as Proposed Project WR P1)	State and federal law promote the voluntary transfer of water from willing sellers to willing buyers, but significant transactions costs and other impediments prevent adequate utilization of this tool. As Public Policy Institute of California reports, the number of water transfers in California during the last decade has declined. California will need to improve conditions for voluntary water transfers to accomplish coequal goals in the future. ♦ Near Term • Recommend that Department of Water Resources and State Water Resources Control Board to work with stakeholders on water transfers to identify and implement measures that reduce impediments and facilitate implementation of water transfers that promote water supply reliability within existing law.

[33] Public Policy Institute of California, 2009. California Water Myths, p.14.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R4 (addresses similar issues as Proposed Project RR R5)	Improved conveyance facilities proposed in the Bay Delta Conservation Plan, if constructed and permitted, will not be operational until after the "long-term" period of the Delta Plan begins. Consequently, consistent with the Act, which states that improvements to Delta conveyance are " inherent in the coequal goals for management of the Delta", the Delta Plan should facilitate feasible improvements prior to Bay Delta Conservation Plan implementation. There can be no delay in addressing the threats to Delta conveyance. ♦ Near Term • Recommend the Department of Water Resources to undertake an assessment and review of the levee infrastructure critical to the current through Delta conveyance of export water supplies and to the protection of contractual and regulatory in-Delta water quantity and quality mandates and prioritize a preventive maintenance program to enhance the resiliency of those levees. • Recommend the State Water Resources Control Board modify permits to allow for the combined place of use for the Central Valley Project and State Water Project provided there are appropriate protections for third parties and other legal users of water.
Reliable Water Supply	WR R5 (addresses similar issues as Proposed Project WR R3, WR R7, WR R8, WR R9, WR R11, WQ R3, and WQ R4)	Recent studies document that local and regional water agencies throughout California have implemented innovative groundwater management techniques in recent years[34] Furthering the coequal goals requires sustainable management of California's groundwater basins. While some regions have made significant progress, others have not. The Council should take affirmative steps to encourage the implementation of sustainability-based groundwater management throughout California. **General** ♦ Near Term • Recommend the State Water Resources Control Board or, if necessary, the Legislature designates the use of surface water for groundwater recharge as a "beneficial use." • Recommend the State Water Resources Control Board consider setting uniform guidance for regional water quality control boards relating to Aquifer Storage and Recovery programs and injection of water into groundwater basins serving potable uses. • Recommend the Department of Public Health to expedite, consistent with best available science, the development of criteria for the use of recycled water to supplement surface and groundwater storage. • Review and prioritize the recommendations made in the Association of California Water Agencies *Framework for Sustainable Groundwater Management* (see Attachment C-8) **Monitoring** ♦ Medium Term • Recommend that Department of Water Resources, in collaboration with U.S. Geological Survey and other federal, state and local agencies, should update Bulletin 118 using field data, California Statewide Groundwater Monitoring Elevation Monitoring ("CASGEM"), groundwater agency reports, satellite imagery and other best available science by January 1, 2015. This information will be available for inclusion in the Urban Water Management Plans and Agricultural Management Plans

[34] Association of California Water Agencies, *Sustainability From the Ground Up, Groundwater Management in California - A Framework*, April 2011, and Nelson, Rebecca, *Uncommon Innovation, Development in Groundwater Management Planning in California*, Stanford University, Water in the West Working Paper 1, March 2011.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		that are required to be submitted to the state by December 31, 2015. ♦ Long Term • Recommend Department of Water Resources synthesize the collected groundwater data to make it publicly available and publish groundwater level data for all basins covered by the 2009 legislation's groundwater bill (SB7X 6) on the Internet. **Storage** ♦ Near Term • Recommend the California Water Commission and Department of Water Resources undertake a review and prioritization of potential groundwater storage projects in the state that might serve statewide, regional or local interests in a manner that could contribute toward achievement of the coequal goals. Direct the California Water Commission to consider the report for adoption after a public hearing. • Convene and chair an inter-agency group including at least Department of Water Resources, State Water Resources Control Board, Regional Water Quality Control Boards and Department of Public Health to catalog and resolve issues limiting increased groundwater storage. Direct the interagency group to submit its recommendations to the Council and to the California Water Commission for consideration, review and adoption. ♦ Medium Term • Participate in state agencies' development of regulations and policies concerning groundwater storage.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R6 (addresses similar issues as Proposed Project WR R6, WR R7, and RR R12)	Increasing surface water storage is an integral component of meeting both coequal goals. Capturing more water is critical to water supply reliability; stored water from wet periods will provide a re liable water supply in times of drought. Similarly, stored water may provide a regime of variable water releases that is necessary to restore a healthy ecosystem. The State's current system of storage is deficient; there are not sufficient storage capabilities to capture excess water. There are several local and regional opportunities to improve surface water storage that have yet to be developed. Opportunities for increased surface storage must be investigated and analyzed to determine which storage solutions can be implemented. The Delta Vision Blue Ribbon Task Force concluded that infrastructure investments in both conveyance solutions and new storage would be required to accomplish the coequal goals over the long-term. In addition to conveyance solutions, the "Task Force called for the immediate completion of... surface storage investigations and speedy implementation of any options that optimize the capture of wet period flows". The 2009 water legislative package included a water bond (Water Code section 79700), which, if passed in November 2012, would continuously appropriate $3 billion to the California Water Commission for allocation through a competitive process to water storage projects that provide public benefits.[35] The California Water Commission is in the process of establishing means of quantifying public benefits from new storage infrastructure in order to fund the set of projects with the largest public benefit. Whether the public passes the 2012 water bond or not, California is entering an era which requires reconsideration of investment strategies and operation of new infrastructure to provide public and private benefits. The Alternate Delta Plan seeks to create forums in which these complex question s can be worked out. ♦ Near Term • Report to Legislature and public concerning benefits and challenges related to increasing existing or developing new storage capacity. • Convene and chair public meetings of Department of Water Resources, Reclamation, university engineers and scientists and private experts to improve the state's understanding of the benefits and challenges of increased storage and, in particular, new storage. • Review of status of Department of Water Resources's pending storage investigations. • Recommend that Department of Water Resources complete its pending storage investigations by December 31, 2012. Studies should include analyses of the potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements. • Recommend Department of Water Resources to initiate and conduct coordinated operations studies that include current operational parameters and coordination of current and potential future storage to optimize the benefits of new storage. Direct Department of Water Resources to present the report to the Council and the California Water Commission for their consideration, review and possible adoption by December 20 13. • Recommend Department of Water Resources to complete feasibility, environmental and planning documents necessary to meet the requirements of the Safe, Clean, and Reliable Drinking Water Supply Act of 2010 (SBX7 2) so that the CWC can make decisions on storage funding by December 2014. • Consult with Department of Water Resources, Reclamation, the U.S. Army Corps of Engineers, Federal Energy Regulatory Commission and other dam operators concerning whether new reservoir-operations rules can be developed that would allow reservoirs to be operated more flexibly in light of current weather-forecasting technology to increase water storage without compromising flood control. • Conduct public hearings to develop protocols to maximize both storage and flood control performance.

[35] Public benefits of new storage include flow-related ecosystem improvements, water quality improvements, flood control benefits, emergency response capabilities, and recreation, (Water Code section 79743(a)).

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R7 (addresses issues not included in Proposed Project)	The number and magnitude of illegal diversions in the Delta watershed is unknown and could be significant. Before there is any discussion of additional water management burdens for lawful water users, illegal diversions must be terminated. The State Water Resources Control Board identified the need to investigate and take enforcement actions against illegal Delta diversions as a concern in its Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. The Delta Plan should include direction to investigate, prevent, and terminate illegal diversions, subject to all appropriate due process protections, necessary to achieve the coequal goals. ♦ Near Term • Recommend the State Water Resources Control Board seek investigate, prevent, and terminate all illegal water diversions, including through the statutory authorities of the Delta Watermaster. (Water Code section 85230 (b).) • Recommend the State Water Resources Control Board prioritize enforcement against illegal diversions that could significantly impact the achievement of the coequal goals. ♦ Medium Term • Conduct public hearings on status of State Water Resources Control Board and Delta Watermaster and Court enforcement action related to termination of illegal diversions.
Reliable Water Supply	WR R8 (addresses similar issues as Proposed Project ER R8)	The planning goals of the Bay Delta Conservation Plan include providing for the conservation and management of species and for the restoration and protection of the water supply of water agencies in the Bay Area, the Central Valley and Southern California that serve approximately two thirds of California's population and millions of acres of the nation's most productive agricultural lands long into the future. The Bay Delta Conservation Plan, if successful, will protect the rights of non-participants, improve water supplies of participants and enhance the Delta ecosystem. As a result, the Delta Reform Act requires the Council to incorporate Bay Delta Conservation Plan into the Delta Plan if certain conditions are met. Therefore, this plan should not be predecisional or otherwise prejudice the Bay Delta Conservation Plan outcome or impede Bay Delta Conservation Plan 's completion and implementation. ♦ Near Term • State that Bay Delta Conservation Plan should be completed and approved by January 1, 2014. ♦ Medium Term • Incorporate the Bay Delta Conservation Plan, if it satisfies the requirements of Water Code section 85320, into the Delta Plan as part of the first review and update of the Delta Plan, to be consistent with the requirements of the Delta Reform Act. • Monitor progress of Bay Delta Conservation Plan and conduct any necessary public discussions of its status to the extent needed to coordinate with other related activities in the Delta Plan. • If Bay Delta Conservation Plan is not completed by January 1, 2014, and there is no alternative process underway by an entity capable of pursuing conveyance solutions consistent with the Delta Reform Act, initiate and conduct public process to develop recommendations regarding improved Delta conveyance. In addition, in consultation with the Delta Conservancy, prioritize habitat projects that would have otherwise been undertaken by Bay Delta Conservation Plan.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R9 (addresses similar issues as Proposed Project WR R3 and WQ R4)	The commitment of matching State funds may make affordable projects that local agencies would like to implement for local, regional or statewide benefit, but are not justified under the strict rate-making rules that apply to local agencies under Proposition 218, among other laws. Those laws require that local rates be set to reflect local water costs, making it very difficult for local agencies to make significant contributions to projects that while beneficial to them predominantly create statewide and regional benefits, without supplemental state funding. It therefore is crucially important to further the coequal goals that the maximum water-supply and economic benefits be wrung from the available state funds. ♦ Near Term • Consult with Department of Water Resources and State Water Resources Control Board concerning their grant-funding processes with the goal of reducing the costs associated with grant applications and recommend that grant-funded projects address key objectives in the Delta Plan. • Recommend that Department of Water Resources and the State Water Resources Control Board to timely issue proposal solicitation packages for bond funding already allocated for projects that protect environmental and drinking water quality (Propositions 84 and 50) and reduce risk to people and property. (Proposition 1E.) • Recommend that Department of Water Resources, State Water Resources Control Board, and other state grant funding agencies to prioritize funding of projects that are not locally cost effective and provide local, regional, or Slate benefit. • Consult with Department of Water Resources and the State Water Resources Control Board regarding opportunities to assist disadvantaged communities improve their capacity to successfully apply for grants. • Recommend that Department of Water Resources, State Water Resources Control Board, and other state agencies to file with the Council quarterly progress reports on the implementation of projects being funded from bonds. Prepare an annual report to the Legislature evaluating the progress of those projects. ♦ Medium Term • Review Department of Water Resources and State Water Resources Control Board grant-funding guidelines and comment on whether those guidelines will ensure projects that advance the coequal goals and key objectives set forth in the Delta Plan and as described in Water Code section 85020 arc prioritized. • Monitor Department of Water Resources and the State Water Resources Control Board on efforts to improve grant-funding effectiveness, and as appropriate, issue an update report to the Governor and Legislature. ♦ Long Term • Repeat Medium Term actions during each round of Department of Water Resources's and State Water Resources Control Board's development of grant-funding guidelines.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R10 (addresses similar issues as Proposed Project WR R1)	The Delta Reform Act includes a new state policy to "reduce reliance on the Delta in meeting California's future water supply needs through a statewide strategy" of investment. (Water Code section 85021). Under the Act, the Delta Plan addresses this policy by promoting "statewide water conservation, water use efficiency, and sustainable use of water" (Water Code section 85303.) Department of Water Resources should consult with local agencies to develop a water sustainability element for urban and agricultural water management plans. ♦ Near Term • Recommend that Department of Water Resources to consult with local agencies and stakeholders to develop guidelines for a voluntary water sustainability element of urban and agricultural water management plans to be incorporated in those plans beginning in 2015. ♦ Medium Term • Recommend that Department of Water Resources to evaluate guidelines and update where appropriate. • Recommend that Department of Water Resources to evaluate 2015 urban and agricultural water management plans to assess progress towards implementation of sustainable water supplies, and report assessment to the Council by December 31, 2016.
Delta Ecosystem Restoration	ER R1 (addresses similar issues as Proposed Project ER P2, ER R1, ER R2)	A considerable amount of wetlands habitat in the Delta has been lost. Development of local Habitat Conservation Plans by each of the Delta Counties, as well as large-scale projects being developed as part of the Bay Delta Conservation Plan, are indicative of a growing focus on the restoration of native habitat (marine, tidal, intertidal and upland) within the Delta. Such habitat restoration plans must address as many of the necessary ecosystem components as practicable. ♦ Near Term • Recommend that the California Department of Fish and Game to convene a working group to set goals, objectives and performance measures for restoration projects. The working group shall include United States Fish and Wildlife Service, National Marine Fisheries Service, local stakeholders and affected parties. The working group shall develop goals objectives and performance measures by March, 2012 and present them to the Council, which shall review them with at least one public hearing be fore considering whether to adopt them as part of the Delta Plan. Prior to adoption, the goals, objectives and performance measures shall be reviewed by the Independent Science Board. For consideration in the goals, objective and performance measures, the working group shall emphasize improving conditions for native species and avoiding where possible conditions that would enhance populations of non-native species. • Recommend that resource agencies and local agencies to identify, and finalize plans for and implementation of in-Delta habitat restoration project plans as soon as possible on publicly-owned land as pilot efforts to assess the effectiveness of various techniques and determine the efficacy of hypotheses related to expected ecosystem benefits. • Direct the Delta Science Program to work with state and federal resource and local agencies of interest to identify, prioritize and begin implementation of such projects. • Recommended projects should be informed by the Bay Delta Conservation Plan planning process and should not conflict with or duplicate ecosystem measures that are part of the Bay Delta Conservation Plan. Promising projects include: – Prospect Island – Little Holland Tract – Dutch Slough

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		– Yolo Ranch – Tule Red - Suisun Marsh • Recommend that the Delta Conservancy and other state agencies to prioritize the implementation of the identified projects. • Promote the development of institutional capacity of the Delta Conservancy to manage restored habitat in the Delta. • Direct the Delta Science Program to develop basic monitoring protocols for habitat restoration projects to allow for assessment of efficacy and adaptive management. ♦ Medium Term • Assess progress of Delta Conservancy, Natural Community Conservation Planning, and Habitat Conservation Plan activities in the Delta and facilitate further progress in their implementation as necessary. • Ensure adaptive management of in-Delta habitat restoration projects, consistent with biological goals and compatibility with surrounding land uses. • Identify further necessary in-Delta habitat restoration projects and develop implementation proposals for consideration by the Delta Conservancy. • Recommend the Delta Science Program study reconfiguring Delta waterway geometry to increase variability in estuarine circulation patterns, while maintaining appropriate flood protection, water supply and flood management capabilities both within the Della and in areas supplied from the Delta. ♦ Long Term • Continued monitoring and receive progress reports from Delta Conservancy and others as to effectiveness and adaptive management of habitat projects in the Delta. • Review the Delta Conservancy's and other proposed in-Delta habitat restoration projects for consistency with Delta Plan.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R2 (addresses similar issues as Proposed Project ER P5, ER R6, ER R7)	The Delta is one of the most invaded estuaries in the world. More than 250 alien aquatic and plant species currently inhabit the Delta. Ninety-five percent of the biomass in the Delta is non-native and 28 of the 40 fish species now residing in the Delta are non-native. These invasive species substantially alter the Delta ecosystem by displacing and out-competing species that are native to the Delta. Significant quantities of native fish species, including species protected by the Endangered Species Act, such as Chinook salmon, Delta smelt, steelhead, and longfin smelt, are eaten by non-native predatory fish each year. Radio telemetry tagging studies show that 90-98 percent of young salmon are lost to predation prior to reaching the ocean, which greatly exceeds natural predation rates. Predation by non-native species is one of the major contributors to the decline of Chinook salmon and smelt abundance in the Delta. Peer reviewed studies and actions in other aquatic ecosystems have shown that predation control and management are effective tools in recovery of native species. Invasive species also adversely affect habitat for native fish that are not eaten by predators. For example, the Asian clam infestation dramatically reduces the availability of food sources by filtering the water column every 24 hours and the overgrowth of water hyacinth blocks light needed for photosynthesis and reduces dissolved oxygen in the water. ♦ Near Term • Recommend the Department of Fish and Game remove bass fishing restrictions and bag limits. • Direct Department of Fish and Game and the California Department of Boating and Waterways to continue programs to discourage and remove *Egeria* and *Corbula* from the system. • Recommend Department of Fish and Game work with stakeholders to obtain funding for predation removal/reduction programs and implement the programs as soon as possible. • Identify other measures with best scientific basis to reduce riverine and in-Delta predation on salmonids. • Identify other measures to remove invasive species or lessen the impact of native species to restore the Delta ecosystem. ♦ Medium Term • Identify and recommend measures to address salmonid predation "hot spots," including assessment of in-channel structures. • Consult with fishery and resources agencies to develop comprehensive program to control salmonid predators to improve the Delta as a functional migratory corridor for native salmonid species. • Identify and recommend measures to remove or reduce population of Asian clam and other invasive species that adversely impact ecosystem functions. ♦ Long Term • Apply adaptive management to identify revised or additional predation-control measures.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R3 (addresses issues not included in Proposed Project)	The Delta ecosystem has recently experienced a significant decline in Chinook salmon species. Poor oceanic feeding conditions and commercial fishing have been identified as key causes of the collapse of fall run Chinook salmon, with the former being identified by experts as the "proximate cause" of the collapse. Prior to the halt on commercial salmon fishing in 2007, the Pacific Fisheries Management Council estimated that approximately 50 percent of adult fall-run salmon were being harvested by commercial fisherman, and, which because of current fishery practices resulted in large amounts of take of listed salmon. ♦ Near Term • Recommend that National Marine Fisheries Service, the Pacific Fisheries Management Council and Department of Fish and Game to develop regulations or rules for Central Valley salmon to selectively protect naturally-spawning fish, and older fish, from ocean harvest i.e. a "mark-select" fishery similar to that already in place in the Pacific Northwest, reducing the incidental take of threatened and endangered stocks. • Recommend that National Marine Fisheries Service prepare a report assessing the impact of ocean harvest relative to other activities that take salmon. ♦ Medium Term • Consult with National Marine Fisheries Service, the Pacific Fisheries Management Council and Department of Fish and Game to develop regulations or rules for Central Valley salmon to selectively protect naturally-spawning fish, and older fish, from ocean harvest.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R4 (addresses similar issues as Proposed Project ER P1)	The flow of water to and through the Delta, from the tributary watersheds is regulated by the State Water Resources Control Board, the Federal Energy Regulatory Commission, Department of Fish and Game, among other agencies. Despite the extensive regulation of Delta and upstream flows over the past 25 years, the extent to which flow benefits the ecosystem or fish abundance is not well understood. In many Delta tributaries, there has been extensive scientific work that has greatly increased the understanding of the conditions that migratory fish such as salmon and steelhead need to thrive while they spawn and rear in those tributaries. Similar efforts must be undertaken to address the decline of native species in the Delta. Specifically biological models, such as life-cycle models, need to be developed to determine how fish abundance is affected by various factors, including flow. Development of this important and currently absent scientific tool will in form existing regulatory processes and allow for a more refined and effective balancing of beneficial uses pursuant to the reasonable use doctrine under Article X, section two, of the California Constitution and the public trust doctrine consistent with the coequal goals. Investigating whether addressing other stressors would improve the efficacy of those water investments is fundamental to developing the most efficient approach to the balancing decisions inherent in assessing achievement of the coequal goals. ♦ Near Term • Review how other processes that significantly affect and, in many cases, control instream flows in the Delta watershed - including, but not limited to, the San Joaquin River Restoration program, the Yuba River Accord and the American River's Water Forum Agreement - and assess those processes as possible models for achieving the coequal goals in the Delta. • Direct the Delta Science Program to develop life cycle models for each species of concern to begin to uncover the mechanisms for species responses to environmental conditions. • Direct the Delta Science Program to develop a Science Plan that prioritizes the investigation of questions regarding the relationship of the benefits of flow management to the reduction or other stressors and understanding whether undertaking the latter would reduce the magnitude of proscriptions related to the former. • Direct the Delta Science Program to evaluate how changes in Delta geometry can positively affect locations of salinity gradients for given flows. • Recognize that the "Area of Origin" statutes and the Delta Protection Act (Water Code section 12200 et seq.) were specifically enacted to protect in -bas in and legal in-Delta water users. ♦ Medium Term • Consult with the State Water Resources Control Board in its selection of "high priority" rivers and streams of significant magnitude within Delta watershed on which to conduct new streamflow studies to focus actions that will benefit fish migrating through the Delta but do so in the most fiscally and water efficient manner. • Provide the Independent Science Board support to finalize peer-reviewed life cycle or other biological models developed by the Science Program.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R1 (addresses similar issues as Proposed Project WQ R6)	There is substantial concern and dispute concerning the direct or indirect impact of discharges of ammonia and other nutrients on the Delta ecosystem and the Delta's native fish species. One of the most significant contributions the Council can make on Delta water quality issues is to direct the Delta Science Program to refine the science concerning nutrients to support future consideration by the State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards under the Porter-Cologne Act. ♦ Near Term • Direct the Science Program to review existing studies, and if necessary, undertake or sponsor additional scientific studies on the effects of ammonia and other nutrient discharges on the quality of Delta water and food web that supports native species.
Improve Water Quality	WQ R2 (addresses similar issues as Proposed Project WQ R7)	Achievement of the coequal goals will require an evolving understanding of how water quality in the Delta is affecting species of concern because limited water supplies must not be used to address water quality issues that impact the Delta's ecosystem. Similarly, in cases like *Peabody v. City of Vallejo*, the California Supreme Court interpreted Article X, section two, of the California Constitution to prohibit the unreasonable use of water to address water quality issues. Accordingly, the Council should seek to coordinate state agencies' actions to develop a monitoring program that will generate the necessary information for those agencies to react appropriately to the Delta's evolving water quality. ♦ Medium Term • Recommend the Department of Fish and Game, State Water Resources Control Board, Department of Toxic Substance Control, and Department of Pesticide Regulations develop a monitoring program to assess chemical concentrations in delta water, sediment and wild life tissue and evaluate the impacts of those concentrations on fish and wild life populations in the Delta.
Improve Water Quality	WQ R3 (addresses similar issues as Proposed Project ER P2, ER R1, ER R2)	Constituents in treated wastewater discharged from wastewater treatment plants in, near or upstream of the Delta may impact fish species of concern in, or migrating through, the Delta by directly impacting on fish, impacting on their food chain, promoting non-native fish or plants or other avenues. The National Pollutant Discharge Elimination System that the Regional Water Quality Control Boards implement under the federal Clean Water Act and the state Porter-Cologne Water Quality Control Act is constructed to address such issues because fisheries are designated beneficial uses of the Delta and its tributaries, water quality objectives are designed to protect such beneficial uses and National Pollutant Discharge Elimination System permits are designed to implement those objectives. The federal Clean Water Act establishes a method for updating National Pollutant Discharge Elimination System permits because the Act slates that they must be renewed every five years. In reality, however, the Regional Water Quality Control Boards often do not review and revise individual National Pollutant Discharge Elimination System permits every five years. In some cases, it may not be necessary to revise such perm its every five years, as where a previous permit has required a permittee to construct new facilities that cannot be completed within five years. ♦ Near Term • Review, and issue a public report on, the timing of National Pollutant Discharge Elimination System permit renewals relevant to the Delta by the San Francisco Bay and Central Valley Regional Water Quality Control Boards. ♦ Medium Term • Consult with the San Francisco Bay and Central Valley Regional Water Quality Control Boards to evaluate whether National Pollutant Discharge Elimination System permits should be reviewed every five years. • Conduct public reviews of National Pollutant Discharge Elimination System permitting processes of San Francisco Bay and Central Valley Regional Water Quality Control Boards if terms of National Pollutant Discharge Elimination System permits relevant to the Delta are not being reviewed every five years.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R4 (addresses similar issues as Proposed Project WQ R10)	The division of the responsibilities of the San Francisco and Central Valley Regional Water Quality Control Boards occurs at the western end of the Delta. Because of the tidal nature of the Bay-Delta system, discharges into the western end of Suisun Bay and the Carquinez Strait can affect the water quality and ecosystems in Suisun Bay, Suisun Marsh and the Delta. Currently, the San Francisco Regional Water Quality Control Board and the Central Valley Regional Water Quality Control Board may require different discharge standards with respect to discharges that are near each other, and effectively into the same waters when tides are taken into account. Improved coordination between the two Regional Water Quality Control Boards is needed to ensure they are not working at odds with each other and with the water quality needs for the Delta. ♦ Near Term Action • Recommend that the State Water Resources Control Board direct the San Francisco Regional Water Quality Control Board and the Central Valley Regional Water Quality Control Board to examine their Basin Plans to identify areas of inconsistency in the area between the Carquinez Strait and the Delta to ensure that discharge requirements are coordinated and consistent for the Suisun Bay, Suisun Marsh and Delta regions.
Improve Water Quality	WQ R5 (Addresses similar issues as Proposed Project ER P2, ER R1, ER R2)	Pyrethroids are a class of pesticides that has been increasingly used by households in urban areas as other pesticides have become less acceptable. Pyrethroids reach Delta waterbodies through storm drainage. The use of pyrethroids may be affecting the Delta's ecosystem, but the particular effects are not well understood. ♦ Near Term • Direct the Delta Science Program to develop a better understanding of the impacts of pyrethroids on the Delta's ecosystem. • Conduct public hearings involving the Department of Pesticide Regulation and local agencies to examine methods of ensuring that the use of pyrethroids in the Delta watershed is consistent with their label specifications and to expand integrated pest management programs for residential, agricultural and commercial sectors, including incentives (e.g. tax breaks, reduced permitting costs) to encourage integrated pest management practices.
Improve Water Quality	WQ R6 (addresses similar issues as Proposed Project WQ R1 and WQ R4)	Actions in the Delta can affect drinking water quality as well as water quality for the ecosystem. It is important that the State Water Resources Control Board and Regional Water Quality Control Boards consider these factors in addressing activities that can affect the Delta's water quality. ♦ Near Term • Recommend that the State Water Resources Control Board and the Regional Water Quality Control Boards apply existing anti-degradation policies (State Water Resources Control Board Resolution No. 68-16 and Resolution No. 88-63, and 40 Code of Federal Regulations section 131.1 2) to ensure that activities that can affect the Delta's water quality address any impacts that they have on Delta water quality. • Exercise the Council's authority as a responsible agency under California Environmental Quality Act to ensure that covered actions minimize or mitigate Delta water quality impacts consistent with California Environmental Quality Act. • Recommend that the State Water Resources Control Board, the San Francisco and Central Valley Regional Water Quality Control Boards adopt policies giving incentives to improve to the quality of discharged water beyond that required through enhanced treatment or best management practices. • Recommend the Central Valley Regional Water Quality Control Board complete the Central Valley Drinking Water Policy, with appropriate protections for Delta water quality and anti-degradation, as part of its 2013 Basin Plan Amendment.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R1 (addresses similar issues as Proposed Project RR P4)	♦ Near Term • Recommend that the Legislature consider permanently authorizing the Delta Levee subventions program (Water Code section 12980 el seq.) incorporating the Central Valley Flood Protection Plan and State Plan of Flood Control when these become available. This program aligns local and state interests in flood control and cost-effective levee maintenance and has been a demonstrated success for the past 40 years. • Recommend Department of Water Resources consider the goal of elevating all Delta levees to the Hazard Mitigation Plan and then the PL 84-99 design criteria for the purpose of establishing a uniform baseline for flood protection, flood risk reduction, and establishing eligibility for federal assistance in levee rehabilitation and restoration. • Recommend Department of Water Resources consider the adoption of risk-based standards based on land use, with the PL 84-99 standard as the minimum goal for all land uses except habitat and wetlands. Agricultural areas should meet the PL 84-99 standard, rural communities should meet a FEMA 100-year standard, and urban areas should meet the new California 200-year standard. • Recommend Department of Water Resources evaluate the extent to which flood protection facilities provide benefits to those other than landowners. ♦ Medium Term and Long Term • Recommend that Department of Water Resources and other grant funding agencies ensure that bond funds are being used to implement, in accordance with Water Code section 12986(b), projects needed to meet the risk-based standards. • Recommend Department of Water Resources and the U.S. Army Corps of Engineers seek additional funding for flood projects. • Recommend Department of Water Resources and the U.S. Army Corps of Engineers valuate regulatory, financial and technical impediments to meeting the risk-based standards. • Recommend Department of Water Resources develop funding based on the beneficiary pays principle, including public beneficiaries.
Reduce Risk of Floods in the Delta	RR R2 (addresses similar issues as Proposed Project RR P1 and RR R7)	♦ Near Term, Medium Term, and Long Term • Coordinate with the Delta Protection Commission and local governments to assure that development in the Delta conforms to the adopted Delta Land Use and Management Plan. • Recommend that the Central Valley Flood Protection Board establish designated floodways as an integral part of the Central Valley Flood Protection Plan. • Recommend that Department of Water Resources to conduct an emergency response study to identify a suite of coordinated actions that would minimize water supply disruption following a catastrophic earthquake or flood in the Delta, including coordinated actions among agencies such as local reclamation districts, Department of Water Resources, the Central Valley Project, and other responsible agencies. The study shall include a draft plan and shall be completed by March 2012 and shall be presented to the Council for its consideration. After review by the Council and the Delta Science Program, the Council shall consider the plan for adoption and if adopted, shall direct state agencies to implement the plan.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R3 (addresses similar issues as Proposed Project RR R5 and RR R6)	♦ Near Term, Medium Term, and Long Term • Recommend the U.S. Army Corps of Engineers and Department of Water Resources prepare, not later than December 31, 2012, a map of the Central Valley floodplain for various design storm events and various levels of sea level rise so that local agencies can engage in appropriate emergency planning. • Recommend the U.S. Army Corps of Engineers, Department of Water Resources, the Regional Water Quality Control Boards, National Marine Fisheries Service, and U.S. Fish and Wildlife Service, at least, develop a streamlined plan not later than December 31, 2012 for dredging Delta channels. • Recommend the Legislature expand and fund the activities that were authorized under SB 27 and, in particular, should fund emergency response improvements such as the development of a coordinated and specific emergency response plan for the Delta and the creation of regional stockpiles of materiel and equipment for emergency response (e.g., medical supplies, drinking water, rock and other supplies needed to quickly close a breached levee). • Recommend each local agency with emergency response and flood protection responsibilities prepare coordinated emergency response plans and submit those plans to the U.S. Army Corps of Engineers and the Central Valley Flood Protection Board for review and comments, no later than December 3 1, 20 12. These plans could include the following: (a) a communication plan and authority matrix identifying parties responsible for specific emergency response actions; (b) a pre-drafted letters needed to authorize emergency responses or request assistance from other agencies and entities; (c) a coordinated action plan to minimize the disruption of essential public services; and (d) a discussion of logistical challenges potentially limiting emergency response (road flooding, transportation of stockpiled rock, barge limitations, etc) and strategies to minimize logistical obstacles. These plans should be updated every other year at least. • Convene a working group composed of Department of Water Resources, local governments, and the Little Hoover Commission to examine the processes that Department of Water Resources (and other state agencies) have used to award and distribute bond funds to determine whether and how the process can be streamlined to both distribute funds more quickly, and to identify projects with the greatest return on investment, while ensuring strict accountability for the use of public funds. The working group should report to the Council no later than December 31, 2013.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R1 (addresses similar issues as Proposed Project DP R1)	As noted above, the coequal goals must be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource and agricultural values of the Delta as an evolving place. These values rely, in large part, upon ensuring the Delta's economic health and sustainability over the long term, which must therefore be considered as a key measure of the success of the Delta Plan. Indeed, it is impossible to imagine the Delta Plan succeeding without a healthy and sustainable Delta economy. Success will require local involvement, input, and decision-making in the Delta. Each of the unique values identified - cultural, recreational, natural resource and agricultural are dependent on the maintaining a stable, expandable and robust economic climate within the Delta. The Delta Protection Commission is solely responsible for the development of an economic sustainability plan for the Delta with the Council reviewing that plan for inclusion in the Delta Plan. The Commission's economic sustainability plan must respect and seek to protect and enhance the Delta's economic vitality, as sustainability of the Delta's economy is necessary to achieve the coequal goals. ♦ Near Term, Medium Term, and Long Term • The Delta Protection Commission shall submit its Economic Sustainability Plan to the Council for its consideration. • The Council should incorporate into the Delta Plan the elements of the Delta Protection Commission's Economic Sustainability Plan that are feasible and

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		consistent with the Delta Plan. • The Council should recommend the Commission include the following elements in the Economic Sustainability Plan: 1) The Commission should propose and the Council should consider for inclusion in the Delta Plan a statement that all Delta resources must be protected and enhanced in order to create a sustainable and viable Delta. (Water Code section 85302) 2) The Commission should prepare and the Council should consider for inclusion in the Delta Plan provisions to preserve agriculture as a primary land use and economic driver in the Delta, recognizing that traditional fanning communities provide stability and economic sustainability for the Delta. The meandering channels of the Delta have been recognized as part of its character and part of its sense of "place" by the Legislature in Water Code section 12981(b). 3) The Commission should propose and the Council, working collaboratively with local governments in the Delta, should consider for inclusion in the Delta Plan provisions that develop a reliable and sustainable permanent mechanism and funding to replace local government revenues (i.e., taxes, assessments, fees/charges) that are lost if those losses occur as a result of the acquisition or conversion of lands to habitat, infrastructure and other activities identified in the Delta Plan, including, but not limited to Bay Delta Conservation Plan. 4) The Commission should propose and the Council should consider for inclusion in the Delta Plan provisions that explicitly acknowledge affected local governments' authority over land uses, revenues, public health and safety, economic development within their boundaries. 5) The Commission should propose and the Council should consider for inclusion in the Delta Plan provisions that explicitly acknowledge the role local governments (including counties, cities and special districts) have under California's Constitution, as they are uniquely equipped to effectively manage these processes. Local governments are responsible to advocate for the interests of the represented communities. 6) The Commission should propose and the Council should consider for inclusion in the Delta Plan provisions that acknowledge the important role of local governments does not detract from the Council's role in overseeing consistency reviews; instead, acknowledging the role of local governments bolsters the Council's role as the one agency looking at the "big picture" of the Delta from a statewide perspective, rather than attempting to replace or duplicate the functions of local government. In this way, collaboration with local governments is consistent with and implements the Delta Vision Strategic Plan.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R2 (addresses similar issues as Proposed Project ER P2, ER R2, ER R5)	Currently, substantial portions of the Delta are owned by public agencies for the purpose of habitat restoration. Such projects should initially be implemented on those lands. Obtaining the voluntary assistance of landowners and other interests in the Delta will be important for making improvements to the Delta ecosystem. Such landowners and interests, however, may be unwilling to provide that assistance if their voluntary efforts could result in increased regulatory burdens under the federal Endangered Species Act or the California Endangered Species Act. The primary means to address this concern is for state and federal resources agencies to provide federal Endangered Species Act/California Endangered Species Act, take protection to those landowners and interests, and assumption of the financial responsibility for relocations and protective devices necessary to meet obligations under of federal Endangered Species Act/California Endangered Species Act. that result from restoration activities of the Bay Delta Conservation Plan and Delta Plan. The development and execution of such agreements should be part of the Delta Plan and Bay Delta Conservation Plan restoration project permits and expedited. ♦ Near Term, Medium Term, and Long Term • Convene a collaborative working group composed of representatives of Delta landowners, local governments, and the parties to Bay Delta Conservation Plan to develop two forms of agreement for habitat restoration projects in the Delta: a "no surprises/safe harbor" implementing agreement for Delta landowners or local governments that wish to collaborate in the creation of habitat, and a "good neighbors" implementing agreement for Delta landowners or local governments that own property or which have facilities in the vicinity of proposed habitat restoration projects. This working group should be charged with reaching agreement on these forms of agreement no later than December 31, 20 13. These implementing agreements should, in the case of "no surprises/safe harbor" provide substantial incentives to encourage voluntary participation in habitat restoration efforts, and in the case of "good neighbor" provide en foreseeable assurances that landowners or local governments will not be limited in the manner in which they can operate facilities or use property. • There are a number of successful habitat projects already being implemented in the Delta, such as in Suisun Marsh, the Yolo Basin Wildlife Area and the Cosumnes River area. In addition, the Delta counties have all developed habitat conservation plans/natural community conservation plans to protect the Delta ecosystem. The Delta Plan should not interfere with or impair these and other similar local programs. • Recognize and honor the letter and spirit of existing Delta assurances such as the North Delta Water Agency's contract with the State of California. The Delta Plan should recommend that Department of Water Resources and/or other state agencies enter into similar agreements with other agencies/interests in the Delta, for appropriate consideration, thereby providing those agencies with assurances that current legal activities, cultural practices, etc. can be maintained into the future.

Table C-6
Alternative 1B Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R1	♦ Near Term • The most important near-term action required for a successful long-term finance plan is the development of a Delta Plan that will significantly advance the coequal goals while protecting and enhancing Delta as an evolving place. For a successful finance plan, the Delta Plan must be broadly supported among those entities expected to pay for it. • The 2012 water bond contains substantial financing for key elements of the Delta Plan, including local resource development and improvements to water use efficiency, environmental investments in habitat and watersheds, and the public benefits of storage. If the bond passes, the Council will need to develop recommendations for the effective expenditure of those funds to further the achievement of the coequal goal s. This Alternate Delta Plan contains many of the necessary recommendations. If the bond does not pass, the Council will need to develop a finance plan as part of an update to the Delta Plan. • Ecosystem restoration/recovery actions, beyond specific project mitigation requirements, may provide general benefit to California and the nation and may be funded accordingly through General Obligation bonds (including the 2012 bond), General Fund revenues, federal appropriations or voluntary agency contributions. • Ecosystem restoration/recovery actions linked to and a necessary part of a larger package (for example, a restoration activity taken in lieu of another activity that is thereby avoided) or are otherwise required should be pa id for by the beneficiary of that activity. • State agency actions to develop and advance the Delta Plan, including those of the Council, should be funded by the General Fund. In particular, the Council as a coordinating and integrating agency should not have a need for a large staff or budget. Because the activities of the Council and staff are intended to broadly benefit the environment and water supply throughout California, their expenses are appropriately paid for by the general fund. ♦ Medium Term • Prior to the first five (5) year update of the Delta Plan, regardless of the outcome of the bond election, targeted finance plans should be developed for major Delta Plan activities recognizing that a broad base of parties have responsibility for costs, not just water users: a. Water quality improvements b. Habitat restoration c. Flood risk reduction d. Regional self reliance improvements e. Water conveyance f. Roadway and utility service risk reduction g. Sport and commercial fisheries h. Wastewater discharges • All Central Valley Flood Protection Plan and Bay Delta Conservation Plan actions will be funded pursuant to those plans.

Source: Draft Alternate Delta Plan, Ag-Urban II Coalition Alternate Delta Plan, Association of California Water Agencies comment letter to the Delta Stewardship Council dated June 10, 2011.

C.4 Alternative 2

Alternative 2 was developed based upon comment letters submitted by individuals and stakeholders that support improvement in California's environment with comments that emphasized decreased export of water from the Delta and increased emphasis on ecosystem restoration throughout California.

The policies and recommendations for Alternative 2 are presented in Tables C-7 and C-8, respectively. Alternative 2 includes most of the issues addressed by the Proposed Project policies and recommendations, but does not address ER P3 and RR R2. Alternative 2 also includes an additional Financial Plan recommendation, FP R14. Additions and deletions to Proposed Project policies and recommendations are shown as underlined and strikeout text.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
Governance	G P1 (same as Proposed Project G P1)	Certifications of consistency with the Delta Plan must address the following: ♦ A covered action must be consistent with the coequal goals and the inherent objectives. In addition, a covered action must be consistent with each of the policies contained in this Plan implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant policies may not be feasible. In those cases, covered action proponents must clearly identify areas where consistency is not feasible, explain the reasons, and describe how the covered action nevertheless, on whole, is consistent with the coequal goals and the inherent objectives. In those cases, the Delta Stewardship Council may determine, on appeal, that the covered action is consistent with the Delta Plan. ♦ All covered actions must be fully transparent by disclosing all potentially significant adverse environmental impacts and feasible mitigations of those adverse impacts. ♦ As relevant to the purpose and nature of the project, all covered actions must document use of best available science. ♦ Ecosystem restoration and water management covered actions must include adequate provisions, appropriate to the scope of the covered action, to assure continued implementation of adaptive management consistent with the Delta Plan. This requirement shall be satisfied through: • An adaptive management plan that describes the approach to be taken for each of the nine steps of the adaptive management framework: – Define/Redefine the Problem. – Establish Goals and Objectives. – Model Linkages Between Objectives and Proposed Action(s). – Select Action(s): Research, Pilot, or Full-Scale. – Design and Implement Action(s). – Design and Implement Monitoring Plan. – Analyze, Synthesize, and Evaluate. – Communicate Current Understanding. – Adapt. • Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process. ♦ All covered action proponents shall certify that the covered action shall comply at all times with existing applicable law.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
Reliable Water Supply	WR P1 (addresses similar issues as Proposed Project WR P1 and WR R9)	A covered action to export water from, transfer water through, or use water in the Delta is inconsistent with the Delta Plan if the covered action negatively impacts one or more of the coequal goals and one or more of the water suppliers[36] that receive water from the Delta significantly causes the need for the covered action by failing to comply with one or more of the following: ♦ Compliance with State law • Urban water suppliers[37] – Adopt and implement an Urban Water Management Plan and all required elements and measures, meeting the standards and timelines established in Water Code section 10610 et seq. – Adopt and implement a plan to achieve 20 percent reduction in statewide urban per capita water use by December 31, 2020, meeting the standards and timelines established in Water Code section 10608 et seq. ♦ Agricultural water suppliers[38] • Adopt and implement Agricultural Efficient Water Management Practices including measurement of the volume of water delivered to customers, adoption of a pricing structure based in part on the quantity delivered, and implementation of specific conservation measures that are locally cost effective and technically feasible, meeting the standards and timelines established in Water Code section 10608 et. seq. • Adopt and implement an Agricultural Water Management Plan and all required elements, meeting the standards and timelines established in Water Code section 10800 et seq. ♦ Water Reliability Element ~~• To promote accountability throughout the state in achieving the coequal goals, water suppliers shall, no later than December 31, 2015, expand an existing or add a new Water Reliability Element in their Urban Water Management Plan and/or Agricultural Water Management Plan. Water suppliers may also meet this requirement by including a Water Reliability Element in an approved Integrated Regional Water Management Plan or other water plan that provides equivalent information.~~ ~~• The Water Reliability Element shall detail how water suppliers are sustaining and improving regional self-reliance and reducing reliance on the Delta through investments in local and regional programs and projects, and shall document actual or projected reduction in reliance on Delta exports. At a minimum, the Water Reliability Element shall include:~~ ~~**– A plan for possible interruption of Delta water supply due to catastrophic**~~

[36] Water suppliers, as used in this Delta Plan, refer to both "Urban water supplier" and "Agricultural water supplier" as defined in footnotes 37 and 38.

[37] "Urban water supplier" as used in this Delta Plan refers to both "urban retail water suppliers" and "urban wholesale water suppliers" under the Water Code. An "urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annual at retail for municipal purposes (Water Code section 10608.12(p)). An "urban wholesale water supplier " means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of potable water annually at wholesale for municipal purposes (Water Code section 10608.12(r)).

[38] "Agricultural water supplier" as used in this Delta Plan refers to both "agricultural retail water suppliers" and "agricultural wholesale water suppliers" under the Water Code. An "agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. An "agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include DWR (Water Code section 10608.12(a)). Any agricultural water supplier than provides water to less than 25,000 irrigated acres is not required to comply with SBX7 7 requirements unless sufficient funding is provided to the supplier to implement these provisions (Water Code section 10853).

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
		~~**events:** Identify how reliable water service will be provided or shortages managed for minimum periods of 6 months, 18 months, and 36 months in the event that diversions or exports from the Delta are interrupted during an average water year, dry water year, and following three dry water years.~~ ~~**Implementation of planned investments in water conservation, water efficiency, and water supply development:** Identify specific programs and projects that will be implemented over a 20-year planning period and how they are consistent with the coequal goals and will contribute to improved regional self-reliance and reduced reliance on the Delta, including, but not limited to, the following strategies:~~ ~~▪ Water conservation~~ ~~▪ Water use efficiency~~ ~~▪ Local groundwater and surface storage~~ ~~▪ Conjunctive use programs~~ ~~▪ Water transfers~~ ~~▪ Water recycling~~ ~~▪ Treatment and use of currently non-potable groundwater~~ ~~▪ Stormwater capture and recharge~~ ~~▪ Saline water and brackish water desalination~~ ~~• **Evaluation of regional water balance:** Provide an assessment of the long-term sustainability of the water supplies available to meet projected demands within the supplier's hydrologic region, as defined by California Water Plan 2009 Update, over the 20-year planning period. If the region's demand exceeds available supplies, identify the steps being taken through one or more of the Integrated Regional Water Management Plans to bring the region into long-term balance. If the region's demands exceed available supplies and it does not have an Integrated Regional Water Management Plan or the Plan does not address the steps being taken to bring the region into balance, then describe how the supplier's programs and projects are helping to bring the region into long term balance.~~ • ~~**Conservation-oriented water rate structure:** Evaluate the degree to which the supplier's current rate structure sustainably encourages and supports water conservation.~~ • Requirements of the Water Reliability Element would become more stringent for future Urban Water Management Plan and/or Agricultural Water Management Plan for water suppliers that divert or export water from the Delta as compared to a requirement for other projects, including provisions to: – Incorporate the goal of reducing reliance on Delta supplies by promoting regional self-sufficiency for areas that use water exported from the Delta. – Establish specific statewide water use reduction targets for Agricultural Water Management Plans that may exceed Best Management Practices of 1 million acre-feet by 2020. 2.5 million acre-feet by 2025, and 3.5 million acre-feet by 2040. Actions could include mandatory water application and consumption rates for specific crops and soils and conversion of up to 380,000 acres in the San Luis Drainage area. – Mandate use of recycled wastewater, gray water, and stormwater including the increase of recycling by 2 million acre-feet over current use by Year 2030; capture and reuse of up to 333,000 acre-feet/year of stormwater in Southern California; and groundwater cleanup. Water suppliers shall report on the use of recycled water to reduce surface water diversions and groundwater withdrawals. – Mandate plumbing and other water-use equipment retrofits on sale of property. • Local and regional agencies in groundwater basins that have been identified by the Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003),

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
		by December 31, 2014. If local or regional agencies fail to develop and implement these groundwater management plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2 prohibition on unreasonable use of water and whether a groundwater adjudication is needed to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code Section sections 2100-2101. [39] The groundwater management plans should include scientifically-based evaluations of aquifers. • The Legislature should empower the State Water Resources Control Board to review groundwater management plans, intervene, and prepare the groundwater management plans if necessary by December 31, 2015. ♦ Conservation-Oriented Rate Structure • Water suppliers shall, by December 31, 2020, develop and implement a water conservation-oriented rate structure which ~~may~~ would include consideration of a water-budget-based rate structure that sustainably encourages and supports more efficient water use without causing a shortfall in system revenues[40] (including establishment of a web-based tool to assist decisions on landscape and agricultural irrigation based on weather), provides for the identification of waste with rewards efficient use and penalties for excessive use with the establishment of basic rates for low income residential customers, invests 5 percent of the revenues to fund conservation programs, notices to those that have excessive use, and provide funding for community and environmental justice groups for economic development of conservation programs. • Water rate structures for specific water suppliers that benefit from specific facilities to fully fund the programs, including costs of water conservation, recycling, storage, and conveyance costs, water management costs, including mitigation, monitoring, and adaptive management.
Reliable Water Supply	WR P2 (same as Proposed Project WR P2)	All new contracts, contract modifications, contract renewals and agreements to export water from, transfer water through, or use water in the Delta except transfers for up to one year in length, are not consistent with Delta Plan unless they have been developed in a transparent manner consistent with Department of Water Resources' revised policies adopted in 2003 for contract renewals and permanent transfers included in Attachment C-1 or comparable policies issued by the Bureau of Reclamation.
Delta Ecosystem Restoration	ER P1 (addresses similar issues as Proposed Project ER P1)	~~Development, implementation and enforcement of new and updated flow requirements for the Delta and high priority tributaries is key to the achievement of the coequal goals. The State Water Resources Control Board should update the Bay-Delta Water Quality Control Plan objectives and establish flows as follows:~~ ~~c) By June 2, 2014, adopt and implement updated flow objectives for the Delta that are necessary to achieve the coequal goals.~~ ~~d) By June 2, 2018, develop flow criteria for high-priority tributaries in the Delta watershed that are necessary to achieve the coequal goals.~~ ~~Prior to the establishment of revised flow objectives criteria identified above, the existing Bay-Delta Water Quality Control Plan objectives shall be used to determine consistency with the~~

[39] The State Water Resources Control Board anticipates the development of a Strategic Workplan for Groundwater by 2012 that will lay out the Board's plans to protect groundwater, including (1) application of the State Water Resources Control Board's water quality and water rights authorities to address the problems that have the greatest potential to impact beneficial uses of groundwater; (2) focus resources on the most important problems; and (3) encourage efforts to protect and management groundwater at the local or regional level.

[40] A sustainable conservation-oriented rate structure has the following characteristics: encourages more efficient water use without causing a shortfall in system revenue; provides for the identification of waste, rewards efficient use, and penalizes excessive use; produces revenues from penalty rates that are used to fund conservation programs; is supported by a water bill that clearly communicates the cost of wasted water to the responsible person; and is supported by a person or staff who can respond to customers' calls for help in reducing usage.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
		~~Delta Plan.~~ ~~By June 30, 2013, the Delta Stewardship Council will request an update from the State Water Resources Control Board on items ER P1 (a) and (b). If the Board indicates the items (a) or (b) cannot be met by the dates provided, the Delta Stewardship Council will consider and may amend the Delta Plan to achieve progress on the coequal goals in place of the updated flow objectives. For example, the Delta Stewardship Council could:~~ ~~♦ Determine that a covered action that would increase the capacity of any water system to store, divert, move, or export water from or through the Delta would not be consistent with the Delta Plan until the revised flow objectives are implemented.~~ ~~♦ Recommend that the State Water Resources Control Board cease issuing water rights permits in the Delta and the Delta watershed (or, if the absence of flow criteria is specific to one or more of the major tributaries, then the recommendation could be focused on the impacted areas).~~ Prior to establishment of revised flow criteria and water quality objectives, the existing Bay-Delta Water Quality Control Plan and requirements of the Biological Opinions developed by the U.S. Fish and Wildlife Service for Delta smelt and the National Marine Fisheries Service adopted for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, Southern Distinct Population Segment of North American green sturgeon, and Southern Resident killer whales shall be used to determine consistency with the Delta Plan. The State Water Resources Control Board should establish Delta inflow and outflow standards with enforceable provisions. The State Water Resources Control Board and Department of Fish and Game should develop recommendations for instream flows for high-priority rivers by December 31, 2015 and for all major rivers and streams by December 31, 2020. The State Water Resources Control Board should develop the following flow protections: ♦ Flow criteria in accordance with the requirements of the Biological Opinions developed by the U.S. Fish and Wildlife Service for Delta smelt and the National Marine Fisheries Service adopted for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, Southern Distinct Population Segment of North American green sturgeon, and Southern Resident killer whales; and improved flows on the lower San Joaquin River. ♦ Flow criteria for the Delta and high priority tributaries in the Delta watershed to support habitat restoration, and modified, as necessary, if: • Delta flow patterns are modified due to changes in the physical flow channels. • Flow requirements change following implementation of habitat restoration programs. ♦ Flow criteria should be established to increase Delta inflow and outflow and improve Delta hydrodynamics to support Delta fish species abundance, habitat improvements, ecological processes dependent upon Delta outflows, and Delta water quality. Flow criteria to increase spring Delta outflow and provide for San Joaquin River pulse flows should be developed by December 31, 2012 with implementation by December 31, 2015. The State Water Resources Control Board should modify water rights decisions of inter-regional water supply projects (including the State Water Project, Central Valley Project, San Francisco Public Utility Commission Hetch Hetchy Project, and East Bay Municipal Utility District Mokelumne River project) for all of these projects to contribute to Delta outflow requirements based upon the California Constitution, Water Code, Public Trust Doctrine, and "Area of Origins" protections for the Delta and Delta watershed. The State Water Resources Control Board should develop a program to modify existing water rights to incorporate flow requirements based upon climate change projections and total diversions from the Delta and the Delta watershed.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
		The Legislature should recognize protective instream flows as a water right for the protection of public trust uses, including permanently protecting water needed to ensure ecosystem health.
Delta Ecosystem Restoration	ER P2 (addresses similar issues as Proposed Project ER P2)	~~Habitat restoration actions shall be consistent with the habitat type locations shown on the elevation map in Attachment C-2, and accompanying text shown in Attachment C-3, based on the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* (DFG 2011), with minor alterations.~~ ~~The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the Ecosystem Restoration Program's Conservation Strategy as the strategy is revised.~~ The Council should consider that: ♦ Aquatic habitat restoration of wetlands, marshlands, and riparian areas and floodplains should be developed as a complement to adequate restoration of flows, and not a substitute for restoration of flows. ♦ A balance should be achieved to protect existing terrestrial habitat that is agriculture-dependent while implementing aquatic restoration programs. ♦ The Delta Plan should contribute to the implementation of Central Valley Joint Venture' habitat goals to protect, restore, and enhance wetlands for waterfowl and other wetland dependent species. ♦ Habitat restoration must be developed in cooperation with in-Delta and upstream interests to provide a desirable mix of aquatic habitat restoration and sustainable agriculture. ♦ Restoration plans should include schedules and prioritization of areas that science suggests to provide the greatest benefit for achieving restoration objectives. ♦ In-Delta interests should participate in the development of habitat restoration programs, and if possible, incentive programs should be established to identify, create, prioritize, implement, monitor, and evaluate habitat restoration programs. ♦ Habitat restoration programs should focus on lands obtained through a "willing seller/willing buyer" program and avoid condemnation proceedings. The Council should periodically review the progress towards achieving habitat objectives and targets and conduct a review of the restoration priorities every five years as part of the Delta Plan update process. The Council should consider the development of SMART biological objectives (Specific, Measurable, Achievable, Relevant to the goal, and Time bound) based upon a logic chain approach for a full range of species (not limited to threatened and endangered species) and ecosystem functions. Enforceable assurances and enforcement mechanisms should be developed to ensure achievement of the biological objectives.
Delta Ecosystem Restoration	ER P3 (same as Proposed Project ER P4)	State and local agencies constructing new levees, or substantially rehabilitating or reconstructing existing levees in the Delta shall evaluate , and, where feasible, incorporate alternatives (including use of setback levees) that would increase the extent of floodplain and riparian habitats. When available, criteria developed under RR R4 shall be used for determining appropriate locations for setback levees.
Delta Ecosystem Restoration	ER P4 (same as Proposed Project ER P5)	Agencies proposing covered actions shall demonstrate that the potential for new introductions of or improved habitat conditions for nonnative invasive species have been fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
Reduce Risk of Floods in the Delta	RR P1 (same as Proposed Project RR P1)	Floodways[41] shall not be encroached[42] upon nor diminished without mitigating for future flood flows. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities unless they significantly decrease the existing level of flood protection.
Reduce Risk of Floods in the Delta	RR P2 (addresses similar issues as Proposed Project RR P2)	~~The following areas shall not be encroached upon because they are critical floodplains and may also provide ecosystem benefit. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities, or maintenance and repair of existing infrastructure, unless they significantly decrease the existing level of flood protection.~~ The existing or potential value of floodplains or potential floodplains shall not be encroached upon nor diminished except as provided in this Delta Plan. The following areas shall not be encroached upon because they are critical floodplains and shall also provide ecosystem benefit. This policy does not apply to habitat restoration programs or any ongoing agricultural or flood management activities, unless they significantly decrease the existing level of flood protection. The floodplain restoration projects shall increase floodplain capacity for historical and projected flood events, including capacity to accommodate projected changes in storm flows due to climate change that could occur through 2100. Floodplain restoration projects shall be developed to also provide water storage benefits. Low-income communities impacted by floodplain restoration shall be informed and involved in the development of the restoration plans by the restoration proponent. The restoration proponent shall fully mitigate any impacts to the low-income communities. The Delta Stewardship Council may amend these areas in the future if it is determined that such areas can provide additional floodplain opportunities: ♦ Areas located in the Yolo Bypass from Fremont Weir through Cache Slough to the Sacramento River including the confluence of Putah Creek into the bypass. These opportunities should include expansion of the flood capacity in the Yolo Bypass by including: • Areas located to the east and west of the Northern Yolo Bypass including Elkhorn Basin between the Yolo Bypass and the Sacramento River upstream of Sacramento Weir. • Areas located to the west of the southern Yolo Bypass including the Cache Slough Complex. ♦ A one-mile wide bypass to be constructed to the east of the Sacramento Deep Water Ship Channel with connections to the Sacramento River at Garcia Bend and at Prospect Island. ♦ The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by Department of Water Resources or the U.S. Army Corps of Engineers. ♦ The Lower San Joaquin River Floodplain Bypass, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is located upstream of the area being evaluated by the U.S. Army Corps of Engineers, Department of Water Resources, and Central Valley Flood Protection Board Lower San Joaquin River Feasibility Study. This additional area is described in the Lower San Joaquin River Flood Bypass Proposal, submitted to the Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, Reclamation District 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands

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

[42] As Described in the Department of Water Resources' "Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento-San Joaquin Valley": Encroachments and vegetation should be evaluated and managed so as to not impact levee safety, while recognizing their benefits.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
		Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project and potential expansion of the area upstream and downstream of Paradise Cut, including the following areas or actions: • Removal and/or construction of setback levees between Vernalis and Mossdale • Setback levees along the San Joaquin River downstream of Paradise Cut and along Old and Middle rivers. • Bypass areas constructed on Fabian Tract, portions of Roberts Tract along San Joaquin and Middle rivers, Union Island along Middle River and Grant Line Canal, and areas south of Old River and north of the City of Tracy city limit.
Reduce Risk of Floods in the Delta	RR P3 (addresses similar issues as Proposed Project RR P3)	Covered actions in the Delta must be consistent with Table C-2. ♦ No development in deep floodplains that would be flooded to depths greater than 6 feet if the levees fail, even if the levees are designed to reduce risk from the 200-year or greater flood event; unless: • All structures shall be designed to minimize first floor damage by elevating the structure above the projected base flood elevation if the levees fail, even if the levees are designed to reduce risk from the 200-year or greater flood event, or mandating that all residential buildings include two stories with all bedrooms on the second floor, a built-in vertical evacuation route to the roof, and a boat in the attic. • All developments shall have high ground for safety protected by cross levees and accessed by elevated evacuation routes. • All developments shall have pre-placed emergency contracts to be implemented by local stormwater management agencies to improve response time to protect residents in times of levee failures. • All developments shall establish or contribute to existing escrow accounts to maintain levees within an urbanizing area indefinitely. Municipalities shall establish sustainable funding mechanisms for all flood protection and not depend upon future development to fund improvements. • All property sales shall include a pre-sale disclosure and a document signed by the purchaser to provide an acknowledgement that the lands in the Delta are subject to catastrophic flooding. • All developments shall provide documentation that the levees are currently maintained in accordance with the U.S. Army Corps of Engineers National Levee Safety Program recommendations related to a levee inventory and periodic inspections of all levees, an assessment every 5 years potential flood risk, and use of the risk assessment in the periodic inspection programs. Results from the periodic inspection programs shall be provided for review by the public and other interests prior to approvals for additional development within the floodplain.
Reduce Risk of Floods in the Delta	RR P4 (same as Proposed Project RR P4)	Prior to the completion of the Department of Water Resources' A Framework for Department of Water Resources Investments in Delta Integrated Flood Management, guidelines for the Delta Levee Special Flood Control Projects and Subventions programs (included as Attachment C-4) shall be used to determine consistency of projects using state funds with the Delta Plan. This Framework shall be completed by the Department of Water Resources, in consultation with the Central Valley Flood Protection Board and Delta Stewardship Council, by January 1, 2013. Upon completion, the Framework shall be considered by the Delta Stewardship Council for adoption to direct State investments for levee operation, maintenance, and improvements in the Delta. If this Framework is not completed by January 1, 2013, the Delta Stewardship Council will define a strategy for State investments.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
Reduce Risk of Floods in the Delta	RR P5 (addresses similar issues as Proposed Project RR R5)	~~The Department of Water Resources' *A Framework for Department of Water Resources Investments in Delta Integrated Flood Management* should:~~ ~~♦ Define State interests related to flood and levee management in the Delta. These State interests should, at a minimum, include:~~ ~~• Reducing risk of loss of life.~~ ~~• Protecting water supply. This should address identifying and assessing critical water supply corridor levee operations, maintenance, and improvements for all existing municipal and industrial water diversions in the Delta.~~ ~~• Protecting water quality and the ecosystem.~~ ~~• Protecting critical infrastructure of statewide importance (including pipelines, energy transmission facilities, aqueducts, and State highways).~~ ~~• Protecting property.~~ ~~♦ Define a long-term levee policy for the Delta, which, at a minimum, should determine those levees critical for protecting State interests.~~ ~~♦ Recognize the wide variability of conditions across the Delta including depth of inundation upon failure; current condition of existing levees; and degree of exposure to seismicity, sea level rise, climate change, and river flood levels.~~ ~~♦ Define a methodology for assessing existing Delta levee conditions, as well as on a systematic, routine, and coordinated basis, to develop a sound technical understanding and assessment capability to base levee related decisions. This information should be collected and reported in a transparent manner, and shall include the production of a Delta levee conditions map.~~ ~~♦ Define a methodology for proactively identifying, developing, prioritizing, and scheduling specific levee operations, maintenance, and improvement projects.~~ ~~♦ Define a method for determining project costs, cost share, and project partners, if appropriate.~~ ~~♦ Define procedures that distinguish Delta Levees Special Flood Control Projects from routine levee maintenance projects.~~ The Council shall adopt goals to reduce risk and recommend criteria for strategic levee investments that: ♦ Minimize loss of life from flooding. ♦ Emphasize the need to expand floodway conveyance capacity. ♦ Minimize number of people and homes vulnerable to deep and catastrophic flooding and associated social and economic dislocation. ♦ Minimize damage to infrastructure of regional or statewide importance. ♦ Minimize damage to infrastructure of local economic importance. ♦ Levee investments shall be shown by the proponents to be part of a larger integrated risk reduction strategy that should consider: • Land use regulations. • Flood system improvements. • Emergency response programs.

Table C-7
Alternative 2 Policies

Delta Plan Element	Policy Number	Policy
		• Building code changes to avoid flood risks. • Flood insurance requirements. • Other risk reduction tools. ♦ Levee investments shall not be provided to communities that do not adopt other risk reduction elements, such as National Flood Insurance Program Community Rating System.

Source: Adapted from comment letters received from individuals and stakeholders that support improvement in California's environment.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R1 (addresses similar issues as Proposed Project WR R1)	~~The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and approve, by December 31, 2012, guidelines for the preparation of a Water Reliability Element that satisfies the criteria contained in WR P1.~~ The Department of Water Resources should evaluate information reported in the Urban Water Management Plans and/or Agricultural Water Management Plans and coordinate with other agencies, stakeholders, and water suppliers. ♦ The Department of Water Resources should develop standardized methods of evaluation of water efficiency programs to determine water demand reductions and benefits. ♦ The Department of Water Resources should develop and approve, by guidelines for the preparation the 2015 Urban Water Management Plans that require water suppliers to achieve a 40 percent reduction or an average of 150 gallons per capita day following achievement of a 20 percent reduction in per capita demand as required by existing law. ♦ The Department of Water Resources should develop and approve, by guidelines for the preparation the 2015 Urban Water Management Plans that do not increase water demand per acre for new developments as compared to pre-development use ("water neutral development"). The Legislature should require the State Water Resources Control Board, Public Utilities Commission, and Department of Water Resources to establish a water resources loading order to: ♦ First, reduce demand through improved water efficiency; ♦ Second, meet additional water supply demands with alternative sources, such as water recycling, use of groundwater that requires advanced water treatment prior to use, conjunctive use programs; and ♦ Third, meet additional water supply demands with expansion of more traditional water supply methods, including additional storage and conveyance.
Reliable Water Supply	WR R2 (same as Proposed Project WR R2)	The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and include in the future California Water Plan updates the information needed to track the water supply reliability performance measures identified in the Delta Plan and assess improvements in regional self reliance, reduced reliance on the Delta, and statewide water supply reliability.
Reliable Water Supply	WR R3 (same as Proposed Project WR R3)	The Department of Water Resources, the State Water Resources Control Board, the Department of Public Health, and other agencies, in consultation with the Delta Stewardship Council, should revise State grant and loan ranking criteria by December 31, 2012, to provide a priority for water suppliers that include a Water Reliability Element in their adopted Urban Water Management Plans, Agricultural Water Management Plans, and/or Integrated Regional Water Management Plans that satisfies the requirements of WR P1. The Delta Stewardship Council will also work with these agencies to identify additional funding and other incentives to catalyze implementation of local and regional water conservation, water use efficiency, conjunctive management, and other projects that will improve regional self-reliance and reduce reliance on the Delta.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R4 (addresses similar issues as Proposed Project WR R4)	All state agencies should take a leadership role in designing new and retrofitted state owned and leased facilities, including buildings and Caltrans facilities, to increase water efficiency, use recycled water, incorporate stormwater runoff capture and low impact development strategies, and reduce reliance on the Delta. The Delta Stewardship Council will work with these agencies to identify regulations and other policies that will support the improved water efficiencies and new water supply strategies, such as completion of uniform recycling criteria for potable reuse for groundwater recharge, consistent with SB 918 (Water Code section 13521 et seq.). The State Water Resources Control Board, Department of Water Resources, State Department of Public Health, and Department of Housing and Community Development should coordinate to develop regulations by December 31, 2013 to allow for non-potable indoor use of capture rainwater and establish specific quantified goals for direct and indirect use of captured rainfall and stormwater. The State Water Resources Control Board and Department of Public Health should develop uniform water recycling criteria by December 31, 2013 and adopt water recycling criteria for surface water augmentation by December 31, 2016. The State Water Resources Control Board and Department of Public Health should develop regulations by December 31, 2013 to allow for non-potable indoor use of captured rainwater.
Reliable Water Supply	WR R5 (same as Proposed Project WR R5)	The State Water Resources Control Board and/or the Department of Water Resources should require that proponents requesting a new point of diversion, place of use, or purpose of use that results in new or increased use of water from the Delta watershed should demonstrate that the project proponents have evaluated and implemented all other feasible water supply alternatives.
Reliable Water Supply	WR R6 (addresses similar issues as Proposed Project WR R6)	The Department of Water Resources should not complete the Surface Water Storage Investigations of proposed off-stream surface storage projects ~~by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the State's surface storage~~ or implement the recommendations.
Reliable Water Supply	WR R7 (addresses similar issues as Proposed Project WR R7)	~~The Department of Water Resources, in coordination with the California Water Commission , Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance facilities, and enhance opportunities for conjunctive use programs and water transfers. The California Water Commission should hold hearings and provide recommendations on priority projects. These recommendations should be used to support water supplier requests for state grants and loans and other sources of funding for these projects.~~ The following actions are recommended for implementation by federal, state, and local agencies to identify projects that would improve statewide water supply reliability. ♦ **Surface Water Storage** • To reduce reliance on the Delta and increase regional self-sufficiency in areas that use water exported from the Delta, the Tulare Lake could be reestablished with natural inflows from the Kern, Kings, Kaweah, and Tule rivers to store about 2.5 million acre-feet of water with minimal modifications of existing berms, as proposed by the San Joaquin Valley Leadership Forum. The Tulare Lake Basin Surface Storage Facility also could store water from the San Joaquin River, Friant Kern Canal, or California Aqueduct following construction of conveyance from Tulare Lake to these locations. ♦ **Groundwater and Surface Water Management** • The State Water Resources Control Board should require all surface water and groundwater diversions to be reported by December 31, 2012. • The federal Bureau of Reclamation, Department of Water Resources, and other water reservoir operators should release surface water from storage to recharge groundwater basins.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		♦ **Groundwater Storage** • The State Water Resources Control Board should not allow groundwater banks to be established in the Sacramento Valley to reduce groundwater pumping. • The Department of Water Resources and Kern County Water Agency should transfer ownership of the Kern Water Bank to the Department of Water Resources. ♦ **Conveyance without Bay Delta Conservation Plan Implementation** • The State Water Resources Control Board and/or other regulating agencies should restrict the maximum total amount of Delta exports, including water contracts, water rights, water delivered to refuges, and water transfers to 3 million acre-feet/year. • The State Water Resources Control Board and/or other regulating agencies should prohibit the use of water exported from the Delta for irrigation of drainage-impaired farmlands. ♦ **Voluntary Water Transfers** • The State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should not allow groundwater to be used for water transfers or substituted for transferred water if the water would be conveyed through the Delta. If groundwater is used by the water seller, the State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should require a full characterization and sustainable yield analysis of the seller's groundwater management plan to avoid groundwater substitution or overdraft. • The State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should not allow water to be transferred for irrigation of drainage-impaired farmlands if the water would be conveyed through the Delta.. • The State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should not allow water transfers for water that would be conveyed through the Delta if the transfer would reduce flows in rivers and main tributaries that support listed species under the federal Endangered Species Act or the California Endangered Species Act. • The State Water Resources Control Board should consider limiting water transfers that require use of public funds for environmental compliance purposes, such as the Environmental Water Account, especially if the water transfer potentially could interfere with habitat restoration efforts and associated adaptive management. • The State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should consider limiting water transfers between water users in the Delta watershed to maintain the water within the same hydrologic basin. • The State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should require detailed Environmental Impact Reports or Environmental Impact Statements for all water transfers. • The State Water Resources Control Board should establish a comprehensive process for evaluating permanent and serial short-term water transfers that may affect the Delta, groundwater, and Delta watershed tributaries. • The State Water Resources Control Board should consider policies, and potentially recommended legislation, to require reallocation of a portion of the transferred water in a permanent or serial short-term transfer to reduce over-allocation and assist with habitat restoration efforts. ♦ **Changes in Central Valley Project and State Water Project Water Contracts** • The federal Bureau of Reclamation should modify the Central Valley Project water contracts and the Department of Water Resources should modify the State Water

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		Project water contracts to reduce reliance on the Delta by considering the following actions. – The federal Bureau of Reclamation should analyze the Central Valley Project projected water contract deliveries and the Department of Water Resources should analyze the State Water Project projected water contract deliveries to identify the amount of water that would be provided for at least 75 percent of the time for each project. The water contracts should be renegotiated to reflect more reliable contract amounts that are projected to be delivered for at least 75 percent of the time based on projected regulatory requirements and water demands at the contracts are signed. – The Department of Water Resources should modify the operations of the State Water Project to provide a higher level of water delivery reliability to municipal and industrial water users than for agricultural water users in a manner that is similar to water delivery allocations for the Central Valley Project. ♦ **Changes in Water Rights** • The State Water Resources Control Board should develop a finding on the extent of over-appropriation of water bodies in the Delta watershed based on seasonal flows and water year types by January 1, 2014. Before this analysis is completed and adopted, the State Water Resources Control Board should not issue new water rights permits in the Delta watershed. • The State Water Resources Control Board should create a Reasonable Water Use Unit to enforce the prohibition against the waste or unreasonable use of water, and to promote more efficient use of water. • The State Water Resources Control Board and the Legislature should consider changes to the water rights system to comply with the California Constitution provisions related to unreasonable use of water, beneficial use of water, water use efficiency, and the public trust doctrine. These actions would include consideration of irrigation of most drainage-problem lands as not being in the public interest, unacceptable as the basis for irrigation of water exported from the Delta, and a wasteful and unreasonable use of water under the California Constitution. Reduction in irrigated areas may provide additional water that could be used for environmental or other reasonable and beneficial uses.
Reliable Water Supply	WR R8 (addresses similar issues as Proposed Project WR R8)	The Department of Water Resources, in collaboration with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board and other state, Federal, and local agencies, should update Bulletin 118 using field data, California Statewide Groundwater Monitoring Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014. This Bulletin update should include a systematic evaluation of the major groundwater basins to determine sustainable yield and overdraft status, an evaluation of California's groundwater resources in 20 years if current groundwater management trends remain unchanged, the anticipated impacts of climate change on groundwater resources, and the recommendations for actions by state, Federal and local actions to improve groundwater management. In addition, the Bulletin update should identify groundwater basins in a critical condition of overdraft. This information should be available for inclusion in the Urban Water Management Plans and Agricultural Management Plans required to be submitted to the State by December 31, 2015. Council should require an independent third party monitor groundwater and stream levels in areas that use water exported from the Delta to assure that sustainable groundwater levels are being maintained and that groundwater is not being substituted for exported surface supplies.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R9 (addresses similar issues as Proposed Project WR R9)	Water suppliers that receive water diverted or exported from the Delta watershed and that receive a significant percentage of their long-term average water supplies from groundwater should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003) by December 31, 2014. <u>This Recommendation should become part of the Water Reliability Element described in WR P1.</u>
Reliable Water Supply	WR R10 (same as Proposed Project WR R11)	The Department of Water Resources, in coordination with the State Water Resources Control Board, the Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, Delta Stewardship Council, and other stakeholders should create by January 1, 2014, and maintain an integrated statewide system for water use monitoring. This new system should consolidate information into a single statewide data base that is in an electronic format and made available to the public online. It should be designed to simplify reporting, reduce the number of required reports, and be coordinated with the reporting requirements for the Urban Water Management Plans/Agricultural Water Management Plans and Integrated Regional Water Management Plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the data base when it becomes available. The Department of Water Resources should every 5 years summarize and incorporate the key information collected through the statewide integrated data base in the California Water Plan Update.
Reliable Water Supply	WR R11 (same as Proposed Project WR R12)	The Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that require the implementation of WR P1.
Delta Ecosystem Restoration	ER R1 (same as Proposed Project ER R1)	The Delta Stewardship Council acknowledges the importance of expediting habitat restoration in the Delta and its watershed and recommends the prioritization and implementation of habitat restoration projects in the following areas, shown in Attachment C-5. Habitat restoration projects should consider landscape elements including connectivity between areas to be restored and existing habitat areas needed for the full life cycle of species targeted to benefit from the restoration project. Where possible, restoration projects should emphasize the potential for water quality improvement. Restoration project proponents should coordinate with local vector control districts in implementing projects. ♦ **Cache Slough Complex.** The flood basins entering the Cache Slough Complex are the interface between river and tidally influenced portions of the Delta. A significant portion of the region should return to uplands with vernal pool and grassland habitats and broad nontidal, freshwater, emergent plant-dominated wetlands that grade into tidal freshwater wetlands, shallow subtidal and deep open water habitats. A restoration project in this area is the passively restoring Liberty Island. Projects in the planning stage include the Department of Water Resources' Prospect Island restoration project. ♦ **Cosumnes River–Mokelumne River Confluence.** Unregulated and minimally regulated rivers should allow frequent and regular winter and spring overbank flooding to create seasonal floodplain and riparian habitats grading into tidal marsh and shallow subtidal habitats. An existing restoration project is the Cosumnes River Preserve floodplain restoration. Projects in the planning stage include the Department of Water Resources' North Delta Flood and Ecosystem Restoration Project on McCormack-Williamson Tract. ♦ **Lower San Joaquin River Floodplain.** Historically, the south Delta and its connection to the lower San Joaquin River contained a complex network of channels with low natural berms, large woody debris, willows, and other shrubs with upland areas supporting open oak woodlands. Reconnection of significant portions of the floodplain, along with more natural flows, stimulates food webs that support native species. Projects in the planning stage include the Lower San Joaquin Flood Bypass proposed by the South Delta Levee Protection and Channel Maintenance Authority and partners.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		♦ **Suisun Marsh.** The largest wetland area on the west coast of the contiguous United States, Suisun Marsh has been mostly disconnected from the estuary. Restoring significant portions of Suisun Marsh provides the brackish portion of the estuary with sea level rise accommodation space, opportunities for extensive land-water interface dynamics, and compressed chemical and biological gradients that support productive and complex food webs to which native species are adapted. An ongoing restoration project is the Department of Water Resources' Blacklock Restoration Project. Projects in the planning stage include the Department of Fish and Game's Hill Slough Restoration Project. ♦ **Yolo Bypass.** The current operation of the Yolo Bypass as a flood control project provides substantial ecosystem benefits for Sacramento splittail spawning and rearing and salmon rearing. Enhancing the ability of Yolo Bypass to be "activated" by higher-frequency, lower-magnitude flood levels provides more opportunity for migrating fish, especially Chinook salmon, to use this system as a migration corridor rich in refugia and food resources. Projects in the planning stage include fish passage improvements, and various approaches, such as notching the Fremont Weir, to increase the frequency and duration of inundation during times of year critical for spawning and rearing of native fish.
Delta Ecosystem Restoration	ER R2 (same as Proposed Project ER R2)	As part of its Strategic Plan, and subsequent Implementation Plan or annual work plans, the Sacramento–San Joaquin Delta Conservancy should: ♦ Develop and adopt criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles. ♦ Develop and adopt processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration. ♦ Develop and adopt a formal mutual agreement with the Department of Water Resources, Department of Fish and Game, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh. ♦ Develop, in conjunction with the Wildlife Conservation Board, the Department of Water Resources, Department of Fish and Game, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program's Conservation Strategy. ♦ Lead an effort to develop a habitat credit program that provides credit for each of these steps: acquisition in preparation for future restoration; preservation, management, and enhancement of existing habitat; restoration of habitat; and monitoring and evaluation of habitat evolution and ecological outcomes. ♦ Work closely with the Delta Science Program to: • Incorporate the best available understanding of the scales, patterns, and processes of the historical landscape to guide land acquisition strategies and restoration design. • Apply the best understanding of landscape ecology as a unifying perspective for restoring processes and functions on degraded landscapes. • Construct landscape-level conceptual models for key regions of the Delta and Suisun Marsh to clarify how more natural flows and ecosystem restoration confer resilience to native species while promoting processes of self-repair of modified landscapes. Conceptual design models should engage hydrodynamics, transport, particle tracking, and food web models to support and integrate the interdisciplinary perspectives. • Study available habitat reference sites to increase understanding of well-functioning habitats and to inform performance measure metrics and trajectories.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R3 (same as Proposed Project ER R3)	State and federal fish agencies (California Department of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service) should complete ongoing negotiations toward a habitat credit agreement with water supply agencies.
Delta Ecosystem Restoration	ER R4 (same as Proposed Project ER R4)	Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should work with the Department of Fish and Game and the Department of Water Resources to develop and execute an agreed-upon variance process to exempt Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.
Delta Ecosystem Restoration	ER R5 (same as Proposed Project ER R5)	The Department of Fish and Game and the U.S. Fish and Wildlife Service should develop rules for voluntary Safe Harbor agreements with property owners in the Delta whose actions contribute to the recovery of listed threatened or endangered species.
Delta Ecosystem Restoration	ER R6 (same as Proposed Project ER R6)	The Department of Fish and Game and other appropriate agencies should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" and accompanying text shown in Attachment C-4 taken from the *Conservation Strategy for Restoration of the Sacramento San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*. The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* as the strategy is revised.
Delta Ecosystem Restoration	ER R7 (same as Proposed Project ER R7)	The Delta Science Program, in conjunction with the Department of Fish and Game, the Department of Water Resources, the State Water Resources Control Board, and other relevant agencies and stakeholders, should conduct workshops to develop recommendations to the Delta Stewardship Council for measures to reduce stressor impacts on the Delta ecosystem that would support and be consistent with the coequal goals. For example, workshops would consider options for varying salinity to reduce impacts of nonnative invasive species while providing overall ecosystem benefits and minimally disrupting water supply. The recommended measures could be adopted as policies or recommendations by the Delta Stewardship Council into an amended Delta Plan. The resulting recommendations should be provided to the Delta Stewardship Council by January 1, 2013.
Delta Ecosystem Restoration	ER R8 (addresses similar issues as Proposed Project ER R8)	~~The relevant federal, State, and local agencies should complete the Bay Delta Conservation Plan, consistent with the provisions of the Delta Reform Act, and receive required incidental take permits by December 31, 2014. If the Bay Delta Conservation Plan process is not completed by this date, the Delta Stewardship Council will consider how to proceed with an alternative approach to develop and complete the ecosystem and conveyance planning process.~~ The Department of Water Resources should complete the following analyses as part of the Bay Delta Conservation Plan process: ♦ The purpose of the Bay Delta Conservation Plan conveyance facilities should be stated to be to decrease physical vulnerability and increase predictability of Delta supplies, and achieve maximum ecosystem protection; and not to increase Delta diversions. ♦ Focus on improving the reliability and predictability of Delta supplies, rather than focusing narrowly on increasing Delta diversions. ♦ Analyze the public trust flow criteria that were developed by the State Water Resources Control Board to inform the analysis of the Bay Delta Conservation Plan, including consideration of the flow and operational criteria that would reduce Delta diversions in comparison with current requirements. ♦ Analyze other water supply investments, such as water use efficiency, groundwater management, water recycling and stormwater capture, which could reduce reliance on Delta supplies. ♦ Analysis, at an equal level of detail, facilities that provide a range of conveyance capacities and operational criteria, including environmental flow criteria recommendations developed in 2010 by the State Water Resources Control Board. The analysis should

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		incorporate a scientifically credible effects analysis. ♦ Analyze a full range of conveyance capacities under a full range of operational criteria, including the potential impacts and benefits of increased South of Delta storage. ♦ Analyze the cost-effectiveness of water conveyance capital investments, particularly regarding the water supply and economic performance of conveyance capacities and designs under operational criteria that provide significant improvement in estuarine habitat conditions. ♦ Analysis of energy use and associated greenhouse gas emissions for each of the conveyance alternatives considered, projected Delta water exports, and alternative water supply strategies. ♦ Provide for timely, independent scientific review at critical points in the planning process, such as the development of biological objectives, operational criteria, methodology to evaluate potential effects, the Bay Delta Conservation Plan Effects Analysis and the adaptive management program. ♦ Analysis of abandonment of operations of the existing South Delta intakes.
Improve Water Quality	WQ R1 (addresses similar issues as Proposed Project WQ R1)	The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy by July 2013, with implementation to follow. State Water Resources Control Board and Department of Public Health should develop coordinated source water protection program that prioritizes protection of drinking water sources, and establishes the responsibility of mitigating impacts on drinking water sources to the operators of point and nonpoint sources of pollutants that adversely affect the drinking water quality.
Improve Water Quality	WQ R2 (same as Proposed Project WQ R2)	The Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project EIR by July 1, 2012, and begin construction as soon as possible thereafter.
Improve Water Quality	WQ R3 (same as Proposed Project WQ R3)	The State Water Resources Control Board and/or Central Valley Regional Water Quality Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.
Improve Water Quality	WQ R4 (addresses similar issues as Proposed Project WQ R4)	The Department of Public Health, State Water Resources Control Board, and Department of Water Resources should prioritize funding for small and disadvantaged communities that lack access to safe drinking water supplies or resources for adequate wastewater treatment construction costs.
Improve Water Quality	WQ R5 (same as Proposed Project WQ R5)	The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should require all recipient regions that are supplied water from the Delta or the Delta Watershed or discharge wastewater to the Delta or the Delta Watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program (CV-SALTS).

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R6 (addresses similar issues as Proposed Project WQ R6)	The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and if possible accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that: ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should develop and adopt objectives, either narrative or numeric, where appropriate, for nutrients in the Delta and Delta watershed by January 1, 2014. ♦ The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013. ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016. ♦ The San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for selenium and methylmercury and efforts to support their implementation should be coordinated. ♦ The State Water Resources Control Board and San Francisco Bay and Central Valley Regional Water Quality Control Boards should continue to participate in efforts revise water quality objectives for selenium. ♦ <u>The State Water Resources Control Board should exercise it full legal authority under the Porter-Cologne Act to implement and enforce requirements on municipal wastewater discharges and agricultural-related discharges to both surface waters and groundwater, such that affected waters throughout the state meet all water quality objectives by 2030.</u> ♦ <u>The State Water Resources Control Board should incorporate Delta water quality improvements identified in the State Water Resources Control Board Strategic Plan into all waste discharge requirements and enforceable waivers of waste discharge requirements on any and all discharges that may impact those improvements.</u> ♦ <u>The State Water Resources Control Board should develop, implement and enforce numeric standards for stormwater discharges, including municipal discharges, to ensure stormwater discharges around the state conform to standards for release of sediment, pathogens, trash, and other contaminants to protect the uses of the affected waterways.</u> ♦ <u>The State Water Resources Control Board should consider impacts to water quality as a reason for curtailing water rights, and bundle water rights and water quality permits as needed to ensure that water discharges are as clean or cleaner as when diverted for use.</u>
Improve Water Quality	WQ R7 (same as Proposed Project WQ R7)	The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the Department of Water Resources, Department of Fish and Game, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R8 (addresses similar issues as Proposed Project WQ R8)	The Central Valley Regional Water Quality Control Board, consistent with existing Water Quality Control Plan policies and water rights law, should require responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014. As described in WR P1, the Water Reliability Element would be required for future Urban Water Management Plan and/or Agricultural Water Management Plan for water suppliers that divert or export water from the Delta and should include use of recycled wastewater, gray water, and stormwater including the increase of recycling by 2 million acre-feet over current use by Year 2030; capture and reuse of up to 333,000 acre-feet/year of stormwater in Southern California; and groundwater cleanup. Water suppliers shall report on the use of recycled water to reduce surface water diversions and groundwater withdrawals.
Improve Water Quality	WQ R9 (same as Proposed Project WQ R11)	The State Water Resources Control Board and Regional Water Quality Control Boards should conduct or require special studies of pollutants including emerging contaminants and causes of toxicity in Delta waters and sediments by January 1, 2014.
Improve Water Quality	WQ R10 (same as Proposed Project WQ R10)	To comply with the San Francisco Bay Conservation and Development Commission water quality policies and facilitate the commission's impact determination, proponents of actions potentially affecting water quality in Suisun Marsh should consult with the San Francisco Bay Regional Water Quality Control Board and obtain all necessary authorizations early in the process.
Improve Water Quality	RR R1 (addresses similar issues as Proposed Project RR R1)	The Legislature should fund the Department of Water Resources and the Central Valley Flood Protection Board ~~to evaluate and implement a bypass and floodways on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstem San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c)~~ should complete their investigation of the bypass and floodways on the San Joaquin River to reduce potential flooding near Paradise Cut as required by Water Code section 9613(c) and described in RR P2.
Improve Water Quality	RR R2 (same as Proposed Project RR R3)	The Delta Stewardship Council should coordinate with the Department of Water Resources, Department of Parks and Recreation, and other appropriate local agencies to develop a plan identifying appropriate levels of flood protection relating to specific land and recreation uses for State recreation facilities in the Delta. This plan should address emergency response and notification procedures for recreational users.
Reduce Risk of Floods in the Delta	RR R3 (same as Proposed Project RR R4)	The Department of Water Resources, in conjunction with the Department of Fish and Game and Delta Conservancy, should develop criteria to define locations for future setback levees in the Delta and Delta watershed. Until then, the siting of future permanent structures should provide adequate area to accommodate future setback levees.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R4 (same as Proposed Project RR R6)	The following actions should be taken by January 1, 2013, to promote effective emergency preparedness and response in the Delta: ♦ Responsible local, State, and federal agencies with emergency response authority should consider and implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta. ♦ The California Emergency Management Agency, Department of Water Resources, U.S. Army Corps of Engineers, appropriate Operational Areas and other State and local partners should cooperatively participate in Delta-specific emergency preparedness activities. These activities should include but not be limited to the development and maintenance of a Sacramento-San Joaquin Delta Flood Catastrophic Incident Plan, a Regional Mass Evacuation Plan and an Interoperable Communications Plan; adoption and implementation of a Delta Multi-Agency Coordination System (MACS); participation in federal and State flood and evacuation contingency mapping; and regularly scheduled all-hazards drills and exercises. Public education and outreach program topics should include flood risk awareness, emergency preparedness, alert and notification. ♦ Cal EMA in collaboration with local, State and federal emergency response agencies in the Delta region should develop a training plan that is consistent with SEMS and NIMS requirements and compliments the development of plans, procedures and protocols that address all hazards that pose a threat to the Delta. ♦ In consultation with local agencies, the Department of Water Resources should expand its emergency stockpiles to make them regional in nature and usable by a larger number of agencies in accordance with Department of Water Resources' plans and procedures. The Department of Water Resources, as a part of this plan, should evaluate the potential of creating stored material sites by "over-reinforcing" west Delta levees. ♦ State and local agencies and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.
Reduce Risk of Floods in the Delta	RR R5 (same as Proposed Project RR R7)	The Delta Stewardship Council should convene a working group to develop and evaluate recommendations to the Department of Water Resources to address appropriate response actions to both routine and catastrophic Delta levee failures. The working group should include the Delta Protection Commission and other interested parties, and the recommendations should be completed by January 1, 2013.
Reduce Risk of Floods in the Delta	RR R6 (same as Proposed Project RR R8)	The Legislature should provide specific immunity for public safety flood protection activities, similar to that provided for police and fire protection services.[43]
Reduce Risk of Floods in the Delta	RR R7 (same as Proposed Project RR R9)	The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in flood-prone areas.

[43] Sections 850 – 850.8 (Fire Protection Services). Section 850 provides immunity for the government not providing fire protection services. Sections 850.2 through 850.8 provide governmental immunity related to the actual provision of fire protection services (i.e., failure to maintain sufficient fire protection facilities, injuries sustained while transporting a person from a fire to medical facility, etc.).

Section 845 (Police Protection Services). Section 845 provides governmental immunity for the failure to provide police protection services or the provision of insufficient police protection services.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R8 (same as Proposed Project RR R10)	The Legislature should create a Delta Flood Risk Management Assessment District with fee assessment authority (including over State infrastructure) to provide adequate flood control protection and emergency response for the regional benefit of all beneficiaries, including landowners, infrastructure owners, and other entities that benefit from the maintenance of the levees, such as water users who rely on the levees to protect water quality. This district should be authorized to: ♦ Develop, fund, and implement a regional plan of flood management for both Project and non project levees of the Delta in cooperation with the existing reclamation districts, cities, counties, and owners of infrastructure and other interests protected by the levees; ♦ Conduct levee elevation surveys and inspections at least every 5 years, and report data to Department of Water Resources; ♦ In coordination with Department of Water Resources and the U.S. Army Corps of Engineers, establish standardized flood risk measurement data. This data should support the development of Expected Annual Damage and loss of life values for the Delta, to be conducted by the District annually. Expected Annual Damage is a measure of risk that integrates the likelihood and consequences of flooding, and is a standard measure of the benefits of reducing flood risk (USACE 1996, USACE 2006). The U.S. Army Corps of Engineers is currently developing a levee risk management system, including means to evaluate and rank risk of loss of life and flood damages for levee systems; ♦ Notify residents and landowners of flood risk, personal safety information, and available systems for obtaining emergency information before and during a disaster on an annual basis; and ♦ Potentially implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5) in conjunction with local, State, and federal agencies and maintain the resulting regional response system and components and procedures on behalf of SEMS jurisdictions (reclamation district, city, county, and State) that would jointly implement the regional system in response to a disaster event. ♦ Identify and assess critical water supply corridor levee operations, maintenance, and improvements.
Reduce Risk of Floods in the Delta	RR R9 (same as Proposed Project RR R11)	State agencies should not renew or enter into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence-reversal or reduction programs.
Reduce Risk of Floods in the Delta	RR R10 (addresses similar issues as Proposed Project RR R12)	U.S. Army Corps of Engineers, Bureau of Reclamation, Department of Water Resources, and local agencies and hydropower utilities should evaluate and modify flood control management procedures for reservoirs upstream of the Delta with consideration for sea level rise, changes in timing and form of precipitation, and changes in water supply operations to alleviate potential Delta flooding. <u>The agencies should consider the use of forecast-based flood releases.</u>

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R1 (same as Proposed Project DP R1)	The Economic Sustainability Plan should include, but not be limited to, planning for the following items: ♦ Public safety recommendations, such as flood protection recommendations ♦ The economic goals, policies, and objectives in local general plans and other local economic efforts, including recommendations on continued socioeconomic sustainability of Delta agriculture and its infrastructure to support the proposed economic strategies and legacy communities in the Delta ♦ Comments and recommendations to the Department of Water Resources concerning its periodic update of the flood management plan for the Delta. ♦ Identification of ways to encourage recreational investment along the key river corridors, as appropriate
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R2 (same as Proposed Project DP R2)	The Delta Protection Commission should complete the evaluation and initiate recommendations related to designation of the Delta and Suisun Marsh as a National Heritage Area. If the recommendation is to proceed with the designation, the federal government should complete the process in a timely manner.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R3 (same as Proposed Project DP R3)	The Department of Transportation should partner with local cities and counties to establish major gateways and improve connecting transportation routes, bike lanes, sidewalks, and trails to promote the Delta's identity, visibility, and access.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R4 (same as Proposed Project DP R4)	The Department of Parks and Recreation should develop funding sources and partner with other State and federal agencies, counties, conservancies, and nonprofits to conduct definitive and consistent recreation use surveys every 5 years and add and/or improve recreation facilities in the Delta, including facilities to meet public recreational needs as part of State Water Project facilities, and add three new parks at Barker Slough, Elkhorn Basin, and in the Southern Delta.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R5 (same as Proposed Project DP R5)	The Department of Fish and Game should collaborate with other agencies and nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R6 (same as Proposed Project DP R6)	The Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.
Finance Plan Framework	FP R1 (same as Proposed Project FP R1)	Public and private agencies with infrastructure crossing the Delta should protect their assets from flooding and other natural disasters. ♦ The Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The Delta Stewardship Council, in consultation with the Public Utilities Commission and the Delta Protection Commission, should allocate these funds between State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency. ♦ The Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, in order to minimize the impact on the State's economy. ♦ The Governor, by Executive Order, should direct State agencies with projects or infrastructure in the Delta to set aside a reasonable amount of funding to pay for flood protection and disaster prevention. The local share of these funds should be allocated as described above.
Finance Plan Framework	FP R2 (same as Proposed Project FP R2)	A Delta Flood Risk Management Assessment District (as described for RR R9) should be created and initially funded with $10 million dollars to develop a benefit assessment plan for the Delta. The Council also recommends an additional $100 million for implementation of flood management improvements to be funded by Propositions 1E and 84 and matched up to 50 percent with non-State funding.
Finance Plan Framework	FP R3 (same as Proposed Project FP R3)	The Legislature should appropriate $50 million of Proposition 1E funds to the Department of Water Resources and direct the Department of Water Resources to begin the acquisition of land and easements for the proposed San Joaquin/South Delta Flood Plain.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R4 (same as Proposed Project FP R4)	Long-term non-General Fund and non-general obligation bonds stable funding should be established to support the Department of Water Resources' Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board. Until this long-term funding is secure, the existing funding for the Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board should be provided until the bonds funds are completely allocated by extending the deadline of July 1, 2013.
Finance Plan Framework	FP R5 (same as Proposed Project FP R5)	As part of the California Water Plan Update, the Department of Water Resources should prepare an assessment of the state's water infrastructure needs. This should include an assessment of the existing infrastructure's rehabilitation/replacement costs, as well as new improvements to meet projected demands over the planning period. The Department of Water Resources should consider a survey of agencies requesting information on small-scale projects (such as storage or conveyance) that allow the State to improve water supply reliability. In the future, a provision should be added to Urban Water Management Plans and Agricultural Water Management Plans to include information on potential local water reliability projects. This could form the basis of future State bond funding decisions and be used to inform the Legislature and the public of systemwide needs.
Finance Plan Framework	FP R6 (same as Proposed Project FP R6)	User Fees/Stressors Fees should support the coequal goals and the Delta Plan. ♦ The Legislature should authorize the Delta Stewardship Council to develop reasonable fees for beneficial uses and reasonable fees for those who stress the Delta ecosystem, and apply these fees to the operational costs of the Delta Stewardship Council, the Delta Conservancy, and the Delta Protection Commission to allow implementation of the Delta Plan. These fees would be developed in an open and transparent process. Operating costs of the Delta Stewardship Council, Delta Conservancy, and Delta Protection Commission should be pre-funded for a period of 10 years. As previously discussed, the annual budget of the new governance structure is approximately $50 million. ♦ Repayment of these costs, with interest, would be made annually commencing in 2022 from collected fees. Repayment could begin sooner if revenue from fees were available before 2022. Repayment should be completed no later than 2032. ♦ Revenue bond authority should be granted to implement the Delta Plan should a fiscal partner be found.
Finance Plan Framework	FP R7 (same as Proposed Project FP R7)	The Legislature should amend AB 3030 and SB 1938 to allow local agencies to assess fees under Proposition 218.
Finance Plan Framework	FP R8 (same as Proposed Project FP R8)	Sufficient funding should be provided to the Delta Conservancy to commence implementation of the ecosystem restoration portion of the Delta Plan. This would include building the capabilities to administer and monitor the Conservancy's projects, as well as funding initial early start projects approved by the Conservancy Board. Funding should be no less than $50 million and should be allocated from existing bond funds, or from any new funds authorized by voters. Total dollar amount allocated for this purpose will depend on all available funding sources and may well exceed $50 million.
Finance Plan Framework	FP R9 (same as Proposed Project FP R9)	The Delta Conservancy, in conjunction with other appropriate agencies, should investigate carbon offsets as a revenue source for Delta islands.
Finance Plan Framework	FP R10 (same as Proposed Project FP R10)	The Legislature should consider appropriate funding for implementation of the Economic Sustainability Plan consistent with the Delta Plan.
Finance Plan Framework	FP R11 (same as Proposed Project FP R11)	The Legislature should consider reasonable payments-in-lieu-of-taxes to replace lost local government revenues resulting from the removal of properties from property tax rolls for ecosystem habitat or water supply purposes in the Delta.

Table C-8
Alternative 2 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R12 (addresses similar issues as Proposed Project FP R12)	Establish a statewide public goods charge (or broad-based user fee) for water. The Legislature should create a public goods charge (similar to the energy public goods charge created in 1996) on urban water users and agricultural users. ~~This charge could provide for ecosystem costs that were once paid with general obligation bonds, or could be used for State water management costs such as developing the California Water Plan Update or science programs.~~ This charge would be to fund investments in efficiency, water recycling, groundwater clean-up, stormwater capture, and other tools that can reduce reliance on imported supplies. A public goods charge could ensure a minimum investment by all urban and agricultural water agencies in water user efficiency and other tools that can reduce reliance on imported water. It could also provide consistent funding over time and reduce the size of future water bonds and create a funding stream for investments by urban and agricultural agencies. Funds should remain with local agencies, rather than being collected by and controlled by the state. These funds should be invested in the investment strategies to reduce reliance on the Delta. Before the charge would be put in place, efforts would be necessary to determine administrative details of the program, including how the charge would be assessed, who would be assessed, what type of costs would be recovered, and how revenues collected would be applied. These efforts would take place in an open and transparent process.
Finance Plan Framework	FP R13 (same as Proposed Project FP R13)	By January 2015, the Department of Water Resources should complete a Delta-wide comparative benefit/cost analysis based on recommendations for prioritized State investments for levee operations, maintenance, and improvements in the Delta developed in accordance with RR P4. Benefits should be specifically identifiable and calculable, and include an analysis of the value of lands behind levees. Such a report should be developed in collaboration with the Delta Stewardship Council, local agencies, federal agencies, and the proposed new Delta Flood Risk Management Assessment District.
Finance Plan Framework	FP R14 (addresses issues not included in Proposed Project)	The Council should continue exploration of a water diversion fee and a Delta export fee by the Council and the State Water Resources Control Board. The top priority of such a diversion and export fee should be to support ecosystem restoration efforts. This system of fees should be founded on the responsibility of all water users under the public trust to contribute to ecosystem restoration. Development of these fees should consider the following: ♦ Long-term habitat restoration funding required to achieve the co-equal goals. ♦ An appropriate share of public funding for ecosystem restoration efforts, as well as likely state and federal funding, given the pressures on the state and federal budgets. ♦ Contributions by water users to other system-wide ecosystem restoration efforts. Site specific, water agency local mitigation costs (e.g. the installation of fish screens) should not be considered for crediting in the development of these user fees. ♦ These water fees should not be used for the purchase of water to achieve compliance with regulatory requirements.

Source: Adapted from comment letters received from individuals and stakeholders that support improvement in California's environment.

C.5 Alternative 3

Alternative 3 was developed based upon comment letters submitted by individual and stakeholders that represent water users, residents, and agencies located in the Delta with comments that emphasized protection and enhancement of Delta communities and culture, protection of Delta agricultural land and less ecosystem restoration, and fewer regulations for Delta counties.

The policies and recommendations for Alternative 3 are presented in Tables C-9 and C-10, respectively. Alternative 3 includes most of the issues addressed by the Proposed Project policies and recommendations, but does not address ER P3, WR R3, ER R3, RR R1, RR R8 - R11, FP R2, and FP R12. Alternative 3 also includes four additional Financial Plan recommendations, FP R12 - R15. Additions and deletions to Proposed Project policies and recommendations are shown as underlined and strikeout text.

Table C-9
Alternative 3 Policies

Delta Plan Element	Policy Number	Policy
Governance	G P1 (same as Proposed Project G P1)	Certifications of consistency with the Delta Plan must address the following: ♦ A covered action must be consistent with the coequal goals and the inherent objectives. In addition, a covered action must be consistent with each of the policies contained in this Plan implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant policies may not be feasible. In those cases, covered action proponents must clearly identify areas where consistency is not feasible, explain the reasons, and describe how the covered action nevertheless, on whole, is consistent with the coequal goals and the inherent objectives. In those cases, the Delta Stewardship Council may determine, on appeal, that the covered action is consistent with the Delta Plan. ♦ All covered actions must be fully transparent by disclosing all potentially significant adverse environmental impacts and feasible mitigations of those adverse impacts. ♦ As relevant to the purpose and nature of the project, all covered actions must document use of best available science. ♦ Ecosystem restoration and water management covered actions must include adequate provisions, appropriate to the scope of the covered action, to assure continued implementation of adaptive management consistent with the Delta Plan. This requirement shall be satisfied through: • An adaptive management plan that describes the approach to be taken for each of the nine steps of the adaptive management framework: – Define/Redefine the Problem. – Establish Goals and Objectives. – Model Linkages Between Objectives and Proposed Action(s). – Select Action(s): Research, Pilot, or Full-Scale. – Design and Implement Action(s). – Design and Implement Monitoring Plan. – Analyze, Synthesize, and Evaluate. – Communicate Current Understanding. – Adapt. • Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process. ♦ All covered action proponents shall certify that the covered action shall comply at all times with existing applicable law.

Table C-9
Alternative 3 Policies

Delta Plan Element	Policy Number	Policy
Reliable Water Supply	WR P1 (addresses similar issues as Proposed Project WR P1)	A covered action to export water from, transfer water through, or use water in the Delta is inconsistent with the Delta Plan if the covered action negatively impacts one or more of the coequal goals and one or more of the water suppliers[44] that receive water from the Delta significantly causes the need for the covered action by failing to comply with one or more of the following: ♦ Compliance with State law • Urban water suppliers45 – Adopt and implement an Urban Water Management Plan and all required elements and measures, meeting the standards and timelines established in Water Code section 10610 et seq. – Adopt and implement a plan to achieve 20 percent reduction in statewide urban per capita water use by December 31, 2020, meeting the standards and timelines established in Water Code section 10608 et seq. ♦ Agricultural water suppliers[46] • Adopt and implement Agricultural Efficient Water Management Practices including measurement of the volume of water delivered to customers, adoption of a pricing structure based in part on the quantity delivered, and implementation of specific conservation measures that are locally cost effective and technically feasible, meeting the standards and timelines established in Water Code section 10608 et. seq. • Adopt and implement an Agricultural Water Management Plan and all required elements, meeting the standards and timelines established in Water Code section 10800 et seq. ♦ Water Supply Reliability Element • To promote accountability throughout the state in achieving the coequal goals, water suppliers shall, no later than December 31, 2015, expand an existing or add a new Water Reliability Element in their Urban Water Management Plan and/or Agricultural Water Management Plan. Water suppliers may also meet this requirement by including a Water Reliability Element in an approved Integrated Regional Water Management Plan or other water plan that provides equivalent information. <u>The provisions would only apply to water suppliers that use water exported from the Delta.</u> • The Water Reliability Element shall detail how water suppliers are sustaining and improving regional self-reliance and reducing reliance on the Delta through investments in local and regional programs and projects, and shall document actual or projected reduction in reliance on Delta exports. At a minimum, the Water Reliability

[44] Water suppliers, as used in this Delta Plan, refer to both “Urban water supplier” and “Agricultural water supplier” as defined in footnotes 45 and 46.

[45] “Urban water supplier” as used in this Delta Plan refers to both “urban retail water suppliers” and “urban wholesale water suppliers” under the Water Code. An “urban retail water supplier” means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annual at retail for municipal purposes (Water Code section 10608.12(p)). An “urban wholesale water supplier “ means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of potable water annually at wholesale for municipal purposes (Water Code section 10608.12(r)).

[46] “Agricultural water supplier” as used in this Delta Plan refers to both “agricultural retail water suppliers” and “agricultural wholesale water suppliers” under the Water Code. An “agricultural water supplier” means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. An “agricultural water supplier” includes a supplier or contractor for water, regardless of the basis of right that distributes or sells water for ultimate resale to customers. “Agricultural water supplier” does not include DWR (Water Code section 10608.12(a)). Any agricultural water supplier than provides water to less than 25,000 irrigated acres is not required to comply with SBX7 7 requirements unless sufficient funding is provided to the supplier to implement these provisions (Water Code section 10853).

Table C-9
Alternative 3 Policies

Delta Plan Element	Policy Number	Policy
		Element shall include: – **A plan for possible interruption of Delta water supply due to catastrophic events:** Identify how reliable water service will be provided or shortages managed for minimum ~~periods of 6 months, 18 months, and 36 months~~ of 10 years in the event that diversions or exports from the Delta are interrupted during an average water year, dry water year, and following three dry water years. – **Implementation of planned investments in water conservation, water efficiency, and water supply development:** Identify specific programs and projects that will be implemented over a 20-year planning period and how they are consistent with the coequal goals and will contribute to improved regional self-reliance and reduced reliance on the Delta, including, but not limited to, the following strategies[47]: ▪ Water conservation ▪ Water use efficiency ▪ Local groundwater and surface storage ▪ Conjunctive use programs ▪ Water transfers ▪ Water recycling ▪ Treatment and use of currently non-potable groundwater ▪ Stormwater capture and recharge ▪ Saline water and brackish water desalination • ~~**Evaluation of regional water balance:** Provide an assessment of the long-term sustainability of the water supplies available to meet projected demands within the supplier's hydrologic region, as defined by California Water Plan 2009 Update, over the 20-year planning period. If the region's demand exceeds available supplies, identify the steps being taken through one or more of the Integrated Regional Water Management Plans to bring the region into long-term balance. If the region's demands exceed available supplies and it does not have an Integrated Regional Water Management Plan or the Plan does not address the steps being taken to bring the region into balance, then describe how the supplier's programs and projects are helping to bring the region into long-term balance.~~ • **Conservation-oriented water rate structure:** Evaluate the degree to which the supplier's current rate structure sustainably encourages and supports water conservation. The provisions would only apply to water suppliers that use water exported from the Delta. ♦ Conservation-oriented Rate Structure • Water suppliers shall, by December 31, 2020, develop and implement a conservation-oriented rate structure, which may include consideration of a water-budget-based rate structure that sustainably encourages and supports more efficient water use without causing a shortfall in system revenues.[48] The provisions would only apply to water suppliers that use water exported from the Delta.

[47] The Department of Water Resources has identified 27 "resource management strategies" that water suppliers should consider as investments in water conservation, water efficiency, and water supply development.

[48] A sustainable conservation-oriented rate structure has the following characteristics: encourages more efficient water use without causing a shortfall in system revenue; provides for the identification of waste, rewards efficient use, and penalizes excessive use; produces revenues from penalty rates that are used to fund conservation programs; is supported by a water bill that clearly communicates the cost of wasted water to the responsible person; and is supported by a person or staff who can respond to customers' calls for help in reducing usage.

Table C-9
Alternative 3 Policies

Delta Plan Element	Policy Number	Policy
Reliable Water Supply	WR P2 (same as Proposed Project WR P2)	All new contracts, contract modifications, contract renewals and agreements to export water from, transfer water through, or use water in the Delta except transfers for up to one year in length, are not consistent with Delta Plan unless they have been developed in a transparent manner consistent with Department of Water Resources' revised policies adopted in 2003 for contract renewals and permanent transfers included in Attachment C-1 or comparable policies issued by the Bureau of Reclamation.
Delta Ecosystem Restoration	ER P1 (same as Proposed Project ER P1)	Development, implementation and enforcement of new and updated flow requirements for the Delta and high priority tributaries is key to the achievement of the coequal goals. The State Water Resources Control Board should update the Bay-Delta Water Quality Control Plan objectives and establish flows as follows: a) By June 2, 2014, adopt and implement updated flow objectives for the Delta that are necessary to achieve the coequal goals.[49] b) By June 2, 2018, develop flow criteria for high-priority tributaries in the Delta watershed that are necessary to achieve the coequal goals.[50] Prior to the establishment of revised flow objectives criteria identified above, the existing Bay-Delta Water Quality Control Plan objectives shall be used to determine consistency with the Delta Plan. By June 30, 2013, the Delta Stewardship Council will request an update from the State Water Resources Control Board on items ER P1 (a) and (b). If the Board indicates the items (a) or (b) cannot be met by the dates provided, the Delta Stewardship Council will consider and may amend the Delta Plan to achieve progress on the coequal goals in place of the updated flow objectives. For example, the Delta Stewardship Council could: ♦ Determine that a covered action that would increase the capacity of any water system to store, divert, move, or export water from or through the Delta would not be consistent with the Delta Plan until the revised flow objectives are implemented. ♦ Recommend that the State Water Resources Control Board cease issuing water rights permits in the Delta and the Delta watershed (or, if the absence of flow criteria is specific to one or more of the major tributaries, then the recommendation could be focused on the impacted areas).

[49] Flow requirements could be implemented through several mechanisms including water rights hearing, Federal Energy Regulatory Commission relicensing and negotiation and settlement. Implementation through hearings is expected to take longer than the deadline shown here.

[50] State Water Resources Control Board staff will work with the Delta Stewardship Council to determine priority streams. As an illustrative example, priority streams could include the Merced River, Tuolumne River, Stanislaus River, Lower San Joaquin River, Deer Creek (tributary to Sacramento River), Lower Butte Creek, Mill Creek (tributary to Sacramento River), Cosumnes River, and American River.

Table C-9
Alternative 3 Policies

Delta Plan Element	Policy Number	Policy
Delta Ecosystem Restoration	ER P2 (addresses similar issues as Proposed Project ER P2)	~~Habitat restoration actions shall be consistent with the habitat type locations shown on the elevation map in Attachment C-2, and accompanying text shown in Attachment C-3, based on the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*, with minor alterations.~~ ~~The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the Ecosystem Restoration Program's Conservation Strategy as the strategy is revised.~~ The Council should consider that: ♦ Focus habitat restoration and creation on publicly owned lands initially to document the success and applicability for restoration of non-publicly owned lands. Private lands should be acquired only from willing sellers for habitat restoration. ♦ Reduced emphasis on habitat restoration on existing productive farmland. ♦ Habitat restoration programs should be developed with buffer zones between created or restored habitat and ongoing agricultural activities. ♦ Habitat restoration programs should be developed with mitigation measures to control migration of weedy and pest species between created or restored habitat and neighboring agricultural lands. ♦ Habitat restoration programs should comply with local Habitat Conservation Plans, Natural Community Conservation Plans, and other ongoing plans after they are adopted, including plans for Suisun Marsh and Yolo Bypass. ♦ Habitat restoration programs should consider criteria the assures the availability of fresh water for aquatic and terrestrial species that use farmlands, including freshwater to support the crops.
Delta Ecosystem Restoration	ER P3 (addresses similar issues as Proposed Project ER P4)	State and local agencies constructing new levees, or substantially rehabilitating or reconstructing existing levees in the Delta shall evaluate, and, where feasible, incorporate alternatives (including use of setback levees) that would increase the extent of floodplain and riparian habitats if there was specific support from local reclamation districts or flood management agencies. ~~When available, criteria developed under RR R4 shall be used for determining appropriate locations for setback levees.~~
Delta Ecosystem Restoration	ER P4 (same as Proposed Project ER P5)	Agencies proposing covered actions shall demonstrate that the potential for new introductions of or improved habitat conditions for nonnative invasive species have been fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.
Reduce Risk of Floods in the Delta	RR P1 (same as Proposed Project RR P1)	Floodways[51] shall not be encroached[52] upon nor diminished without mitigating for future flood flows. This policy does not apply to ecosystem restoration projects or any ongoing agricultural or flood management activities unless they significantly decrease the existing level of flood protection.

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

[52] As described in the Department of Water Resources' "Interim Levee Design Criteria for Urban and Urbanizing Areas in the Sacramento-San Joaquin Valley": Encroachments and vegetation should be evaluated and managed so as to not impact levee safety, while recognizing their benefits.

Table C-9
Alternative 3 Policies

Delta Plan Element	Policy Number	Policy
Reduce Risk of Floods in the Delta	RR P2 (addresses similar issues as Proposed Project RR P2)	The following areas shall not be encroached upon because they are critical floodplains and may also provide ecosystem benefit. This policy does not apply to ecosystem restoration programs or any ongoing agricultural or flood management activities, or maintenance and repair of existing infrastructure, unless they significantly decrease the existing level of flood protection. The Delta Stewardship Council may amend these areas in the future if it is determined that such areas can provide additional floodplain opportunities: ♦ Areas located in the Yolo Bypass from Fremont Weir through Cache Slough to the Sacramento River including the confluence of Putah Creek into the bypass ♦ The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by Department of Water Resources or the U.S. Army Corps of Engineers. ~~♦ The Lower San Joaquin River Floodplain Bypass, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, RD 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.~~
Reduce Risk of Floods in the Delta	RR P3 (addresses similar issues as Proposed Project RR P3)	Covered actions in the Delta must be consistent with Table C-2 except that development in agricultural areas should comply with PL 84-99 criteria instead of HMP criteria included in the Proposed Project. Levee construction should promote ongoing agricultural viability without facilitating urban development in the Primary Zone and major housing development projects in the Secondary Zone. All activities should not be constrained in the near-term if compliance actions will require many years for implementation.
Reduce Risk of Floods in the Delta	RR P4 (same as Proposed Project RR P4)	Prior to the completion of the Department of Water Resources' A Framework for Department of Water Resources Investments in Delta Integrated Flood Management, guidelines for the Delta Levee Special Flood Control Projects and Subventions programs (included as Attachment C-4) shall be used to determine consistency of projects using state funds with the Delta Plan. This Framework shall be completed by the Department of Water Resources, in consultation with the Central Valley Flood Protection Board and Delta Stewardship Council, by January 1, 2013. Upon completion, the Framework shall be considered by the Delta Stewardship Council for adoption to direct State investments for levee operation, maintenance, and improvements in the Delta. If this Framework is not completed by January 1, 2013, the Delta Stewardship Council will define a strategy for State investments.

Source: Adapted from comments letters received from individual and stakeholders that represent water users, residents, and agencies located in the Delta.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R1 (addresses similar issues as Proposed Project WR R1)	The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and approve, by December 31, 2012, guidelines for the preparation of a Water Reliability Element that satisfies the criteria contained in WR P1. The guidelines could include recommendations for inclusion of an evaluation of regional water balance with an assessment of the long-term sustainability of the water supplies available to meet projected demands within the supplier's hydrologic region, as defined by California Water Plan 2009 Update, over the 20-year planning period.53 If the region's demand exceeds available supplies, identify the steps being taken through one or more of the Integrated Regional Water Management Plans to bring the region into long-term balance. If the region's demands exceed available supplies and it does not have an Integrated Regional Water Management Plan or the Plan does not address the steps being taken to bring the region into balance, then describe how the supplier's programs and projects are helping to bring the region into long term balance. The provisions would only apply to water suppliers that use water exported from the Delta.
Reliable Water Supply	WR R2 (addresses similar issues as Proposed Project WR R2)	~~The Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and include in the future California Water Plan updates the information needed to track the water supply reliability performance measures identified in the Delta Plan and assess improvements in regional self reliance, reduced reliance on the Delta, and statewide water supply reliability.~~ The Department of Water Resources should provide an assessment of the long-term sustainability of the water supplies available to meet projected demands within hydrologic region, as defined by the 2009 Water Plan Update, over the 20-year planning period, as described under the Proposed Project. If the region's demand exceeds available supplies, identify the steps being taken through the Integrated Regional Water Management Plan to bring the region into long-term balance. If the region's demand exceeds available supplies and it does not have an Integrated Regional Water Management Plan or the Plan does not address the steps being taken to bring the region into balance, then describe how the region's supplier's programs and projects are helping to bring the region into balance.
Reliable Water Supply	WR R3 (same as Proposed Project WR R4)	All state agencies should take a leadership role in designing new and retrofitted state owned and leased facilities, including buildings and Caltrans facilities, to increase water efficiency, use recycled water, incorporate stormwater runoff capture and low impact development strategies, and reduce reliance on the Delta. The Delta Stewardship Council will work with these agencies to identify regulations and other policies that will support the improved water efficiencies and new water supply strategies, such as completion of uniform recycling criteria for potable reuse for groundwater recharge, consistent with SB 918 (Water Code section 13521 et seq.).
Reliable Water Supply	WR R4 (addresses similar issues as Proposed Project WR R5)	The State Water Resources Control Board and/or the Department of Water Resources should require that proponents requesting a new point of diversion, place of use, or purpose of use that results in new or increased use of water from the Delta watershed should demonstrate that the project proponents have evaluated and implemented all other feasible water supply alternatives. The recommendation should only apply to water suppliers that divert water upstream of the Delta and in areas that use water exported from the Delta..
Reliable Water Supply	WR R5 (addresses similar issues as Proposed Project WR R6)	The Department of Water Resources should complete the Surface Water Storage Investigations of proposed off-stream surface storage projects by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the State's surface storage. Consideration should be provided for implementation of one or more of the storage projects being considered by the Surface Water Storage Investigations.

53 The purpose of a water balance is to provide an accounting of all water that enters and leaves a specific hydrologic region, how it is used, and how it is exchanged between regions. A water balance can be used to compare how water supplies and uses in a region can vary among wet, average, and dry hydrologic conditions and how each region's water balance compares with other regions and with the State's water balance. This is important to all water planning activities and provides a basis for evaluating unsustainable water management practices and making appropriate improvements.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R6 (addresses similar issues as Proposed Project WR R7)	The Department of Water Resources, in coordination with the California Water Commission , Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance facilities, and enhance opportunities for conjunctive use programs and water transfers. The California Water Commission should hold hearings and provide recommendations on priority projects. These recommendations should be used to support water supplier requests for state grants and loans and other sources of funding for these projects. The following actions are recommended for implementation by federal, state, and local agencies to identify projects that would improve statewide water supply reliability: ♦ Groundwater and Surface Water Management • The Department of Water Resources, federal Bureau of Reclamation, and local water suppliers should evaluate and implement additional surface water and groundwater storage in the Delta watershed and in areas that use water exported from the Delta. ♦ Voluntary Water Transfers • The State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should not allow groundwater to be used for water transfers or substituted for transferred water if the water would be conveyed through the Delta. If groundwater is used by the water seller, the State Water Resources Control Board, federal Bureau of Reclamation, or Department of Water Resources should require a full characterization and sustainable yield analysis of the seller's groundwater management plan to avoid groundwater substitution or overdraft.
Reliable Water Supply	WR R7 (same as Proposed Project WR R8)	The Department of Water Resources, in collaboration with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board and other state, Federal, and local agencies, should update Bulletin 118 using field data, California Statewide Groundwater Monitoring Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014. This Bulletin update should include a systematic evaluation of the major groundwater basins to determine sustainable yield and overdraft status, an evaluation of California's groundwater resources in 20 years if current groundwater management trends remain unchanged, the anticipated impacts of climate change on groundwater resources, and the recommendations for actions by state, Federal and local actions to improve groundwater management. In addition, the Bulletin update should identify groundwater basins in a critical condition of overdraft. This information should be available for inclusion in the Urban Water Management Plans and Agricultural Management Plans required to be submitted to the State by December 31, 2015.
Reliable Water Supply	WR R8 (addresses similar issues as Proposed Project WR R9)	Water suppliers that receive water diverted or exported from the Delta watershed and that receive a significant percentage of their long-term average water supplies from groundwater should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003) by December 31, 2014. This Recommendation only should apply to water suppliers that use water exported from the Delta.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reliable Water Supply	WR R9 (addresses similar issues as Proposed Project WR R10)	Local and regional agencies in groundwater basins that have been identified by the Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the Department of Water Resources (Bulletin 118, Update 2003), by December 31, 2014. If local or regional agencies fail to develop and implement these groundwater management plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2 prohibition on unreasonable use of water and whether a groundwater adjudication is needed to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code Section sections 2100-2101. [54] This Recommendation only should apply to water suppliers that use water exported from the Delta.
Reliable Water Supply	WR R10 (same as Proposed Project WR R11)	The Department of Water Resources, in coordination with the State Water Resources Control Board, the Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, Delta Stewardship Council, and other stakeholders should create by January 1, 2014, and maintain an integrated statewide system for water use monitoring. This new system should consolidate information into a single statewide data base that is in an electronic format and made available to the public online. It should be designed to simplify reporting, reduce the number of required reports, and be coordinated with the reporting requirements for the Urban Water Management Plans/Agricultural Water Management Plans and Integrated Regional Water Management Plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the data base when it becomes available. The Department of Water Resources should every 5 years summarize and incorporate the key information collected through the statewide integrated data base in the California Water Plan Update.
Reliable Water Supply	WR R11 (same as Proposed Project WR R12)	The Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that require the implementation of WR P1.
Delta Ecosystem Restoration	ER R1 (addresses similar issues as Proposed Project ER R1)	The Delta Stewardship Council acknowledges the importance of expediting habitat restoration in the Delta and its watershed and recommends the prioritization and implementation of habitat restoration projects ~~in the following areas, shown in Attachment C-5. Habitat restoration projects should consider landscape elements including connectivity between areas to be restored and existing habitat areas needed for the full life cycle of species targeted to benefit from the restoration project. Where possible, restoration projects should emphasize the potential for water quality improvement. Restoration project proponents should coordinate with local vector control districts in implementing projects~~. ~~♦ **Cache Slough Complex.** The flood basins entering the Cache Slough Complex are the interface between river and tidally influenced portions of the Delta. A significant portion of the region should return to uplands with vernal pool and grassland habitats and broad nontidal, freshwater, emergent plant-dominated wetlands that grade into tidal freshwater wetlands, shallow subtidal and deep open water habitats. A restoration project in this area is the passively restoring Liberty Island. Projects in the planning stage include the Department of Water Resources' Prospect Island restoration project.~~ ~~♦ **Cosumnes River–Mokelumne River Confluence.** Unregulated and minimally regulated rivers should allow frequent and regular winter and spring overbank flooding to create seasonal floodplain and riparian habitats grading into tidal marsh and shallow subtidal habitats. An existing restoration project is the Cosumnes River Preserve floodplain restoration. Projects in the planning stage include the Department of Water Resources'~~

[54] The State Water Resources Control Board anticipates the development of a Strategic Workplan for Groundwater by 2012 that will lay out the Board's plans to protect groundwater, including (1) application of the State Water Resources Control Board's water quality and water rights authorities to address the problems that have the greatest potential to impact beneficial uses of groundwater; (2) focus resources on the most important problems; and (3) encourage efforts to protect and management groundwater at the local or regional level.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
		~~North Delta Flood and Ecosystem Restoration Project on McCormack-Williamson Tract.~~ ~~♦ **Lower San Joaquin River Floodplain.** Historically, the south Delta and its connection to the lower San Joaquin River contained a complex network of channels with low natural berms, large woody debris, willows, and other shrubs with upland areas supporting open oak woodlands. Reconnection of significant portions of the floodplain, along with more natural flows, stimulates food webs that support native species. Projects in the planning stage include the Lower San Joaquin Flood Bypass proposed by the South Delta Levee Protection and Channel Maintenance Authority and partners.~~ ~~♦ **Suisun Marsh.** The largest wetland area on the west coast of the contiguous United States, Suisun Marsh has been mostly disconnected from the estuary. Restoring significant portions of Suisun Marsh provides the brackish portion of the estuary with sea level rise accommodation space, opportunities for extensive land-water interface dynamics, and compressed chemical and biological gradients that support productive and complex food webs to which native species are adapted. An ongoing restoration project is the Department of Water Resources' Blacklock Restoration Project. Projects in the planning stage include the Department of Fish and Game's Hill Slough Restoration Project.~~ ~~♦ **Yolo Bypass.** The current operation of the Yolo Bypass as a flood control project provides substantial ecosystem benefits for Sacramento splittail spawning and rearing and salmon rearing. Enhancing the ability of Yolo Bypass to be "activated" by higher-frequency, lower-magnitude flood levels provides more opportunity for migrating fish, especially Chinook salmon, to use this system as a migration corridor rich in refugia and food resources. Projects in the planning stage include fish passage improvements, and various approaches, such as notching the Fremont Weir, to increase the frequency and duration of inundation during times of year critical for spawning and rearing of native fish.~~ The focus of habitat restoration and creation on publicly owned lands initially to document the success and applicability for restoration of non-publicly owned lands. Private lands should be acquired only from willing sellers for habitat restoration. Habitat restoration programs should not be implemented until species goals and objectives, habitat goals and objectives that are aligned for the focused species, determination of the nexus between habitat programs and the coequal goals, and measureable criteria have been developed. Habitat restoration programs should comply with local Habitat Conservation Plans, Natural Community Conservation Plans, and other ongoing plans after they are adopted, including plans for Suisun Marsh and Yolo Bypass. Habitat restoration programs should consider criteria that assures the availability of fresh water for aquatic and terrestrial species that use farmlands, including freshwater to support the crops. Habitat restoration programs should be developed with buffer zones between created or restored habitat and ongoing agricultural activities.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R2 (addresses similar issues as Proposed Project ER R2)	As part of its Strategic Plan, and subsequent Implementation Plan or annual work plans, the Sacramento–San Joaquin Delta Conservancy should: ♦ Develop and adopt criteria for prioritization and integration of large-scale ecosystem restoration in the Delta and Suisun Marsh, with sustainability and use of best available science as foundational principles. ♦ Develop and adopt processes for ownership and long-term operations and management of land in the Delta and Suisun Marsh acquired for conservation or restoration. ♦ Develop and adopt a formal mutual agreement with the Department of Water Resources, Department of Fish and Game, federal interests, and other State and local agencies on implementation of ecosystem restoration in the Delta and Suisun Marsh. ♦ Develop, in conjunction with the Wildlife Conservation Board, the Department of Water Resources, Department of Fish and Game, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve ecosystem restoration consistent with the coequal goals and the Ecosystem Restoration Program's Conservation Strategy. ♦ Lead an effort to develop a habitat credit program that provides credit for each of these steps: acquisition in preparation for future restoration; preservation, management, and enhancement of existing habitat; restoration of habitat; and monitoring and evaluation of habitat evolution and ecological outcomes. ♦ <u>Develop and adopt criteria for Delta water quality to be maintained with the implementation of large-scale habitat restoration in the Delta.</u> ♦ <u>Develop and adopt criteria for the amount of land to be used as habitat to benefit areas outside of the Delta as compared to sufficient land for local entities to use for mitigation of in-Delta programs (including existing and future Habitat Conservation Plans developed by the local Delta agencies) and sea level rise accommodation.</u> ♦ <u>Develop and adopt criteria to mitigate adverse impacts to existing land uses due to habitat restoration programs.</u> ♦ <u>Develop, in conjunction with the Wildlife Conservation Board, the Department of Water Resources, Department of Fish and Game, and other State and local agencies, a plan and protocol for acquiring the land necessary to achieve habitat restoration consistent with the coequal goals and the Ecosystem Restoration Program's Conservation Strategy. The protocol should focus on publicly owned lands first and require willing sellers of private lands to be used for habitat restoration.</u> ♦ Work closely with the Delta Science Program to: • Incorporate the best available understanding of the scales, patterns, and processes of the historical landscape to guide land acquisition strategies and restoration design. • Apply the best understanding of landscape ecology as a unifying perspective for restoring processes and functions on degraded landscapes. • Construct landscape-level conceptual models for key regions of the Delta and Suisun Marsh to clarify how more natural flows and ecosystem restoration confer resilience to native species while promoting processes of self-repair of modified landscapes. Conceptual design models should engage hydrodynamics, transport, particle tracking, and food web models to support and integrate the interdisciplinary perspectives. • Study available habitat reference sites to increase understanding of well-functioning habitats and to inform performance measure metrics and trajectories.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R3 (same as Proposed Project ER R4)	Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should work with the Department of Fish and Game and the Department of Water Resources to develop and execute an agreed-upon variance process to exempt Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.
Delta Ecosystem Restoration	ER R4 (addresses similar issues as Proposed Project ER R5)	The Department of Fish and Game and the U.S. Fish and Wildlife Service should develop rules for voluntary Good Neighbor and Safe Harbor agreements with property owners in the Delta whose lands are adjacent to created or restored habitat and whose actions contribute to the recovery of listed threatened or endangered species.
Delta Ecosystem Restoration	ER R5 (addresses similar issues as Proposed Project ER R6)	The Department of Fish and Game and other appropriate agencies should prioritize and fully implement the list of "Stage 2 Actions for Nonnative Invasive Species" and accompanying text shown in Attachment C-6 taken from the *Conservation Strategy for Restoration of the Sacramento San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions*. The Delta Stewardship Council may amend the Delta Plan to incorporate revised figures and text from the *Conservation Strategy for Restoration of the Sacramento-San Joaquin Delta Ecological Management Zone and the Sacramento and San Joaquin Valley Regions* as the strategy is revised. ♦ The list of nonnative species to be should also specifically mention water hyacinth (which is included in the cited report prepared by Department of Fish and Game). ♦ The Council should identify other measures with the best scientific basis to reduce riverine and in-Delta predation on salmonids, including: • Measures to reduce salmonid predation "hot spots," such as an assessment of in-channel structures. • A comprehensive program developed in consultation with fishery and resource agencies to control salmonid predators and improve the Delta as a functional migratory corridor for native salmonid species. ♦ The Council should identify other measures to remove invasive species or lessen the impact of native species to restore the Delta ecosystem. ♦ The Council should identify and recommend measures to remove or reduce the population of Asian clam and other invasive species that adversely impact the ecosystem functions. ♦ The Council should apply adaptive management to identify revised or additional predation-control measures. ♦ Department of Water Resources and federal Bureau of Reclamation should install fish screens at the existing South Delta intakes to reduce fish entrainment. ♦ Water diverters of the largest in-Delta diversions should install fish screens when funding is available. ♦ Department of Fish and Game, Department of Boating and Waterways, State Water Resources Control Board, National Marine Fisheries Service, and Pacific Fisheries Management Council should increase the level of implementation related to elimination of existing and future stressors related to management of nonnative invasive species. ♦ State Water Resources Control Board, Department of Water Resources, Department of Fish and Game, and local agencies should develop and implement a program for abandoned vessel cleanup in the Delta.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Delta Ecosystem Restoration	ER R6 (same as Proposed Project ER R7)	The Delta Science Program, in conjunction with the Department of Fish and Game, the Department of Water Resources, the State Water Resources Control Board, and other relevant agencies and stakeholders, should conduct workshops to develop recommendations to the Delta Stewardship Council for measures to reduce stressor impacts on the Delta ecosystem that would support and be consistent with the coequal goals. For example, workshops would consider options for varying salinity to reduce impacts of nonnative invasive species while providing overall ecosystem benefits and minimally disrupting water supply. The recommended measures could be adopted as policies or recommendations by the Delta Stewardship Council into an amended Delta Plan. The resulting recommendations should be provided to the Delta Stewardship Council by January 1, 2013.
Delta Ecosystem Restoration	ER R7 (addresses similar issues as Proposed Project ER R8)	The relevant federal, State, and local agencies should complete the Bay Delta Conservation Plan process (i.e., receive required incidental take permits) consistent with the Delta Reform Act and ~~receive required incidental take permits by~~ no later than December 31, 2014. If the Bay Delta Conservation Plan process is not completed by this date consistent with the Delta Reform Act, the Delta Stewardship Council will consider how to proceed with ~~an alternative approach to develop and complete the ecosystem and conveyance planning process~~ developing ecosystem and conveyance planning, including consideration of all feasible alternatives to reduce or avoid environmental and other impacts that could occur due to construction of new conveyance facilities in the North Delta (including reduced water exports and water conservation, and increasing groundwater and surface water storage). One potential alternative could include an improved through Delta conveyance option that would include continued operations of the existing South Delta intakes with an isolated fish passage corridor from the San Joaquin River to the Delta along Old River and an isolated water passage corridor from the Sacramento River to the SWP and CVP south Delta pumping plants along southern Mokelumne and Middle rivers.
Improve Water Quality	WQ R1 (same as Proposed Project WQ R1)	The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy by July 2013, with implementation to follow.
Improve Water Quality	WQ R2 (same as Proposed Project WQ R2)	The Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project EIR by July 1, 2012, and begin construction as soon as possible thereafter.
Improve Water Quality	WQ R3 (same as Proposed Project WQ R3)	The State Water Resources Control Board and/or Central Valley Regional Water Quality Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.
Improve Water Quality	WQ R4 (same as Proposed Project WQ R4)	The Department of Public Health, State Water Resources Control Board, and Department of Water Resources should prioritize funding for small and disadvantaged communities that lack access to safe drinking water supplies or resources for adequate wastewater treatment.
Improve Water Quality	WQ R5 (same as Proposed Project WQ R5)	The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should require all recipient regions that are supplied water from the Delta or the Delta Watershed or discharge wastewater to the Delta or the Delta Watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program (CV-SALTS).

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	WQ R6 (addresses similar issues as Proposed Project WQ R6)	The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and if possible accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that: ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should develop and adopt objectives, either narrative or numeric, where appropriate, for nutrients in the Delta and Delta watershed by January 1, 2014. ♦ The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013. ♦ The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016. ♦ The San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for selenium and methylmercury and efforts to support their implementation should be coordinated. ♦ The State Water Resources Control Board and San Francisco Bay and Central Valley Regional Water Quality Control Boards should continue to participate in efforts revise water quality objectives for selenium. ♦ <u>State Water Resources Control Board, Regional Water Quality Control Boards, and Department of Fish and Game should develop a certification program and other incentives for land owners to provide incentives for wildlife friendly and water quality protection agricultural practices.</u>
Improve Water Quality	WQ R7 (addresses similar issues as Proposed Project WQ R7)	The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the Department of Water Resources, Department of Fish and Game, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis. <u>State Water Resources Control Board and Regional Water Quality Control Boards should integrate the water quality monitoring program with existing programs for upstream tributaries in the Delta watershed. The monitoring program also should include water quality constituents, including salinity, within the Delta and in the upstream tributaries.</u>
Improve Water Quality	WQ R8 (same as Proposed Project WQ R8)	The Central Valley Regional Water Quality Control Board, consistent with existing Water Quality Control Plan policies and water rights law, should require responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.
Improve Water Quality	WQ R9 (same as Proposed Project WQ R9)	The State Water Resources Control Board and Regional Water Quality Control Boards should conduct or require special studies of pollutants including emerging contaminants and causes of toxicity in Delta waters and sediments by January 1, 2014.
Improve Water Quality	WQ R10 (same as Proposed Project WQ R10)	To comply with the San Francisco Bay Conservation and Development Commission water quality policies and facilitate the commission's impact determination, proponents of actions potentially affecting water quality in Suisun Marsh should consult with the San Francisco Bay Regional Water Quality Control Board and obtain all necessary authorizations early in the process.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Improve Water Quality	RR R1 (addresses similar issues as Proposed Project RR R2)	The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the *Delta Dredged Sediment Long-Term Management Strategy* (Attachment C-7), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals. The Department of Water Resources, Regional Water Quality Control Board, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and other interested agencies should develop a streamlined plan by December 31, 2012 for dredging Delta channels.
Improve Water Quality	RR R2 (same as Proposed Project RR R3)	The Delta Stewardship Council should coordinate with the Department of Water Resources, Department of Parks and Recreation, and other appropriate local agencies to develop a plan identifying appropriate levels of flood protection relating to specific land and recreation uses for State recreation facilities in the Delta. This plan should address emergency response and notification procedures for recreational users.
Reduce Risk of Floods in the Delta	RR R3 (addresses similar issues as Proposed Project RR R4)	~~The Department of Water Resources, in conjunction with the Department of Fish and Game and Delta Conservancy, should develop criteria to define locations for future setback levees in the Delta and Delta watershed. Until then, the siting of future permanent structures should provide adequate area to accommodate future setback levees.~~ Levee repairs projects should consider inclusion of habitat enhancements.
Reduce Risk of Floods in the Delta	RR R4 (addresses similar issues as Proposed Project RR R5)	The Department of Water Resources' *A Framework for Department of Water Resources Investments in Delta Integrated Flood Management* in coordination with the local agencies that maintain levees that should: ♦ Define State interests related to flood and levee management in the Delta. These State interests should, at a minimum, include: • Reducing risk of loss of life. • Protecting water supply. This should address identifying and assessing critical water supply corridor levee operations, maintenance, and improvements for all existing municipal and industrial water diversions in the Delta. • Protecting water quality and the ecosystem. • Protecting critical infrastructure of statewide importance (including pipelines, energy transmission facilities, aqueducts, and State highways). • Protecting property. ♦ Define a long-term levee policy for the Delta, which, at a minimum, should determine those levees critical for protecting State interests. ♦ Recognize the wide variability of conditions across the Delta including depth of inundation upon failure; current condition of existing levees; and degree of exposure to seismicity, sea level rise, climate change, and river flood levels. ♦ Define a methodology for assessing existing Delta levee conditions, as well as on a systematic, routine, and coordinated basis, to develop a sound technical understanding and assessment capability to base levee related decisions. This information should be collected and reported in a transparent manner, and shall include the production of a Delta levee conditions map. ♦ Define a methodology for proactively identifying, developing, prioritizing, and scheduling specific levee operations, maintenance, and improvement projects. ♦ Define a method for determining project costs, cost share, and project partners, if appropriate. ♦ Define procedures that distinguish Delta Levees Special Flood Control Projects from routine levee maintenance projects.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R5 (addresses similar issues as Proposed Project RR R6)	The following actions should be taken by January 1, 2013, to promote effective emergency preparedness and response in the Delta: ♦ Responsible local, state, and federal agencies with emergency response authority should consider and implement the recommendations of the Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta. ~~♦ The California Emergency Management Agency, Department of Water Resources, U.S. Army Corps of Engineers, appropriate Operational Areas and other State and local partners should cooperatively participate in Delta-specific emergency preparedness activities. These activities should include but not be limited to the development and maintenance of a Sacramento-San Joaquin Delta Flood Catastrophic Incident Plan, a Regional Mass Evacuation Plan and an Interoperable Communications Plan; adoption and implementation of a Delta Multi-Agency Coordination System (MACS); participation in federal and State flood and evacuation contingency mapping; and regularly scheduled all-hazards drills and exercises. Public education and outreach program topics should include flood risk awareness, emergency preparedness, alert and notification.~~ ~~♦ Cal EMA in collaboration with local, State and federal emergency response agencies in the Delta region should develop a training plan that is consistent with SEMS and NIMS requirements and compliments the development of plans, procedures and protocols that address all hazards that pose a threat to the Delta.~~ ~~♦ In consultation with local agencies, the Department of Water Resources should expand its emergency stockpiles to make them regional in nature and usable by a larger number of agencies in accordance with Department of Water Resources' plans and procedures. The Department of Water Resources, as a part of this plan, should evaluate the potential of creating stored material sites by "over-reinforcing" west Delta levees.~~ ♦ The Department of Water Resources, the California Emergency Management Agency, and local flood management agencies should prepare and regularly update a Delta-wide emergency response and evacuation procedures and systems comprising the regional response system established in accordance with the Delta Multi-Hazard Coordination Task Force recommendations. These agencies should participate in emergency response exercises for both periodic and catastrophic flood events, inland mass evacuation exercises, and emergency preparedness public training, notification, and flood risk education and outreach programs. The U.S. Army Corps of Engineers should be a part of all emergency preparedness activities. ♦ All personnel prepared to respond to Delta flood emergencies should be trained in the Statewide Emergency Management System (SEMS) and the National Incident Management System (NIMS) procedures. All emergency response plans and emergency response training exercises involving the Delta should be SEMS- and NIMS-compliant. ♦ The Department of Water Resources and all other public agencies that maintain local emergency stockpiles should expand their emergency stockpiles to make them regional in nature and usable by a larger number of agencies in accordance with a Delta multi-agency logistic system within a new Delta regional response system. The Department of Water Resources, as a part of an overall emergency logistics plan, should evaluate the potential of creating stored material sites by "over-reinforcing" west Delta levees. ♦ State and local agencies and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Reduce Risk of Floods in the Delta	RR R6 (same as Proposed Project RR R7)	The Delta Stewardship Council should convene a working group to develop and evaluate recommendations to the Department of Water Resources to address appropriate response actions to both routine and catastrophic Delta levee failures. The working group should include the Delta Protection Commission and other interested parties, and the recommendations should be completed by January 1, 2013.
Reduce Risk of Floods in the Delta	RR R7 (same as Proposed Project RR R12)	U.S. Army Corps of Engineers, Bureau of Reclamation, Department of Water Resources, and local agencies and hydropower utilities should evaluate and modify flood control management procedures for reservoirs upstream of the Delta with consideration for sea level rise, changes in timing and form of precipitation, and changes in water supply operations to alleviate potential Delta flooding.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R1 (same as Proposed Project DP R1)	The Economic Sustainability Plan should include, but not be limited to, planning for the following items: ♦ Public safety recommendations, such as flood protection recommendations ♦ The economic goals, policies, and objectives in local general plans and other local economic efforts, including recommendations on continued socioeconomic sustainability of Delta agriculture and its infrastructure to support the proposed economic strategies and legacy communities in the Delta ♦ Comments and recommendations to the Department of Water Resources concerning its periodic update of the flood management plan for the Delta. ♦ Identification of ways to encourage recreational investment along the key river corridors, as appropriate
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R2 (same as Proposed Project DP R2)	The Delta Protection Commission should complete the evaluation and initiate recommendations related to designation of the Delta and Suisun Marsh as a National Heritage Area. If the recommendation is to proceed with the designation, the federal government should complete the process in a timely manner.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R3 (same as Proposed Project DP R3)	The Department of Transportation should partner with local cities and counties to establish major gateways and improve connecting transportation routes, bike lanes, sidewalks, and trails to promote the Delta's identity, visibility, and access.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R4 (same as Proposed Project DP R4)	The Department of Parks and Recreation should develop funding sources and partner with other State and federal agencies, counties, conservancies, and nonprofits to conduct definitive and consistent recreation use surveys every 5 years and add and/or improve recreation facilities in the Delta, including facilities to meet public recreational needs as part of State Water Project facilities, and add three new parks at Barker Slough, Elkhorn Basin, and in the Southern Delta.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R5 (same as Proposed Project DP R5)	The Department of Fish and Game should collaborate with other agencies and nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.
Protect and Enhance the Unique Cultural, Recreational, Natural Resources, and Agricultural Values of the California Delta as an Evolving Place	DP R6 (same as Proposed Project DP R6)	The Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R1 (same as Proposed Project FP R1)	Public and private agencies with infrastructure crossing the Delta should protect their assets from flooding and other natural disasters. ♦ The Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The Delta Stewardship Council, in consultation with the Public Utilities Commission and the Delta Protection Commission, should allocate these funds between State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency. ♦ The Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, in order to minimize the impact on the State's economy. ♦ The Governor, by Executive Order, should direct State agencies with projects or infrastructure in the Delta to set aside a reasonable amount of funding to pay for flood protection and disaster prevention. The local share of these funds should be allocated as described above.
Finance Plan Framework	FP R2 (same as Proposed Project FP R3)	The Legislature should appropriate $50 million of Proposition 1E funds to the Department of Water Resources and direct the Department of Water Resources to begin the acquisition of land and easements for the proposed San Joaquin/South Delta Flood Plain.
Finance Plan Framework	FP R3 (same as Proposed Project FP R4)	Long-term non-General Fund and non-general obligation bonds stable funding should be established to support the Department of Water Resources' Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board. Until this long-term funding is secure, the existing funding for the Delta Levees Subventions and Special Projects, FloodSAFE, and the Central Valley Flood Protection Board should be provided until the bonds funds are completely allocated by extending the deadline of July 1, 2013.
Finance Plan Framework	FP R4 (same as Proposed Project FP R5)	As part of the California Water Plan Update, the Department of Water Resources should prepare an assessment of the state's water infrastructure needs. This should include an assessment of the existing infrastructure's rehabilitation/replacement costs, as well as new improvements to meet projected demands over the planning period. The Department of Water Resources should consider a survey of agencies requesting information on small-scale projects (such as storage or conveyance) that allow the State to improve water supply reliability. In the future, a provision should be added to Urban Water Management Plans and Agricultural Water Management Plans to include information on potential local water reliability projects. This could form the basis of future State bond funding decisions and be used to inform the Legislature and the public of systemwide needs.
Finance Plan Framework	FP R5 (same as Proposed Project FP R6)	User Fees/Stressors Fees should support the coequal goals and the Delta Plan. ♦ The Legislature should authorize the Delta Stewardship Council to develop reasonable fees for beneficial uses and reasonable fees for those who stress the Delta ecosystem, and apply these fees to the operational costs of the Delta Stewardship Council, the Delta Conservancy, and the Delta Protection Commission to allow implementation of the Delta Plan. These fees would be developed in an open and transparent process. Operating costs of the Delta Stewardship Council, Delta Conservancy, and Delta Protection Commission should be pre-funded for a period of 10 years. As previously discussed, the annual budget of the new governance structure is approximately $50 million. ♦ Repayment of these costs, with interest, would be made annually commencing in 2022 from collected fees. Repayment could begin sooner if revenue from fees were available before 2022. Repayment should be completed no later than 2032. ♦ Revenue bond authority should be granted to implement the Delta Plan should a fiscal partner be found.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R6 (same as Proposed Project FP R7)	The Legislature should amend AB 3030 and SB 1938 to allow local agencies to assess fees under Proposition 218.
Finance Plan Framework	FP R7 (same as Proposed Project FP R8)	Sufficient funding should be provided to the Delta Conservancy to commence implementation of the ecosystem restoration portion of the Delta Plan. This would include building the capabilities to administer and monitor the Conservancy's projects, as well as funding initial early start projects approved by the Conservancy Board. Funding should be no less than $50 million and should be allocated from existing bond funds, or from any new funds authorized by voters. Total dollar amount allocated for this purpose will depend on all available funding sources and may well exceed $50 million.
Finance Plan Framework	FP R8 (same as Proposed Project FP R9)	The Delta Conservancy, in conjunction with other appropriate agencies, should investigate carbon offsets as a revenue source for Delta islands.
Finance Plan Framework	FP R9 (same as Proposed Project FP R10)	The Legislature should consider appropriate funding for implementation of the Economic Sustainability Plan consistent with the Delta Plan.
Finance Plan Framework	FP R10 (same as Proposed Project FP R11)	The Legislature should consider reasonable payments-in-lieu-of-taxes to replace lost local government revenues resulting from the removal of properties from property tax rolls for ecosystem habitat or water supply purposes in the Delta.
Finance Plan Framework	FP R11 (addresses similar issues as Proposed Project FP R13)	By January 2015, the Department of Water Resources should complete a Delta-wide comparative benefit/cost analysis based on recommendations for prioritized State investments for levee operations, maintenance, and improvements in the Delta developed in accordance with RR P4. Benefits should be specifically identifiable and calculable, and include an analysis of the value of lands behind levees. ~~Such a report should be developed in collaboration with the Delta Stewardship Council, local agencies, federal agencies, and the proposed new Delta Flood Risk Management Assessment District.~~
Finance Plan Framework	FP R12	A fund should be established to pay for local costs of compliance for measures that benefit areas outside the Delta and/or are "ecosystem improvements to reduce damage by operations of the existing export pumps in the Delta"
Finance Plan Framework	FP R13	Council should identify government agency overlap in terms of costs for studies, science, research, projects, etc to avoid wasting money on duplication of effort, so know how and where cost savings could occur. This should be part of the initial near-term activities the Council should pursue as it will help identify saved money opportunities if can streamline effort and money.
Finance Plan Framework	FP R14	Establish a reliable mechanism and funding to pay for the long-term management of water supply reliability facilities and habitat restoration lands. ♦ Require consistency determination for these covered action projects to include criteria for a securitized funding source to pay for the ongoing data collection, maintenance, operation, monitoring, adaptive management, and compliance with flood control requirements, or ♦ Establish a fund to be managed by DSC, DPC, or Delta Conservancy to pay for the ongoing data collection, maintenance, operation, monitoring, adaptive management, and compliance with flood control requirements.

Table C-10
Alternative 3 Recommendations

Delta Plan Element	Recommendation Number	Recommendation
Finance Plan Framework	FP R15	Establish a process for Delta landowners to submit a claim for compensation for damage caused by water supply reliability and habitat projects associated with achieving the coequal goals or operation of the SWP and CVP, prior to any of these projects/actions being implemented. A fund should be established to be managed by the DSC, DPC, or Delta Conservancy to pay for the compensation claims submitted for third party impacts associated with actions, projects, policies, and operations associated with achieving coequal goals or operation of the SWP and CVP.

Source: Adapted from comments letters received from individual and stakeholders that represent water users, residents, and agencies located in the Delta.

Attachment C-1
Appendix C-1 and C-2
from the Fifth Staff Draft Delta Plan

Appendix C1
Policy 03-09: Principles Regarding Public Participation Process in State Water Project Contract Negotiations

STATE OF CALIFORNIA • RESOURCES AGENCY • DEPARTMENT OF WATER RESOURCES

NOTICE TO

STATE WATER PROJECT CONTRACTORS

NUMBER: 03-09

DATE: 7/3/03

SUBJECT: Guidelines for Review of Proposed Permanent Transfers of State Water Project Annual Table A Amounts

FROM: INTERIM DIRECTOR, DEPARTMENT OF WATER RESOURCES

The Department of Water Resources is issuing the following guidelines prepared in connection with the Settlement Agreement, dated May 5, 2003, reached in *Planning and Conservation League et al. v. Department of Water Resources, 83 Cal. App. 4th 892 (2000)*. These guidelines are effective upon the superior court's approval of the Settlement Agreement on May 20, 2003.

1. Purpose: The purpose of these guidelines is to describe the process for DWR's review of proposed permanent transfers of State Water Project Annual Table A Amounts and, by so doing, provide disclosure to SWP contractors and to the public of DWR's process and policy for approving permanent transfer of SWP Annual Table A Amounts. Such disclosure should assist contractors in developing their transfer proposals and obtaining DWR review expeditiously, and assist the public in participating in that review.

2. Coverage: These guidelines will apply to DWR's approval of proposed permanent transfers of water among existing SWP contractors and, if and when appropriate, to proposed permanent transfers of water from an existing SWP contractor to a new SWP contractor.

3. Interpretation: These guidelines are in furtherance of the State policy in favor of voluntary water transfers and shall be interpreted consistent with the law, including but not limited to Water Code Section 109, the Burns-Porter Act, the Central Valley Project Act, the California Environmental Quality Act, area of origin laws, the public trust doctrine, and with existing contracts and bond covenants. These guidelines are not intended to change or augment existing law.

4. Revisions: Revisions may be made to these guidelines as necessary to meet changed circumstances, changes in the law or long-term water supply contracts, or to address conditions unanticipated when the guidelines are adopted. Revisions shall be in accordance with the Settlement Agreement.

5. Distribution: The transfer guidelines shall be published by DWR in the next available edition of Bulletin 132, and also as part of the biennial disclosure of SWP reliability as described in the Settlement Agreement.

6. Contract Amendment: Permanent transfers of SWP water are accomplished by amendment of each participating contractor's long-term water supply contract. The amendment consists of amending the Table A upwards for a buying contractor and downwards for a selling contractor. The amendment shall be in conformity with all provisions of the long-term water supply contracts, applicable laws, and bond covenants. Other issues to be addressed in the contract amendment will be subject to negotiation among DWR and the two participating contractors. The negotiations will be conducted in public, pursuant to the Settlement Agreement and Notice to State Water Project Contractors Number 03-10.

7. Financial Issues: The purchasing contractor must demonstrate to DWR's satisfaction that it has the financial ability to assume payments associated with the transferred water. If the purchasing entity was not a SWP contractor as of 2001, special financial requirements pertain as described below, as well as additional qualifications.

8. Compliance with CEQA: Consistent with CEQA, the State's policy to preserve and enhance environmental quality will guide DWR's consideration of transfer proposals (Public Resources Code Section 21000). Identification of the appropriate lead agency will be based on CEQA, the CEQA Guidelines, and applicable case law, including *PCL v. DWR.* CEQA requires the lead agency at a minimum to address the feasible alternatives to the proposed transfer and its potentially significant environmental impacts (1) in the selling contractor's service area; (2) in the buying contractor's service area; (3) on SWP facilities and operations; and (4) on the Delta and areas of origin and other regions as appropriate. Impacts that may occur outside of the transferring SWP contractors' service areas and on fish and wildlife shall be included in the environmental analysis. DWR will not approve a transfer proposal until CEQA compliance is completed. The lead agency shall consult with responsible and trustee agencies and affected cities and counties and, when DWR is not the lead agency, shall provide an administrative draft of the draft EIR or Initial Study/Negative Declaration to DWR prior to the public review period. A descriptive narrative must accompany a checklist, if a checklist is used. The lead agency shall conduct a public hearing on the EIR during the public comment period and notify DWR's State Water Project Analysis Office of the time and place of such hearing in addition to other notice required by law.

9. Place of Use: The purchasing contractor must identify the place and purpose of use of the purchased water, including the reasonable and beneficial use of the water.

Typically, this information would be included in the environmental documentation. If a specific transfer proposal does not fit precisely into any of the alternatives listed below, DWR will use the principles described in these Guidelines to define the process to be followed. The information to be provided under this paragraph is in addition to the CEQA information described in Paragraph 8 of these guidelines.

a. If the place of use is within the contractor's service area, the contractor should disclose the purpose of the transferred water, such as whether the water is being acquired for a specific development project, to enhance overall water supply reliability in the contractor's service area, or some other purpose. If the transferred water is for a municipal purpose, the contractor should state whether the transfer is consistent with its own Urban Water Management Plan or that of its member unit(s) receiving the water.

b. If the place of use is outside the contractor's service area, but within the SWP authorized place of use, and service is to be provided by an existing SWP contractor, then, in addition to Paragraph 9(a) above, the contractor should provide DWR with copies of LAFCO approval and consent of the water agency with authority to serve that area, if any. In some instances, DWR's separate consent is required for annexations in addition to the approval for the transfer.

c. If the place of use is outside the SWP authorized place of use and service is to be provided by an existing SWP contractor, the contractor should provide information in Paragraph 9(a) and 9(b). Prior to approving the transfer, DWR will consider project delivery capability, demands for water supply from the SWP, and the impact, if any, of the proposed transfer on such demand. If DWR approves the transfer, DWR will petition State Water Resources Control Board for approval of expansion of authorized place of use. Water will not be delivered until the place of use has been approved by the SWRCB and will be delivered in compliance with any terms imposed by the SWRCB.

d. If the place of use is outside the SWP authorized place of use and service is not to be provided by an existing SWP contractor, DWR will consider the transfer proposal as a proposal to become a new SWP contractor. Prior to adding a new SWP contractor, DWR will consider project delivery capability, demands for water supply from the SWP, and the impact, if any, of the proposed transfer on such demand. DWR will consult with existing SWP contractors regarding their water supply needs and the proposed transfer. In addition to the information in Paragraph 9(a), 9(b), and 9(c), the new contractor should provide information similar to that provided by the original SWP contractors in the 1960's Bulletin 119 feasibility report addressing hydrology, demand for water supply, population growth, financial feasibility, etc.

DWR will evaluate these issues independently and ordinarily will act as lead agency for CEQA purposes. In addition, issues such as area of origin claims, priorities, environmental impacts and use of water will be addressed. The selling contractor may not be released from financial obligations. The contract will be subject to a CCP 860 validation action initiated by the new contractor. If DWR approves the transfer, DWR will petition the SWRCB for approval of expansion of authorized place of use. Water will not be delivered until the place of use has been approved by the SWRCB and will be delivered in compliance with any terms imposed by the SWRCB.

10. DWR Discretion: Consistent with the long-term water supply contract provisions, CEQA, and other provisions of law, DWR has discretion to approve or deny transfers. DWR's exercise of discretion will incorporate the following principles:

    a. As required by CEQA, DWR as an agency with statewide authority will implement feasible mitigation measures for any significant environmental impacts resulting from a transfer if such impacts and their mitigation are not addressed by other public agencies and are within DWR's jurisdiction.

    b. DWR will invoke "overriding considerations" in approving a transfer only as authorized by law, including but not limited to CEQA, and, to the extent applicable, the public trust doctrine and area of origin laws.

If you have any questions or need further information, please contact Dan Flory, Chief of DWR's State Water Project Analysis Office, at (916) 653-4313 or Nancy Quan of his staff at (916) 653-0190.

Appendix C2
Policy 03-10: Guidelines for Review of Proposed Permanent Transfers of State Water Project Annual Table A Amounts

STATE OF CALIFORNIA • RESOURCES AGENCY • DEPARTMENT OF WATER RESOURCES

NOTICE TO

STATE WATER PROJECT CONTRACTORS

NUMBER: 03-10

DATE: 7/3/03

SUBJECT: Principles Regarding Public Participation Process in State Water Project Contract Negotiations

FROM: Michael J. Gean
INTERIM DIRECTOR, DEPARTMENT OF WATER RESOURCES

The Department of Water Resources is issuing the following guidelines prepared in connection with the Settlement Agreement, dated May 5, 2003, reached in *Planning and Conservation League et al. v. Department of Water Resources, 83 Cal. App. 4th 892 (2000).* These guidelines are effective upon the superior court's approval of the Settlement Agreement on May 20, 2003.

1. Policy: Given the importance of the State Water Project to the State of California, and the key role that the long-term water supply contracts play in the administration of the SWP, DWR agrees that public review of significant changes to these contracts is beneficial and in the public interest.

2. Types of Activities to be Covered: Project-wide contract amendments (i.e., contracts with substantially similar terms intended to be offered to all long-term SWP Contractors) and contract amendments to transfer Table A amounts between existing SWP contractors will not be offered to the contractors for execution unless DWR has first complied with the public participation process as described in Paragraphs (3), (4), (5), and (6).

3. The Public Participation Process:

   1) Negotiations will be conducted in public.

   2) The public will be provided with advance notice of the time and place of the negotiations.

   3) The public will be provided the opportunity to observe negotiations and comment in each negotiating session.

4. Timing of Public Participation: Public participation ordinarily will precede the formulation of the project description in the California Environmental Quality Act process in order to assure that the public participation is meaningful. When DWR is a responsible agency, (e.g., when existing SWP contractors agree to transfer Table A amounts between themselves), the public participation will be scheduled to facilitate coordination with the lead agency's CEQA process.

5. Activities That Will Not Be Subject to Public Participation: Informal discussions prior to exchange of formal drafts and discussion of topics that are authorized to be kept confidential by law will not be subject to the public participation process.

6. Contract Amendments Resulting From Litigation: If litigation has been formally initiated, and settlement negotiations result in a proposal to adopt project-wide amendments to settle the litigation, all proposed contract amendments shall be subject to the public participation process before they are approved by DWR.

Notices of public negotiations will be put on the DWR website.

If you have any questions or need further information, please contact Dan Flory, Chief of DWR's State Water Project Analysis Office, at (916) 653-4313, or Nancy Quan of his staff at (916) 653-0190.

Attachment C-2
Figure 5-2 from the Fifth Staff Draft Delta Plan

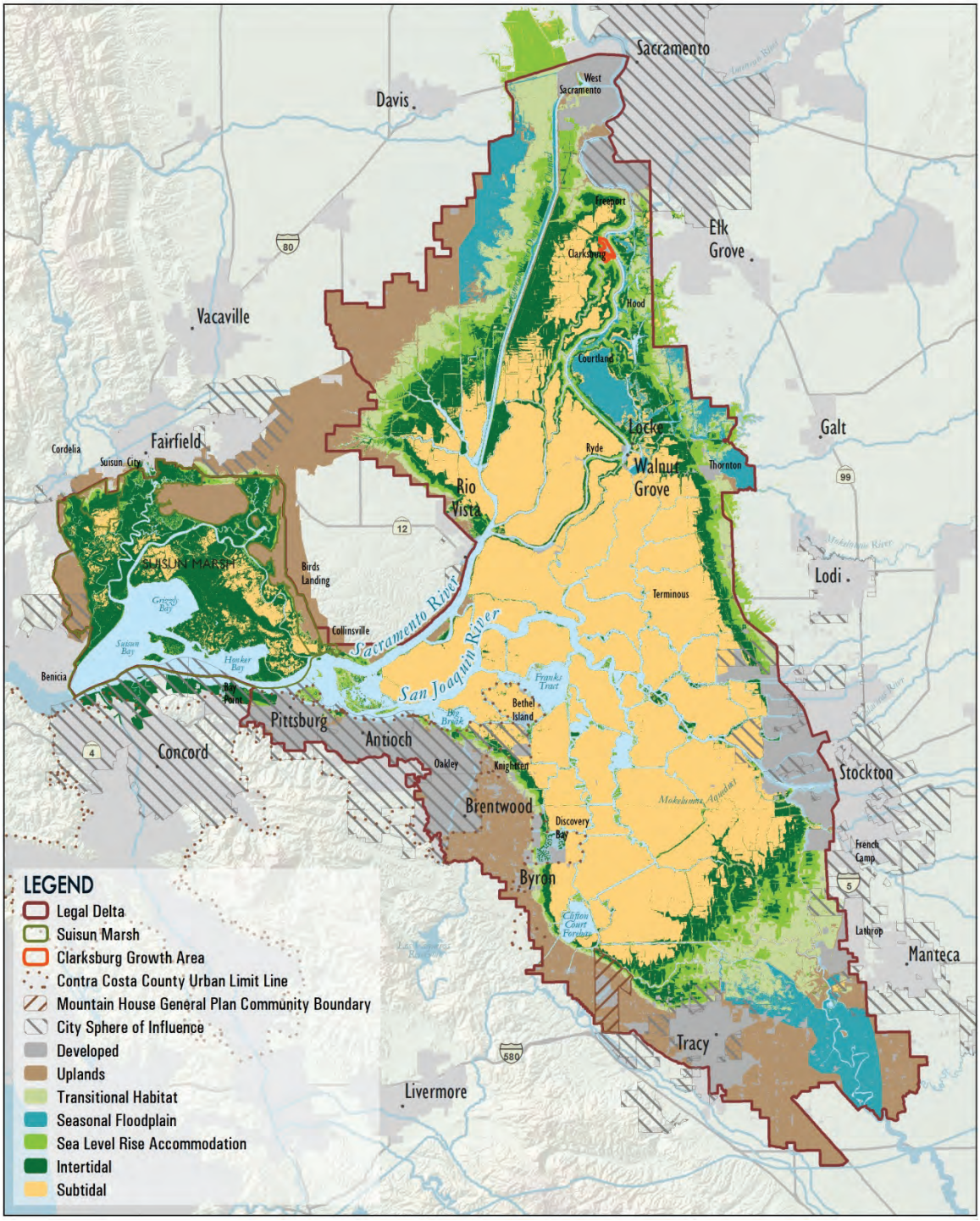


Figure 5-2
Habitat Types Based on Elevation, Shown with Developed Areas in the Delta and Suisun Marsh
Source: Adapted from DFG 2011

Attachment C-3
Appendix D from the Fifth Staff Draft Delta Plan

Appendix D

Excerpt from Draft Ecosystem Restoration Program's Conservation Strategy for Stage 2 Implementation for the Sacramento-San Joaquin Delta Ecological Management Zone (DFG 2011): "Section II. Habitats" including Figures 4 and 5

organic matter with a high biological oxygen demand, which resulted in extremely low DO particularly when discharged into dead end sloughs; and 2) discharges from the Stockton sewage treatment plant historically created a biological oxygen demand (BOD) in the upper portion of the Stockton Deepwater Ship channel and created a migration barrier for fall migrating Chinook salmon. This BOD problem has been substantially abated by converting to tertiary treatment in the Stockton plant.

II. Habitats

ERPP Goal 4 (Habitats) is to protect and/or restore functional habitat types in the Bay-Delta estuary and its watershed for ecological and public values such as supporting species and biotic communities, ecological processes, recreation, scientific research, and aesthetics. The ERPP identified a number of key habitat types for which conservation and restoration would be pursued in the Delta. These habitat types are continuting to be reviewed and evaluated as a part of various habitat conservation plans in terms of the natural communities they seek to conserve, and within the ERP. As these evaluations are completed, scientists and managers will have a better understanding of these natural communities, and will be better able to monitor status and trends in these natural communities at a regional scale, as well as build this information into future management plans.

There were two strategies in the Delta Vision Strategic Plan associated with the creation and restoration of habitat: Strategy 3.1, “Restore large areas of interconnected habitats—on the order of 100,000 acres—within the Delta and its watershed by 2100”; and Strategy 3.2, “Establish migratory corridors for fish, birds, and other animals along selected Delta river channels”. These two strategies describe actions regarding inundation of floodplain areas, restoration of tidal and riparian habitat, and protection of grasslands and farmlands.

Development of the Delta Conservation Strategy Map. This element in the Conservation Strategy contributes to identification of restoration opportunities within the Delta, primarily based on land elevations with consideration of current urban land use constraints (Figure 4). Existing non-urban land uses, infrastructure, and other constraints at these locations were not considered for this map. These features will be addressed in future analyses of site-specific proposals. Figure 4 presents existing elevations in the Delta, which we consider a starting point for developing priorities for habitat restoration. Several broad habitat types were identified for restoration and have been classified according to three ranges of land elevation: upland areas, intertidal areas, and subsided lands/deep open water areas. Appendix E provides a crosswalk between habitat categories in this Conservation Strategy for the Delta and those in the ERP Plan.

In accordance with the recommendations in the Delta Vision Strategic Plan and in light of expected sea level rise, the areas of the Delta that are of highest priority for restoration include lands that are in the existing intertidal range, floodplain areas that

DRAFT

can be seasonally inundated, and transitional and upland habitats. Assuming a rise in sea level of approximately 55 inches over the next 50-100 years (Cayan et al. 2009), these areas would become shallow subtidal, seasonally inundated floodplain, and intertidal and upland habitats respectively. The next highest priority for restoration to tidal marsh would be lands below the intertidal range that are not highly subsided, and are within the range of feasibility for subsidence reversal projects. The lower elevation boundary of subsided lands appropriate for tidal marsh restoration has not been established, and may vary depending on location, configuration, availability of dredge spoils, and other factors that may promote or inhibit soil accretion associated with vegetation establishment. The most subsided lands would be the lowest priority for restoration to tidal marsh because raising elevations to the range appropriate for vegetation establishment is likely to be infeasible. However, these deeply subsided lands may have value as deep water habitat, although the benefits of increasing deep water habitat in the delta ecosystem have not been established.

DRAFT

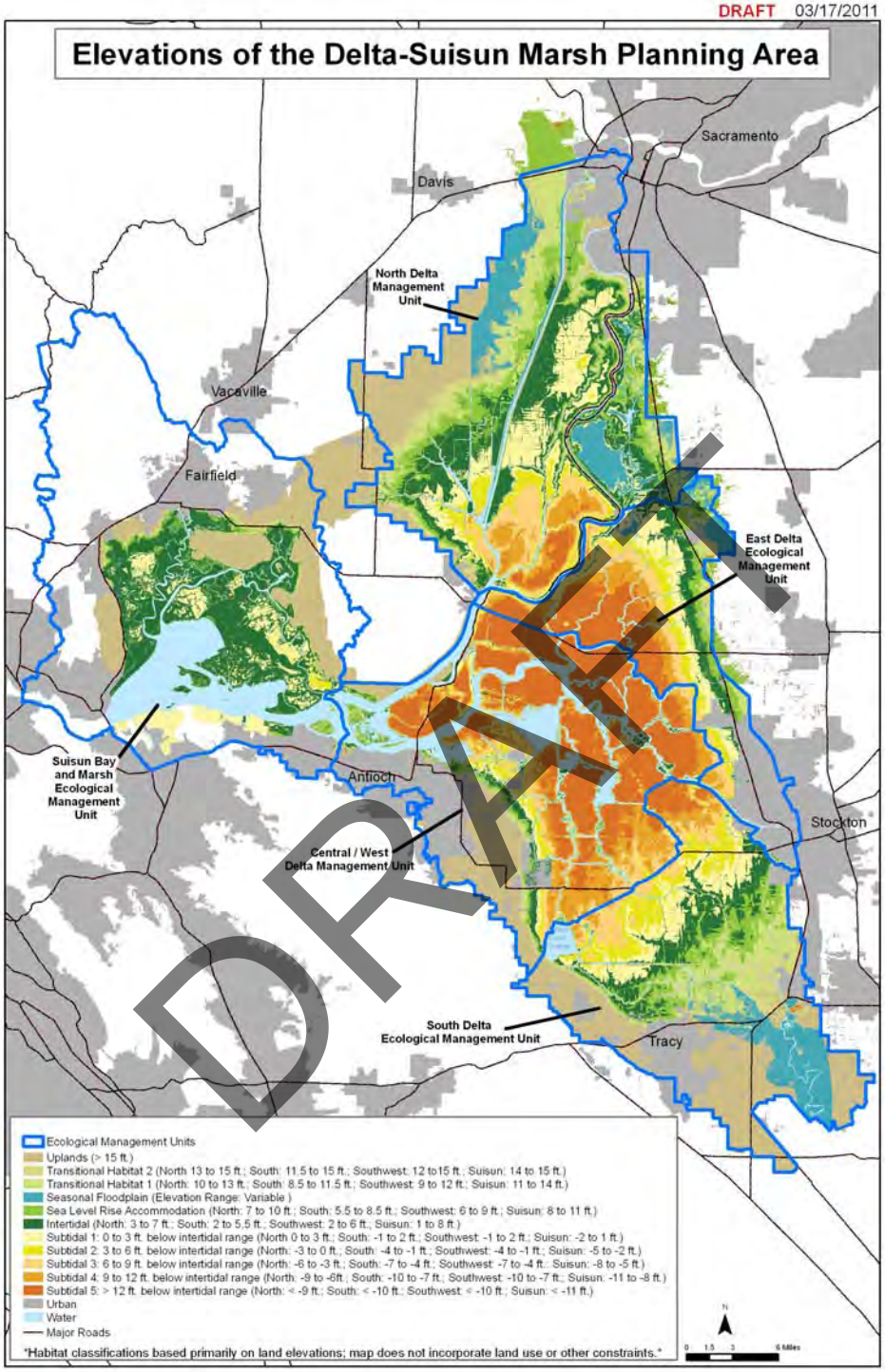


Figure 4: Land elevations in the Delta and Suisun Marsh. Current land elevations will largely determine what habitat types can be accommodated.

Delta Agricultural Lands. It is important to note that a significant portion of the land within the Delta is dedicated to agricultural production, some of which is considered suitable for habitat restoration. Despite this, it is projected that much of this land will remain dedicated to agriculture into the future. Expected reductions in the availability of freshwater for all beneficial uses, due to changing precipitation patterns and extended droughts, means that sea level rise will increase salinity in some areas of the Delta, particularly the western and central Delta, even absent any natural perturbations such as an earthquake-induced levee breach of a major Delta island. There simply will not be enough freshwater in the future to continue maintaining all parts of the Delta as a freshwater pool year-round. It is therefore probable that Delta agriculture will adapt naturally over time to these expected changes in the Delta, through a combination of planting more drought- and salt-tolerant crops as agricultural biotechnology becomes more widely available; growing crops that can be used to produce ethanol or other biofuels; seeking more opportunities for cultural/economic diversification (e.g., ecotourism); and managing for wetlands and associated plants for wildlife benefits rather than agriculture and/or toward development of a carbon emissions offset trading market. Some U.S. Department of Agriculture programs already exist that provide financial incentives for landowners to manage natural areas on their properties, including but not limited to the Wildlife Habitat Incentives Program, the Environmental Quality Incentives Program, and the Conservation Reserve Program. While largely successful in other States, funding for implementation of these programs in California must be augmented to make participation more attractive to landowners who face higher capital and production costs. ERP will continue to fund projects on agricultural lands which benefit wildlife and help ensure that agricultural properties are conserved.

ERPP Vision for Agricultural Lands: Improve associated wildlife habitat values to support special-status wildlife populations and other wildlife dependent on the Bay-Delta. Protecting and enhancing agricultural lands for wildlife would focus on encouraging production of crop types that provide high wildlife habitat value, agricultural land and water management practices that increase wildlife habitat value, and discouraging development of ecologically important agricultural lands for urban or industrial uses in the Sacramento-San Joaquin Delta and Suisun Marsh/North San Francisco Bay Ecological Management Zones.

ERPP volume 1, July 2000

ERPP Vision for Tidal Perennial Aquatic Habitats: Increase the area and improve the quality of existing connecting waters associated with tidal emergent wetlands and their supporting ecosystem processes. Achieving this vision will assist in the recovery of special-status fish, wildlife, and plant populations and provide high-quality aquatic habitat for other fish, wildlife, and plant communities dependent on the Bay-Delta. Restoring tidal perennial aquatic habitat would also result in higher water quality and increase the amount of shallow-water and mudflat habitats; foraging and resting habitats and escape cover for water birds; and rearing and foraging habitats, and escape cover for fish.

ERPP volume 1, July 2000

Delta Upland Areas. Connectivity of existing habitat to higher elevation areas will be critical for Delta habitats and species with rising sea level, global warming, and regional climate change. As the sea level rises, existing intertidal habitat will become subtidal, and adjacent uplands will become intertidal. Additionally, adjacent higher elevation habitat will be critical for wildlife to escape flooding. Changes in regional climate are expected to result in precipitation patterns of more rain and less snow, shifting tributary

DRAFT

peak runoff from spring to winter, making extreme winter runoff events more frequent and intense, and bringing about longer dry periods in summer. In light of these expected changes, and ongoing conversion of open space lands to urban uses, some of these higher elevation areas will be expected to accommodate additional flood flows in new or expanded floodplain areas.

Upland areas in the Delta are best characterized as lands well above current sea level (i.e., greater than five feet in elevation, depending on location). Aquatic habitats in this category include seasonally-inundated floodplain, seasonal wetlands (including vernal pools), and ponds, while terrestrial habitats in this category include riparian areas, perennial grasslands, and inland dune scrub, as well as agricultural lands. Protecting and creating a mosaic of different upland habitat types that are well distributed, and connected to other natural communities is important for maintaining genetic diversity of the numerous species which use these areas for all or part of their life cycles. The aquatic and terrestrial habitat types that comprise upland areas often co-occur (e.g., agricultural lands that are seasonally inundated to benefit waterfowl, and perennial grasslands that support vernal pools). Thus, this habitat category highlights the importance of preserving and enhancing a diversity of habitats in support of numerous species and ecological processes, as well as allowing the system to respond to drivers of change such as sea level rise.

Stage 2 Actions for Upland Areas:

Action 1: Acquire land and easement interests from willing sellers in the East and South Delta that will accommodate seasonal floodplain areas, and shifts in tidal and shallow subtidal habitats due to future sea level rise.

Action 2: Conduct research to determine scale and balance of flow, sediment, and organic material inputs needed to restore riverine ecosystem function.

Action 3: Develop a better understanding of species-habitat interactions, species-species interactions, and species responses to variable ecosystem conditions in order to better determine natural versus human-induced responses of upland habitat restoration.

Action 4: Determine contaminant and runoff impacts of agriculture and urban areas, and develop predictions of effects on the ecosystem from future expansion of these land uses.

Action 5: Restore large-scale riparian vegetation along waterways wherever feasible, including opportunities for setback levees.

DRAFT

The rationales for protection and enhancement of seasonal wetlands, vernal pools, riparian areas, perennial grasslands, and inland dune scrub are contained in the ERPP, and the reader is encouraged to refer to these volumes for more information (CALFED 2000b). For the purposes of this Conservation Strategy, the discussion on restoring upland habitats will be focused on seasonally-inundated floodplains and protection of agricultural and open space lands for wildlife-compatible uses.

With increasing sea level, global warming, and regional climate change, uplands adjacent to Delta tidal fresh and brackish wetlands will be important for future uphill colonization of these wetlands. In light of these expected changes, protection of uplands from ongoing conversion to urban uses should be a high priority to allow adaptation to climate change and maintain sustainable natural aquatic communities into the future.

Much has been learned since 2000 about creating habitats in upland areas, particularly with respect to seasonally-inundated floodplains and their importance to many of the Delta's aquatic species. As knowledge has increased, the risk and uncertainty associated with restoring this habitat is decreasing. Thus, restoration of seasonally-inundated floodplains is a very high priority for the Delta in the near term.

Delta Floodplain. A natural floodplain is an important component of rivers and estuaries that allows many essential ecological functions to occur. Healthy floodplains are morphologically complex. They include backwaters, wetlands, sloughs, and distributaries that carry and store floodwater. Floodplain areas can constitute islands of biodiversity within semi-arid landscapes, especially during dry seasons and extended droughts. The term *floodplain* as used here means the generally flat area adjoining rivers and sloughs that are inundated every 1.5 to 2 years when flows exceed the capacity of the channel (bank full discharge). Peak flows in winter and spring that occur every 1.5 to 2 years are considered by river geomorphologists to be the "dominant discharge" that contributes the most to defining the shape and size of the channel and the distribution of sediment, bar, and bed materials. Larger flood events can cause major changes to occur, but they do not happen often enough to be the decisive factor in river geomorphology.

Floodplain areas have the potential to support highly productive habitats, as they represent a heterogeneous mosaic of habitats including riparian habitat, freshwater tidal marsh, seasonal wetlands, perennial aquatic, and perennial grassland habitats, in addition to agricultural lands. During inundation floodplains are used by numerous native fish for spawning and early growth (Moyle 2002). There has been extensive research on the Yolo Bypass and lower Cosumnes River, in addition to some research in the Sutter Bypass, indicating that native resident and migratory fish show a positive physiological response (i.e., enhanced growth and fitness) when they have access to floodplain habitats (Moyle et al. 2004, Ribeiro et al. 2004, Moyle et al. 2007), which likely benefits them as they complete subsequent stages of their respective life cycles. Inundated floodplain areas provide important spawning and rearing habitat for splittail and rearing habitat for juvenile Chinook salmon (Sommer et al. 2001, Sommer et al. 2002, Moyle et al. 2007). Splittail need about 30 consecutive days of floodplain inundation to produce good survival through the larval stage and survival improves with longer durations (Moyle et al. 2004). Without access to adequate floodplain spawning habitat, splittail reproduction declines drastically as seen during the late 1980s and early-1990s.

Managing the frequency and duration of floodplain inundation during the winter and spring, followed by complete drainage by the end of the flooding season, could favor native fish over non-natives (Moyle et al. 2007, Grimaldo et al. 2004) and reduce nuisance insect problems. Frequency, timing, and duration of inundation are important factors that influence ecological benefits of floodplains. To favor splittail recruitment and benefit salmon fry and smolt growth, DFG recommends during above normal and wet years, once 10 days of floodplain inundation have been achieved based on runoff and discharge from upstream reservoirs between January 1 and May 30, then reservoir

DRAFT

discharges should be continued to maintain uninterrupted inundation for at least 30 days in the Yolo Bypass and at suitable locations in the Sacramento River or the San Joaquin River (DFG 2010b).

Studies on the Cosumnes and Sacramento Rivers indicate that dynamic processes are needed to support complex dynamic riparian habitats and upland systems which form the floodplain habitat (Moyle et al. 2007). Native plants and animals have adapted to the random brief floodplain events that are characteristic of California's hydrology. Riparian habitats would be a component of these future restoration actions. Extant riparian habitats exist along levees and at the higher elevations in intertidal habitats, and in floodplain habitats – usually on fluvial soils or where levees are created with a mineral soil. The voluntary recruitment of this habitat type on Prospect Island and the higher elevation areas of Liberty Island and Little Holland Tract underscore the proclivity of natural restoration when proper soil conditions and elevation occur.

Stage 2 Actions for Floodplains:

Action 1: Continue coordination with Yolo Basin Foundation and other local groups to identify, study, and implement projects on public or private land with willing participants, to create regionally significant improvements in habitat and fish passage.

Action 2: Continue implementing projects at the Cosumnes River Preserve, such as restoring active and regular flooding regimes and flood riparian forest habitat; measuring flora and fauna response to restoration; and monitoring surface and groundwater hydrology and geomorphic changes in restored areas.

Action 3: Pursue opportunities for land and easement acquisitions in the Yolo Bypass and along the lower Cosumnes and San Joaquin Rivers, which could be utilized as floodplain inundation areas in the near term or in the future.

DRAFT

Research on the Cosumnes River also shows the many ecosystem benefits that floodplains provide. The Cosumnes River is the only remaining unregulated river on the western slope of the Sierra Nevada. The Cosumnes River Preserve comprises 46,000 acres. The free-flowing nature of the river allows frequent and regular winter and spring overbank flooding that fosters the growth of native vegetation and the wildlife dependent on those habitats. In addition to the value of floodplain habitat to the Delta's native species, floodplains are believed to enhance the estuarine food web, as they support high levels of primary and secondary productivity by increasing residence time and nutrient inputs into the Delta (Sommer et al. 2004). Ahearn et al. (2006) found that floodplains that are wetted and dried in pulses can act as a productivity pump for the lower estuary. With this type of management, the floodplain exports large amounts of Chlorophyll *a* to the river. Floodplain habitat on the Cosumnes River Preserve has been shown to provide many benefits to native fish (Swenson et al. 2003, Ribeiro et al. 2004, Grosholz and Gallo 2006, Moyle et al. 2007).

Because floodplain areas are inundated only seasonally, many other habitat types that occur in upland areas can be accommodated on floodplains when high winter and early spring flows are not present. The Department of Water Resources Flood Protection Corridor Program provides grant funding to local agencies and nonprofit organizations for nonstructural flood management projects that include wildlife habitat enhancement and/or agricultural land preservation, and acquisition of flood easements. Such easements provide a way to bring floodplain benefits to species seasonally, while also

accommodating agricultural production in summer, fall, and early winter. Delta crops such as rice, grains, corn, and alfalfa provide food for waterfowl and other terrestrial species, and, with appropriately timed plowing and harvest, may serve as surrogate habitat in the absence of historical habitat such as tidal marsh. From Highway 99 west to the Cosumnes River Preserve is a good example of an area that provides a wildlife-friendly agriculture mix. It is the largest conservation easement acquisition funded by ERP during Stage 1. The ERP also provided funding for planning activities or property acquisitions and restoration of wildlife friendly agriculture in the Yolo Bypass, along the Cosumnes River, and along the San Joaquin River near Mossdale Crossing.

Although the benefits of floodplains have been demonstrated, there are several cautions related to restoring seasonal floodplains:

- Restoration must incorporate as much natural connection with the river as possible, to reduce potential stranding of native fish. Large-scale flooding events also help reduce stranding by creating channels on the landscape which allow for natural drainage, and multiple pulse flows help ensure fish receive the migratory cues they need. Deep drainage canals or other unnatural scour holes deeper than a couple feet should be removed. Such areas remain too cool during drainage and don't provide the emigration cues needed for most fishes.
- The periodic wetting and drying of floodplain areas make these areas especially prone to methylmercury production and transport. Within the context of the Delta Total Maximum Daily Load (TMDL) for methylmercury that is currently being developed, floodplain restoration activities should include the investigation and implementation of Best Management Practices (BMPs) to control methylmercury production and/or transport.

Delta-Upland Transitional Corridor. The establishment of a corridor of protected agricultural and natural lands is needed to protect valuable habitats and to facilitate the movement of wildlife between the the Delta's Cache Slough area and the Denverton Slough in Suisun Marsh, this area currently contains a mosaic of perennial grasslands and vernal pool areas, and has been identified by local planners as having great potential for ecological benefits from restoration.

Dune Scrub Habitat. Two ERP grants have been used to fund surveys to locate potential habitat restoration sites capable of supporting Antioch dunes evening primrose, Contra Costa wallflower, and Lange's metalmark butterfly. Potential areas were located and are being assessed for enhancement, but no enhancement has been funded nor have funds for annual monitoring and reporting been identified. Continued evaluation and enhancement of dune scrub habitat is needed during Stage 2 implementation.

Delta and Suisun Marsh Intertidal Areas. Tidal marshes across North America have been shown to play a critical role for native fish by providing improved foraging opportunities, increased growth, and refuge from predators (Boesch and Turner 1984, Baltz et al. 1993, Kneib 1997, Madon et al. 2001). The tidal marshes of the Delta have

DRAFT

received relatively little study; however, research conducted in the San Francisco Estuary and elsewhere along the Pacific coast has shown tidal marsh benefits to native fish, especially salmonids (Simenstad 1982, West and Zedler 2000, Bottom et al. 2005, Maier and Simenstad 2009).

Intertidal areas in the Delta are best characterized as lands between one and seven feet above sea level, depending on location (Figure 4). All lands in the intertidal range are assumed to have the ability to support some tidal marsh habitats (either brackish or freshwater) with associated mudflats, sloughs, channels, and other open water features. Some areas are capable of supporting large areas of contiguous habitat, and others may support only small patches (e.g., mid-channel islands and shoals). Properly functioning tidal marsh habitats have subtidal open water channels with systems of dendritic and progressively lower-order intertidal channels that dissect the marsh plain. These diverse habitats provide structure and processes that benefit both aquatic and terrestrial species.

ERPP Vision for Saline Emergent Wetland: Increase the area and protect the quality of existing saline emergent wetlands from degradation or loss. Wetland habitat will be increased to assist in the recovery of special-status plant, fish, and wildlife populations. Restoration will provide high-quality habitat for other fish and wildlife dependent on the Bay-Delta.

ERPP Vision for Fresh Emergent Wetland: Increase the area and improve the quality of existing fresh emergent wetlands from degradation or loss and increase wetland habitat. Achieving this vision will assist in the recovery of special-status plant, fish, and wildlife populations, and provide high-quality habitat for other fish and wildlife dependent on the Bay-Delta.

ERPP volume 1, July 2000

The rationales for protection and enhancement of fresh and brackish tidal marsh areas are contained in the ERPP, and the reader is encouraged to refer to these volumes for more information (CALFED 2000a). For the purposes of this Conservation Strategy, the discussion on restoring habitats in intertidal areas will focus on what has been learned about the importance of these areas since 2000, particularly as it relates to various species' use of tidal marsh areas and the role of these areas in enhancing the aquatic food web.

Studies of species' use of tidal marsh habitat in the Delta are limited, but ERP and other programs have conducted several studies since the ROD that continue to augment knowledge regarding the role of intertidal habitats for desirable aquatic species. The largest effort to study tidal marsh habitat in the Delta and its benefits to native fish was a series of projects known as the BREACH studies (Simenstad et al 2000), which investigated geomorphology, sedimentation, and vegetation at four reference sites and six restored tidal marsh sites in the Delta. Of the one reference and three restored sites sampled for fish and invertebrates, relative density of both native and introduced fish species was higher at the reference marsh (Simenstad et al. 2000). Although all of the sites were dominated by the introduced fish, the abundance of native fish was highest in winter and spring (Grimaldo et al. 2004). In stomach content analyses, all life stages of chironomids (midges) were shown to be a very important food source for fish, both adjacent to tidal marsh habitats and in open water areas. Chironomid association with marsh vegetation indicates the importance of this habitat to the aquatic food web.

DRAFT

Overall abundance of fish larvae was highest in marsh edge habitat when compared to shallow open water and river channels (Grimaldo et al. 2004). Unfortunately, the BREACH study sites are not representative of the Delta's large historical marshes. Most sites are small and severely degraded areas located along the edge of levees or on small channel islands.

An example of an ongoing study of species use of tidal marsh within intertidal land elevations is the ongoing monitoring associated with restoration of Liberty Island, a 5,209-acre island in the northern Delta that breached naturally nearly ten years ago. The Liberty Island project provides a good example of passive restoration of various habitat types, including some deeper, open water, subtidal, areas at the southern end and freshwater emergent tidal marsh and sloughs with riparian habitat at the higher elevations at the northern end. Liberty Island's sloughs are populated with otters, beavers, muskrats, and numerous species of ducks and geese. Native fish species using the area include Chinook salmon, splittail, Longfin and delta smelt, tule perch, Sacramento pike minnow, and starry flounder. In some areas, native species account for up to 21 percent of the fish collected; for reference, native species only account for approximately 2 to 10 percent elsewhere (Malamud-Roam et al. 2004). Ongoing monitoring at Liberty Island for almost eight years is showing that fish species assemblages at this restored area increasingly resemble assemblages at reference marsh sites. The ERP hopes to build upon the success of this restoration project by increasing the size of the project and developing a dendritic channel system on its interior (DFG 2008b).

In many estuaries of the Pacific Northwest, including the Columbia and Fraser river estuaries, Chinook salmon fry usually occupy shallow, near shore habitats including tidal marsh, where they feed and grow and adapt to salt water (Healey 1982; Levy and Northcote 1982; Simenstad et al. 1982). They often move far up into tidal wetlands on high tides, and may return to the same channels on several tidal cycles (Levy and Northcote 1982). In estuaries throughout Washington, subyearlings and fry occur mainly in marshes when these habitats are available (Simenstad et al. 1982). Tidal marsh restoration has been shown to result in recovery of life history diversity in the Salmon River estuary of Oregon. Tidal marsh habitat in this estuary had largely been lost due to diking by the early 1960s (Gray et al. 2002). In surveys conducted in the mid-1970s, Chinook salmon juveniles were found to rear in the estuary only to a limited extent during the spring and early summer months (Bottom et al. 2005b). Three sites in the estuary were restored to tidal action between 1978 and 1996 and by the early 2000s juvenile salmon were making extensive use of restored marsh habitats for rearing, with estuarine resident times up to several months (Bottom et al. 2005b). Tidal marsh restoration expanded life history variation in the salmon population; the amount of time spent rearing in the estuary was variable and juveniles moved into the ocean over a broad range of time and at a broad range of sizes (Bottom et al. 2005b). Chinook salmon show remarkable phenotypic plasticity in their ability to adapt to new locations and form multiple life history types from a single introduction of fish (Williams 2006); with restoration of tidal marsh in the Delta, Chinook salmon in the Sacramento and San Joaquin rivers may be able to regain varied life history types over time.

DRAFT

A number of additional studies are demonstrating that regardless of species actual use of tidal marsh areas, these habitats could be extremely important for their possible role in augmenting the Delta's aquatic food web, particularly in the saline portion of the estuary.

- Tagging and stomach content studies show that Chinook salmon fry may use intertidal habitat. According to Williams (2006), tagged hatchery fry remain in the Delta up to 64 days and tend to occupy shallow habitats, including tidal marsh. Stomach contents of salmon rearing in the Delta are dominated by chironomids and amphipods, suggesting that juvenile salmon are associated with marsh food production. Juvenile salmon in the Delta also undergo substantial growth (Kjelson et al. 1982, Williams 2006). These findings coincide with studies elsewhere in the Pacific Northwest (Healey 1982, Levy and Northcote 1982, Simenstad et al. 1982), which found that Chinook salmon fry usually occupy shallow, near-shore habitats including tidal marshes, creeks, and flats, where they feed and grow and adapt to salt water (Healey 1982; Levy and Northcote 1982; Simenstad et al. 1982), and that they often move into tidal wetlands on high tides and return to the same channels on several tidal cycles (Levy and Northcote 1982). Also, in estuaries throughout Washington, subyearlings and fry occur mainly in marshes when these habitats are available (Simenstad et al. 1982). In fact, Healey (1982) identified freshwater tidal marshes as the most important habitat to juvenile salmon in the Pacific Northwest. More recently, in the Columbia River estuary, emergent tidal marsh has been shown to support the greatest abundance of insects and highest stomach fullness scores for juvenile salmon, with chironomids again being the dominant prey type (Lott 2004).
- In a study of carbon types and bioavailability, tidal marsh sloughs in Suisun Bay had the highest levels of dissolved, particulate, and phytoplankton-derived carbon (Sobczak et al. 2002). Chlorophyll *a* concentration, used as a measure of standing crop of phytoplankton, was highest in tidal sloughs and supports the greatest zooplankton growth rate (Mueller-Solger et al. 2002) when compared to other habitat types, such as floodplains and river channels. High levels of primary production (as measured by Chlorophyll *a*) seen in several regions in the interior of Suisun Marsh are likely due to high residence time of water, nutrient availability, and absence of non-native clams (DFG 2008b).
- Modeling (Jassby et al. 1993 and Cloern 2007) and empirical studies (Lopez et al. 2006) show that productivity from high-producing areas, such as marsh sloughs, is exported to other connected habitats. Phytoplankton biomass location is only weakly correlated with phytoplankton growth rates across several aquatic habitats. Therefore other processes, including mixing and transport, are important in determining phytoplankton distribution in the Delta. The data shows that Suisun Marsh plays a significant role in estuarine productivity by providing an abundant source of primary production and pelagic invertebrates, both of which are significantly depleted in bay and river channel areas (DFG 2008b).

Tidal marsh may also help improve the pelagic food web by reducing the concentration

DRAFT

of ammonium in the water. Ammonium has been shown to inhibit phytoplankton blooms in Suisun Bay and possibly other open-water habitats in the Delta by inhibiting the uptake of nitrate by diatoms (Wilkerson et al. 2006, Dugdale et al. 2007). In a nutrient-rich estuary in Belgium, tidal freshwater marsh was shown to transform or retain up to 40 percent of ammonium entering the marsh during a single flood tide (Gribsholt et al. 2005). Nitrification (the conversion of ammonium to nitrate) accounted for a large portion of the transformation (30 percent). Nitrification rate in the marsh system was measured at 4 to 9 times that which occurs in the adjacent water column (Gribsholt et al. 2005). Increased tidal marsh habitat may, therefore, improve the base of the aquatic food web in the Delta by increasing primary production within the marshes, and by increasing the ratio of nitrate to ammonia in the estuary.

At the outset of ERP, restoration of intertidal and shallow subtidal areas (at that time, termed “shallow water habitat”, defined as water less than two meters in depth at mean lower low water) was a very high priority, and based on what has been learned since 2000, continues to be a very high priority for the Delta. However, the extensive spread of non-native submerged aquatic vegetation (SAV) in intertidal and shallow subtidal areas renders them less suitable for native fish (Nobriga et al. 2005, Brown and Michniuk 2007, Nobriga and Feyrer 2007). Brown and Michniuk (2007) reported a long-term decline in native fish abundance relative to non-native fish. This decline in native fish abundance occurred coincident with the range expansion of non-native SAV (principally *Egeria densa*) and non-native black bass (centrarchids), both of which are discussed further in the Stressors section below. Predation by largemouth bass is one mechanism hypothesized to result in low native fish abundance where SAV cover is high (Brown 2003, Nobriga et al. 2005). Largemouth bass have a higher per-capita predatory influence than all other piscivores in SAV-dominated intertidal zones (Nobriga and Feyrer 2007). Restoration of Delta intertidal habitats must, therefore, be designed and managed to discourage non-native SAV, or native fish may not benefit from them (Grimaldo et al. 2004, Nobriga and Feyrer 2007).

In summary, restoration of tidal marsh areas in the Delta remains a very high priority for the ERP; however, several cautions must be kept in mind. A major concern is that restored tidal marsh would be colonized by non-native species, which would in turn limit the benefits to native species. Another potential constraint facing the restoration of intertidal habitats is the methylation of mercury in sediments. Therefore, restoration of tidal marsh within intertidal land elevations should be designed as large-scale experiments, and should be rigorously monitored to establish relationships between this habitat and species population abundance. As this information continues to be collected and synthesized, the risk and uncertainty associated with restoring this habitat are expected to decrease.

Subsided Delta Lands and Deep Open Water Areas. Subsided land areas in the Delta are best characterized as land well below current sea level (below approximately six feet in elevation), and include both terrestrial areas (islands that have subsided over time) and deep open water areas (subsided islands that flooded in the past and were never reclaimed). Aquatic habitats in this category include seasonal wetlands and

DRAFT

ponds that occur within subsided land areas, in addition to deep open water areas that occur on flooded islands such as Franks Tract and Mildred Island (also called pelagic habitat).

Stage 2 Actions for Subsided Lands/Deep Open Water Areas:

Action 1: Implement wildlife-friendly agriculture and wetland projects.

Action 2: Secure easements and land interests on which subsidence reversal projects can occur.

Action 3: Continue research on the creation and management of deep open water areas (e.g., Liberty Island) to evaluate physical and biological properties and species use.

With increasing sea level, global warming, and regional climate change, the existing configuration of Delta levees and deeply subsided islands are not expected to remain intact over the long term. A forecast rise in sea level of approximately 55 inches over the next 50-100 years (Cayan et al. 2009) is expected to increase pressure on the Delta's levee system. Changes in regional climate and the shift of tributary peak runoff from spring to winter are expected to make extreme winter runoff events more frequent and intense, further compounding pressure on Delta levees seasonally. In light of these expected changes, in addition to human-induced impacts (e.g., increased runoff from continued conversion of open space lands to urban uses), there is a considerably higher likelihood of Delta levee failure and subsequent island flooding in the future. ERP implementation must therefore adapt to these expected pressures, including planning for optimizing the value of newly-flooded deep islands for the aquatic species that may utilize them in the future.

Terrestrial areas in this category include mainly agricultural lands, some of which are not in active agricultural production. Central Valley Joint Venture (2006) recognizes that agricultural easements to maintain waterfowl food supplies and buffer existing wetlands from urban development may become increasingly important in basins where large increases in human populations are predicted. In addition, ongoing rice cultivation may help minimize subsidence. Subsidence reversal, carbon sequestration, and wildlife-friendly agricultural projects are appropriate on these deep islands in the near term, as they are expected to provide benefits to the local economy, wildlife, and waterfowl while protecting lands from uses that may be unsustainable over the longer term.

The rationales for protection and enhancement of seasonal wetlands and wildlife-friendly agriculture are contained in the ERPP, and the reader is encouraged to refer to these volumes for more information (CALFED 2000b). For the purposes of this document, the discussion on restoring habitats on subsided lands will be focused on subsidence reversal and carbon sequestration, and on continuing to research and restore deep open water areas for the Delta's pelagic fish species, as these deep open water habitat types are known to be important, positively or negatively, for individual native pelagic fish species.

Delta Subsidence Reversal. The exposure of the bare peat soils to air causes oxidation and decomposition, which results in subsidence, or a loss of soil elevation, on Delta islands. Flooding these lands and managing them as wetlands reduces their exposure to oxygen, so there is less decomposition of organic matter, which stabilizes

DRAFT

land elevations. Wetland vegetation cycles lead to biomass accumulation, which sequesters carbon and helps stop and reverse subsidence (Fujii 2007). As subsidence is reversed, land elevations increase and accommodation space (the space in the Delta that lies below sea level and is filled with neither sediment nor water), on individual islands is reduced (Mount and Twiss 2005). A reduction in accommodation space decreases the potential for drinking water quality impacts from salinity intrusion in the case of one or more levee breaks on deeply subsided Delta islands.

A pilot study on Twitchell Island funded by the ERP in the late 1990s investigated methods for minimizing or reversing subsidence. The study showed that by flooding soils on subsided islands approximately one foot deep, peat soil decomposition is stopped, and conditions are ideal for emergent marsh vegetation to become established. In the Twitchell Island pilot project, researchers saw some initial soil accumulation during the late 1990s and early 2000s, and noted that accretion rates accelerated and land surface elevation began increasing much more rapidly after about seven years, as plant biomass was accumulated over time. Land surface elevation is estimated to be increasing at an annual rate of around four inches, and is expected to continue to increase (Fujii 2007).

The USGS is interested in implementing a subsidence reversal program Delta-wide, given the results of their Twitchell Island pilot study. Such a program would involve offering financial incentives to landowners to create and manage wetland areas on their lands (Fujii 2007). Large-scale, whole-island approaches to reversing subsidence would be beneficial for multiple purposes. Programs that offer incentives for 10- or 20-year studies for subsidence reversal on large tracts of land could help improve Delta levee stability and reduce the risk of catastrophic failure. Assuming that accretion rates continue at about four inches annually, estimates suggest a 50 percent reduction in accommodation space in 50 years if subsidence could be pursued throughout the Delta. This reduction in accommodation space jumps to 99 percent over the next 100 years (Fujii 2007). Some deeply subsided lands could also be used as disposal sites for clean dredged sediments, providing local flood control improvements while helping raise land elevations on subsided islands more quickly. This accommodation space reduction, in addition to helping stabilize levees over the longer term, would create additional areas for restoration of additional tidal marsh habitat.

While the primary objectives of creating wetlands on deep Delta islands would be to reverse subsidence and sequester carbon, there would be significant ancillary benefits to wildlife such as waterfowl. Delta agricultural lands and managed wetland areas provide a vital component to Pacific Flyway habitat for migratory waterfowl by increasing the availability of natural forage, ensuring improved body condition and breeding success (CALFED 2000b).

Deep Open Water Habitat. All permanent aquatic habitats in the Delta are occupied by fish of some type. In planning for restoration of Delta aquatic habitats, it is important to consider which fish will occupy which habitat and when; and what type of benefits fish will gain from the habitat. Fish assemblages in the Delta, each with a distinct set of

DRAFT

environmental requirements, include native pelagic species (e.g., delta and longfin smelt), freshwater planktivores, dominated by non-native species such as threadfin shad and inland silverside; anadromous species (e.g., salmon and steelhead), slough-residents associated with beds of SAV (e.g., centrarchide), and freshwater benthic species (e.g., prickly sculpin) (Moyle and Bennett 2008). Habitat diversity is necessary to support multiple fish assemblages in the Delta. Restoration efforts need to focus on creating habitats required by desirable species, while avoiding habitats dominated by undesirable species.

With the increasing threats of levee failure from continuing land subsidence, exacerbated by sea level rise, higher seasonal runoff, and random events such as an earthquake, the Delta is likely to have more large areas of deep, open water in the future (Moyle and Bennett 2008). Important attributes to manage to increase habitat variability and provide improved water quality conditions include salinity, contaminant inputs, and connectivity to surrounding habitats (Moyle and Bennett 2008). Fish assemblages will respond differently to future environmental changes.

New open water habitats may also result from intentional activities on a smaller and more managed scale than whole-island flooding. The intentional removal of levees on islands at the periphery of the Delta in order to create marsh habitat on intertidal land elevations would result in open water below the tidal zone similar to that which is developing at Liberty Island. Exchange of materials between the restored tidal marsh and adjacent open water could result in higher productivity in open water habitat. As mentioned in the discussion on tidal marsh restoration, the potential for SAV dominated by non-native species to establish in new shallow water environments is a concern. On Liberty Island, SAV has not become a dominant component of the open water habitat. This may be a result of tidal flow velocities, wind-induced disturbance and high turbidities, or some other factor. Continuing research and monitoring of the Liberty Island project will improve understanding of the dynamics of a large island breach at the periphery of the Delta, and help plan for future marsh or open water restoration projects.

There are many uncertainties related to future characteristics of flooded island and open water habitats (Moyle and Bennett 2008). These include configuration and location of flooded islands; physical properties such as depth, turbidity, flow, and salinity; biological properties such as productivity of phytoplankton and copepods; and susceptibility to invasion by non-native species such as *Egeria densa*, centrarchids, and invasive non-native clams. Adaptive management, combined with large-scale experimentation on new open water habitat, would help to reduce uncertainties. This could occur through the planned flooding of at least one Delta island, or through an organized study plan that would go into effect in the event of an unplanned levee breach (Moyle and Bennett 2008).

DRAFT

Attachment C-4
Appendix H from the Fifth Staff Draft Delta Plan

Appendix H

Delta Levees Special Flood Control Projects. Final Near-Term Guidelines for Providing Funding to Local Public Agencies. Department of Water Resources, February 2010

Delta Levees
Special Flood Control Projects

Final

Near-Term Guidelines
For
Providing Funding to Local Public Agencies

Department of Water Resources
Delta Suisun Marsh Office
February 2010

TABLE OF CONTENTS

Page

I. INTRODUCTION 1
II. DEFINITIONS AND ACRONYMS 3
III. NO-REGRETS PROJECTS 6
IV. AVAILABLE FUNDING 7
V. ELIGIBLE PROJECTS 8
VI. INELIGIBLE PROJECTS 9
VII. ELIGIBLE COSTS 10
VIII. INELIGIBLE COSTS 10
IX. FIVE-YEAR PLANS 11
X. APPLICATION PROCESS 12
XI. REQUIRED APPLICATION MATERIALS 12
XII. SUBMITTAL DEADLINE 14
XIII. PROJECT ELIGIBILITY CRITERIA 14
- A. HMP Project Eligibility Requirements 15
- B. Delta Specific PL 84-99 Project Eligibility Requirements 16
- C. Delta Aqueduct Project Eligibility Requirements 16
- D. Habitat Project Eligibility Requirements 17

XIV. PROJECT SELECTION CRITERIA 18
- A. HMP Project Selection Criteria 18
- B. Delta Specific PL 84-99 Project Selection Criteria 19
- C. Delta Aqueduct Project Selection Criteria 20
- D. Habitat Project Selection Criteria 22

XV. COST SHARE FORMULA 23
- A. HMP Project Cost-Share: 23
- B. Delta Specific PL 84-99 Project Cost-Share: 23
- C. Delta Aqueduct Project Cost-Share: 26
- D. Habitat Project Cost-Share: 26

XVI. DIRECTED ACTIVITIES 27
XVII. RESERVE FUND 27
XVIII. PROJECT ADMINISTRATION 27

EXIBITS
- A. Requirements for the Five-Year Plan
- B. Typical Levee Cross-Sections
- C. Local Agency Benefit Assessment

I. INTRODUCTION

The Delta Levee Special Flood Control Projects Program (the Program or Special Projects) was established in 1988 by Senate Bill 34. It continues to operate under subsequent legislation that extended and provided funding for the program. Originally, the Program was authorized to address flooding on the eight Western Delta Islands and in the towns of Thornton and Walnut Grove. In 1996, Assembly Bill 360 expanded the Program to include the entire Delta and to portions of Suisun Marsh (approximately 12 miles of levees on islands bordering the Northern Suisun Bay from Van Sickle Island westerly to Montezuma Slough) as outlined in Section 12311 of the California Water Code. Today, any Local Agency with a Project or Non-Project levee in the Primary Zone of the Delta or a Non-Project levee in the Secondary Zone of the Delta is eligible to submit proposals and apply for the Special Projects fund.

The State, through the Delta Levees Maintenance Subventions Program and Delta Levees Special Flood Control Projects, has invested over $200 million in flood control and habitat projects carried out by Local Agencies in the Delta. Department of Water Resources (Department or DWR) funding has been dedicated to maintaining and improving the aging Delta levees. Under California Water Code Section 12314, the Program must not only mitigate the habitat impacts of each Project it funds, but must also ensure that the Program creates a result of a net long-term habitat improvement in the Delta. With the passage of Proposition 1E and Proposition 84 in November 2006, the amount of money potentially available for levee projects in the Delta has significantly increased.

In January 2009, the Department published the Interim Guidelines for Providing Funding to Local Agencies in the Delta (Interim Guidelines) for expenditure of Propositions 1E and 84 funds. Those Guidelines governed work authorized in Fiscal Year 2008-09.

This document contains the Department's Near-Term Special Projects Guidelines. The Near-Term Guidelines represent the next phase in the Guidelines process and govern Special Projects expenditure of funds appropriated through Senate Bill X2 1, Senate Bill X7 8, and other funds available to the Program during Fiscal Years 2009-2010 and 2010-2011.[1] After that time, the Department anticipates issuing Long-Term Guidelines which will govern Special Projects funding for the duration of Propositions 1E and 84.

[1] The Near-Term Guidelines only cover funding of competitive proposals the Department solicits from Local Agencies through a Projects Solicitation Package. The Department will also directly expend funds for Special Projects in cooperation with Local Agencies. The internal policies the Department will apply to "direct expenditure" Projects are discussed in these Guidelines at section XVI. In addition, the Department reserves the right to increase the funding for previously approved Projects with executed Project Funding Agreements by amending the Funding Agreement *after* reassessing those Projects to determine continuing consistency with these Guidelines in order to complete those Projects in a timely manner.

Senate Bill X2 1 authorizes a total of $235 million from Propositions 1E and 84 for various flood related projects. The Department expects that additional funds will be available through the State budget process for this program through Fiscal Year 2010-2011.

Additionally, Senate Bill X7 8 authorizes DWR to spend $202 million ($32 million from Proposition 84 and $170 million from Proposition 1E) for flood protection projects in the Delta to reduce the risk of levee failures that would jeopardize water conveyance.

These Near-Term Guidelines implement several important DWR goals, including, but not limited to

- protecting statewide interests through raising delta levees to HMP;
- protecting life and infrastructure through other levee improvements, such as selectively funding construction of levees that offer advanced (Delta Specific PL 84-99) levels of protection;
- funding studies and research that help to characterize the Delta levees, deepen the Department's understanding of levee stability issues, or further the goals of subsidence reversal;
- funding habitat mitigation and enhancement Projects to benefit the Delta ecosystem and statewide interests; and
- funding subsidence reversal work.

The implementing legislation and these DWR goals reflect a variety of potential Projects. As a result, each application must meet certain common eligibility and other requirements, but will have category-specific (i.e. HMP, Delta Specific PL 84-99, Habitat, etc.) eligibility requirements, selection criteria, and cost-share formulas.

The Department will release Projects Solicitation Packages (PSP) requesting proposals for a variety of projects including: levee improvement projects, studies and research, and habitat works.

All completed applications will be reviewed, scored[2] and cost-shared according to the requirements common to all Projects and the dictates of the category to which they belong.

The Department will not fund Projects that do not meet the minimum requirements of Water Code Sections 12310 - 12318. Projects funded under these Guidelines may include construction, design, study and/or engineering work, and habitat enhancement.

[2] Scoring criteria will be defined in the Projects Solicitation Packages.

II. DEFINITIONS AND ACRONYMS

“Alternative State Cost-Share:” Refers to the State cost-share determined by the Local Agency’s Local Agency Benefits Assessment (LABA).

“Applicant:” Refers to the agency submitting an application under these Guidelines. Also referred to as “Local Agency.”

“Base State Cost-Share:” Is the amount the State will pay in a given cost-share arrangement assuming the Local Agency does not qualify for an Alternative Cost-Share and has not proposed a Project with any qualifying Enhanced Cost-Share.

"Beneficial Reuse:" Refers to the practice of making beneficial use of dredged materials.

"CEQA:" The California Environmental Quality Act.

"Corps:" The United States Army Corps of Engineers.

"Cost-Share Recommendation and Report:" Refers to the recommendation and report regarding cost-share that the Applicant must include in its Special Projects application.

"Delta:" The area of the Sacramento-San Joaquin Delta as defined in Section 12220 of the Water Code. Also referred to as the "Legal Delta."

"Delta Levee Special Flood Control Projects" or "Special Projects:" Refers to a Project(s) funded under these Guidelines - a Delta Levee Special Flood Control Project, one of the components of the Department's Delta Levees Program codified at Sections 12300 -12318 of Water Code.

"Delta Primary Zone" or "Primary Zone:" Is the Delta land and water area of primary State concern and statewide significance situated within the boundaries of the Delta, as described in Section 12220 of the Water Code, but is not within either the urban limit line or sphere of influence line of any local government's general plan or studies existing as of January 1, 1992. The precise boundary lines of the Primary Zone includes the land and water areas as shown on the map titled "Delta Protection Zones" on file with the California State Lands Commission. Where the boundary between the Primary Zone and Secondary Zone is a river, stream, channel, or waterway, the boundary line shall be the middle of that river, stream, channel, or waterway. The Primary Zone consists of approximately 500,000 acres. Cal. Pub. Resources Code Section 29728.

"Delta Secondary Zone" or "Secondary Zone:" is the Delta land and water area within the boundaries of the legal Delta not included within the Primary Zone, subject to the land use authority of local government, and that includes the land and water areas as shown on the map referenced above. The Secondary Zone consists of approximately 238,000 acres. Cal. Pub. Resources Code Section 29731

“Delta Specific PL 84-99 Design Standards:” See Exhibit B.

"Department or DWR:" The Department of Water Resources.

“Direct Expenditures” or “Directed Activities:” Project expenditures made by the Department that are not necessarily in response to a competitive proposal from a Local Agency, but rather are made to implement Department priorities.

"Eligible Projects:" Refers to Projects eligible for funding under these Guidelines.

"Eligible Project Costs:" The reasonable and necessary actual costs associated with an Eligible Project.

"Eligible Real Estate Capital Outlays:" Refers to real estate costs that are eligible under these Guidelines. In the Special Projects program, real estate costs are generally the responsibility of the Local Agency. For certain Projects, however, particularly Habitat Enhancement Projects, the Department will fund Eligible Real Estate Capital Outlay Costs. Only reasonable real estate costs for land that has been assessed and deemed suitable for its intended purposes by the Department will be eligible.

"Enhanced Cost-Share:" Refers to increased State cost-share (above the Base State Cost-Share or Alternative State Cost-Share) which an Applicant earns by offering Project aspects that qualify it for a higher cost-share under Section XV, below.

"Financial Plan:" Refers to the plan required by these Guidelines that describes, in detail, how the Applicant will fund design, construction, and maintenance of the proposed Project.

"Five-Year Plan" or "Plan:" The Five-Year Plan is a document that describes, in detail, an Applicant's integrated work plan to repair and improve flood protection infrastructure for the next five to ten years in the geographic area controlled by the Applicant.

"Funding Agreement" or "Agreement:" An Agreement entered into by a successful Applicant and the State to provide funds for the Project.

"Habitat Projects:" Refers to a Project under these Guidelines that supports net habitat improvement or habitat banking. This category includes planning and on-going management where appropriate.

“Habitat Bank:” A habitat area created to provide mitigation for unavoidable habitat impacts for multiple projects carried out through the Delta Levees Program. The habitat bank must create transferable credits of habitat, allow transfer of liability for habitat impacts, and develop a system of accounting.

“HMP Design Standards:” See Exhibit B.

"Local Agency:" Means a reclamation district or levee district or other public agency responsible for the maintenance of a Non-Project levee as defined in Water Code Section 12980(e) or a Project Levee as defined in Water Code Section 12980(f).

"Local Agency Benefits Assessment (LABA):" Is the benefits assessment a Local Agency may perform or have performed to derive an Alternative State Cost-Share based on the benefits the proposed Project will provide to the Local Agency, separate from the benefits that the Project offers statewide or to other nearby beneficiaries.

"Local Agency Emergency Response Plan:" Refers to an Emergency Response Plan developed by or for Applicant for emergency response in a particular Reclamation District or area.

"Non-Construction Costs:" Costs associated with engineering, design, permitting, environmental compliance, Eligible Real Estate Capital Outlays and other aspects of the Project that do not include actual construction.

"Non-Eligible Projects:" Projects not eligible for funding under the Special Projects Program.

"Non-Project Levee:" Means a local Delta levee that is not a project facility under the State Water Resources Law of 1945, as shown on page 38 of the Department of Water Resources "Sacramento-San Joaquin Delta Atlas," dated 1993. Section 12980(e) of Water Code.

"No Regrets Projects:" Are Projects that meet the No Regrets requirements outlined in these Guidelines. Generally, these are Projects that the Department sees as an imperative to build even if they are built out of sequence or before all long-term planning has concluded. These Projects will not create Stranded Investments.

"OMRR&R:" Operation, maintenance, repair, replacement, and rehabilitation.

"Project:" Means a proposal for work to be cost-shared by the State under these Guidelines.

"Project Description:" Is the document each Applicant must include with their application that describes the proposed Project in detail. The Project Description must offer as much detail and documentation about the Project as possible, as the eligibility criteria, selection criteria, and cost-share formulae established in these Guidelines require significant specific information to be properly implemented.

"Project Levee:" Is a federal flood control levee, as shown on page 40 of the Department of Water Resources "Sacramento-San Joaquin Delta Atlas," dated 1993, that is a project facility under the State Water Resources law of 1945 (Chapter 1 (commencing with Section 12570) and Chapter 2 (commencing with Section 12639 of Part 6).

"Projects Solicitation Package (PSP):" Refers to the solicitation package the Department will issue to inform Local Agencies that the Department is accepting Special Projects applications. This package also offers Applicants specific information about deadlines, scoring, and more information regarding how to apply for Special Project funding.

"Scope of Work:" After a Project is selected and before a Project Funding Agreement is signed, the Applicant must develop a Scope of Work that provides detailed plans and information about how the Project will be implemented.

"Setback Levee:" A new levee constructed behind an existing levee which allows for removal of a portion of the existing levee and creation of additional floodplain connected to the stream. In the Delta, a Setback Levee may not necessarily result in removal of the existing levee.

"State:" The State of California, acting by and through the Department of Water Resources.

"Stranded Investments:" Are funds committed to Projects that do not eventually contribute to the overall flood protection system or, at the very least, provide lasting benefits that are greater than the Project cost.

III. NO-REGRETS PROJECTS

The Department is developing a long-term levee policy in the Delta that will be adapted as the Delta Risk Management Strategy (DRMS) and a number of other planning processes are finalized, including, but not limited to the Delta Vision Strategic Plan, the Bay Delta Conservation Plan, the CALFED Ecosystem Restoration Program Strategic Plan, the Central Valley Flood Protection Plan, and the Strategic Plan of the State Water Resources Control Board, and the planning processes, such as the Delta Plan, initiated by the enactment of recent Senate Bills signed into the law in November 2009.

Like the January 2009 Interim Special Projects Guidelines, the Department issues these Near - Term Guidelines to continue critical flood protection work in the Delta while Delta-wide planning progresses. As a result these Guidelines require all Projects to be No-Regrets meaning all work funded under these Guidelines must be a strategic action that can immediately take advantage of Senate Bill X2 1 and Senate Bill X7 8 funding or any other Special Projects funding available during the Near-Term period. These actions must not conflict with the current knowledge within the plans (and draft plans) referenced above and will not foreclose future habitat restoration opportunities. Such Projects must not be likely to lead to Stranded Investments.

No-Regrets Projects include levee works and habitat projects that:

- Are clearly legislatively authorized; and
- Protect assets of statewide importance; and

- Ensure no net loss of habitat and are consistent with a net long-term habitat enhancement program.

In addition to these three required components, No Regrets Projects must include one of the following characteristics:

- Repair or improve levee sections that provide protection of public investments; or;
- Improve the levee up to HMP or the Delta Specific PL 84-99 standards as provided for in these Guidelines; or
- Support needed urgent repairs to prevent levee breach or failure; or
- Provide studies or research critical to Delta flood protection issues; or
- Meet the Special Projects habitat enhancement priorities.

In addition, if a Local Agency has any interaction with ongoing flood protection programs it must consider that relationship and detail how it is coordinating this Project with those programs.

IV. AVAILABLE FUNDING

Senate Bill X2 1 authorized DWR to spend $100 million of Proposition 84 funds to improve levee stability, reduce subsidence, and assist in restoring the Delta ecosystem, with a priority on projects that benefit delta smelt and other native fish. It also provides DWR with $35 million in Proposition 1E funds for levee works to protect aqueducts crossing the Delta. Finally, $20 million of the $100 million of Proposition 1E funds dedicated to emergency response and preparedness are authorized by Senate Bill X2 1 to be allocated to the Delta Levees Special Projects to be spent on emergency repairs. The remaining $80 million will be allocated to the Flood Operations Center for emergency response. Senate Bill X7 8 authorizes DWR to spend $202 million ($32 million from Proposition 84 and $170 million from Proposition 1E) for flood protection projects in the Delta to reduce the risk of levee failures that would jeopardize water conveyance. Both Senate Bill X2 1 and Senate Bill X7 8 funded Projects are subject to the approval of the Secretary of the Natural Resources Agency.

The Department expects that additional funds will be available through the State budget process for this program through Fiscal Year 2010-2011.

V. ELIGIBLE PROJECTS

Eligible Projects include levee evaluation, repair and/or improvement and habitat enhancement. Acceptable work is not limited to construction but includes engineering, studies, research, and design. Under these Guidelines, Eligible Projects must meet the No Regrets requirements discussed in Section III, the eligibility requirements, and any additional category-specific requirements discussed in Section XIII.

Eligible Projects in no specific order include, but are not limited to:

- Field Investigations, including electromagnetic survey, topographical survey, or other testing research needed to formulate the Scope of Work;
- Habitat Projects, including restoration and protection that meets program mandates to ensure no net loss of habitat and net habitat enhancement. This includes planning, management, and monitoring.
- Setback Levees, to reduce flood risk for the Local Agency;
- Levee Improvement, to reduce flood risk for the Local Agency;
- Levee Repair, as needed to improve the levee integrity and provide additional flood risk reduction benefits to the Local Agency;
- Emergency Response Planning and Preparedness, planning efforts and flood preparation efforts (such as stockpiling flood fight materials) to support ongoing FloodSAFE Program actions to improve emergency response. Such work should be consistent with the Department's Delta Specific Flood Emergency Operation Plan that is currently under development.
- Engineering Analysis and Design work, needed to pursue a Project;
- Environmental Permitting and Planning work. This work includes preparing CEQA or NEPA documents, obtaining other environmental permits (e.g., USACE, FWS, or DFG permits), preparing and filing environmental documents related to a specific project or developing programmatic documents for future projects;
- Planning Studies, to better understand the future flood control needs of the Local Agency;
- Scientific Studies and Research, to assist the Department and Local Agency to better understand Delta characteristics such as subsidence or ecosystem restoration related to improvement of levees to HMP or Delta Specific PL 84-99 standards;

- Beneficial Reuse Projects, to assist federal, State, and Local Agencies to promote the Beneficial Reuse of clean dredged materials for levee rehabilitation and habitat enhancement projects as appropriate, related to improvement of levees to HMP or Delta Specific PL 84-99 standards;

- Water Projects, a project to improve/reinforce levees that protect water supply and quality, to the extent that such Projects are a component of a larger Project intended to raise a levee to HMP or Delta Specific PL 84-99 standards or protect Delta aqueducts; and

- Development of a Five-Year Plan, for rehabilitation, repair or improvement of a Local Agency's facilities to a desired levee standard or level of protection.

VI. INELIGIBLE PROJECTS

Ineligible Projects include projects which do not meet eligibility requirements and those directly related to work on agricultural, water supply and waste disposal facilities. Such Projects generally do not meet the primary purpose of the Special Projects and the intent of California Water Code Section 12311: "the [flood] protection of discrete and identifiable public benefits, including the protection of public highways and roads, utility lines and conduits, and other public facilities, and the protection of urbanized areas, water quality, recreation, navigation, and fish and wildlife habitats, and other public benefits."

Under these Guidelines Ineligible Projects might also include Projects that do not meet the No Regret requirements, but might otherwise be eligible. To the extent a Project appears ineligible but actually may meet the intent of Water Code Section 12311, the Department retains discretion to approve the Project. Examples of Projects that are not eligible include, but are not limited to:

- Drainage projects when the scope of the proposed Project is the responsibility of the Local Agency as part of its routine maintenance work;

- Irrigation projects;

- Projects that support agricultural operations, such as repair of pumping stations, or routine maintenance activities, such as maintaining drainage ditches that are the responsibility of the Local Agency;

- Water supply projects to develop or repair facilities for the purpose of water delivery within the jurisdiction of the Local Agency (Projects increasing protection of water supply facilities are eligible);

- Projects that do not meet the No Regrets requirements discussed above; and

- Waste disposal projects to develop or repair conveyance facilities for the purpose of waste disposal within the jurisdiction of the Local Agency.

VII. ELIGIBLE COSTS

Eligible Project Costs are the reasonable and necessary actual costs associated with an Eligible Project incurred after November 7, 2006 (date of passage of Propositions 84 and 1E). Reimbursement will not be provided for Eligible Project Costs incurred before a Project Funding Agreement is executed, except in extraordinary circumstances when the Local Agency has obtained written authorization from the Department prior to incurring the cost. Credit may normally be provided for Eligible Project Costs incurred prior to execution of a Funding Agreement with written approval from the Department prior to incurring the cost. Eligible Project Costs may include, but are not limited to, the following:

- Project engineering, design, and construction costs;[3]
- Costs of planning, implementing, and maintaining habitat mitigation and/or enhancement associated with the project
- Costs of obtaining environmental permits and associated environmental mitigation costs including the costs of preparing CEQA and NEPA documents (if applicable) that are directly related to and necessary for the proposed Project;
- Costs of obtaining necessary federal or state governmental approvals;
- Reasonable legal fees associated with incurring Eligible Project Costs, such as those listed above;
- Reasonable overhead costs relating to the Project;
- Cost of conducting a Project Review, if required by the Department; and
- Eligible Real Estate Capital Outlays. Special Projects real estate costs are generally the responsibility of the Local Agency. For some Projects, such as Habitat and Setback Levee projects, the Department may fund a portion of real estate costs. Only the fair market value of real estate costs for land that has been appraised and deemed suitable for its intended purposes by the Department will be considered Eligible Costs.
- The Department may consider costs for removal or relocation on a case by case basis.

VIII. INELIGIBLE COSTS

Costs that are not eligible may include, but are not limited to, the following:

[3] For construction Projects, the State will only pay its State share of Non-Construction Costs up to 20% of the total Project cost. Any additional reimbursement exceeding the 20% will require prior approval by the Department.

- Operation, maintenance, repair, replacement, and rehabilitation costs of the completed levee works, including the cost to maintain the HMP or Delta Specific PL 84-99 standards once they have been achieved through a Project funded under the Special Projects program;

- Purchase of equipment that is not an integral part of the Project;

- Replacement of existing funding sources for ongoing projects;

- Support of existing Local Agency requirements and mandates;

- Purchase of land in excess of the minimum required acreage or at a price in excess of its market value, unless the Local Agency provides evidence demonstrating the cost effectiveness of the transaction. The Project Funding Agreement will detail the terms and conditions of such an exception. For purposes of Special Projects, the minimum required acreage is determined by the amount of acreage an agency purchases to acquire the land it actually needs. For example, if an agency needs a 1 acre piece of land inside a 5 acre parcel and the landowner is only willing to sell the 5 acres as a whole, the minimum required acreage is the 5 acres, not the 1 necessary acre;

- Costs that the State does not authorize as part of final accounting; i.e. works not related to flood protection and/or habitat.

- Costs incurred as part of any and all necessary response and cleanup activities required under CERCLA, RCRA, Hazardous Substances Control Act or other applicable law; and

- Costs, including engineering and environmental expenses, associated with preliminary studies that are not directly related to the proposed Project, unless approved in writing by the Department prior to incurring the cost.

IX. FIVE-YEAR PLANS

Under these Guidelines, Local Agencies in the Delta continue to have the opportunity to develop a Five-Year Plan. The Five-Year Plan assesses the current conditions of a Local Agency's levees and sets out a strategy for rehabilitation, repair and/or improvement of its facilities to meet a desired levee standard and/or level of protection.

All Applicants seeking funding for Special Projects will eventually be required to provide, with their application, a complete Five-Year Plan. For this reason the Department strongly urges all Local Agencies that have not completed a Five-Year Plan to request funding for, and complete such a Plan before applying for other Special Projects.

The State will fund 100% of the first $50,000 spent on the preparation of Five-Year Plan, 75% of any costs between $50,000 and $100,000 and will not share any costs

related to the Five-Year Plan beyond $100,000. The Five-Year Plan must provide an assessment of the district's existing levee system and a strategic plan to meet a desired levee standard and/or level of protection. These plans must identify risks to island assets, assets of statewide importance and provide a long-term funding strategy. Plans must also describe how habitat impacts from proposed levee work will be avoided or mitigated, whether any enhancement activities are planned, and how the planned projects will address CEQA and environmental permitting requirements. The final plan shall be submitted to DWR for review and evaluation. An outline of what is required in the Five-Year Plan is attached as Exhibit A.

X. APPLICATION PROCESS

The Department anticipates that it will issue multiple Special Projects Solicitation Packages (PSP) under the Near-Term Guidelines.

PSPs will be sent out to all Local Agencies that qualify for Special Project Funding. These PSPs will also be posted on the Special Projects website. They will describe all application requirements (as more fully set forth in these Guidelines) and will establish the application and selection timeline as well as the scoring system to rank each project.

Again, **Five-Year Plans will eventually be required of all Applicants** seeking funding for Special Projects. As a result, any Local Agency that has not yet executed a Project Funding Agreement to complete a Five-Year Plan should send a letter of request and apply to complete a Plan.

XI. REQUIRED APPLICATION MATERIALS

Applications must include the following when submitting a Project proposal:[4]

- An application cover sheet that provides an overview of the Project;
- A statement identifying the Applicant's representatives;
- A resolution signed by the Local Agency authorizing submission of the application and designating a representative to sign the application, entering into a contract with the State of California, implementing a flood protection program, and providing the local cost-share;
- A detailed Project Description; including maps, drawings and a statement explaining the assets the Project will protect and justification for the project. The level of detail provided in the Project Description is at the discretion of the Applicant, but it is in the Applicant's interest to offer as much detail and

[4] Applicants with questions about what to provide should consult with the Department. Typically FloodSAFE requires an economic justification. Projects eligible under these guidelines, however, do not need to provide any economic justification since the California Water Code includes specific mandates for the Delta Special Projects Program.

documentation as possible, as the eligibility and ranking criteria in these Guidelines require a great deal of specific information;

- References for information used in the proposal should be cited.
- A statement from a California registered professional civil engineer who has reviewed the Project Description discussing the benefits of the project to flood protection and/or habitat;
- A detailed statement of expected Project costs and a detailed Financial Plan;
- A detailed description of the impact the Project has on habitat and the environment, a detailed discussion of the environmental permits required for the Project based on the anticipated impact, and a schedule for permit completion;
- A statement addressing the impacts of climate change on the Local Agency levees and possible features allowing accommodation or adaptation to future moderate changes.
- A detailed description of how the Project will mitigate for all environmental impacts, including the requirements of Water Code Section 12314, which requires no net long-term loss of habitat and net habitat improvement (through impact avoidance, minimization, or mitigation). The statement of expected Project costs should include habitat costs;
- A cost-share recommendation and report detailing the amount of State cost-share to which the Local Agency believes it is entitled and a Local Agency Benefit Assessment (LABA) if the Local Agency intends to request an Alternative Cost-Share.

All participants are subject to State and Federal conflict of interest laws. Failure to comply with these laws, including business and financial disclosure provisions, will result in the application being rejected and any subsequent contract being declared void. Other legal action may also be taken. Applicable statutes include, but are not limited to, Government Code, Section 1090, and Public Contract Code, Sections 10410 and 10411, for State conflict of interest requirements.

In addition, the Applicants will be required to keep informed of and take all measures necessary to ensure compliance with applicable California Labor Code requirements, including but not limited to Section 1720 *et seq*. of the California Labor Code regarding public works, limitations on use of volunteer labor (California Labor Code Section 1720.4), labor compliance programs (California Labor Code Section 1771.5) and payment of prevailing wages for work done under a Funding Agreement.

For Projects that receive funding pursuant to the provisions of Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection

Bond Act of 2006, Cal. Pub. Res. Code § 75076 *et seq*., the Local Agency will be required to maintain a labor compliance program that meets the requirements of California Labor Code Section 1771.5. Written evidence of the Labor Compliance Program will need to be submitted to the State before the project is funded.

XII. SUBMITTAL DEADLINE

Project Proposals that do not meet the deadline established in the Projects Solicitation Package will not be reviewed. The Department will review all timely submittals for completeness after proposals are submitted. Proposals that are not substantially complete will not be further reviewed. The Department may contact proponents of proposals that are substantially complete but missing some items. If a Local Agency is contacted by the Department with a request for more materials, it will have one week to provide all requested information.

XIII. PROJECT ELIGIBILITY CRITERIA

Under these Guidelines, applications will be solicited for work that improves Delta levees to HMP and/or Delta Specific PL 84-99 standards[5], Delta Levee Studies or Research related to improvement of levees to HMP or Delta Specific PL 84-99 standards, work that improves protection of aqueducts that cross the Delta, work to reduce the risk of levee failures that would jeopardize water conveyance, and/or work that provides significant habitat enhancements. Eligible Projects also include stand-alone engineering and design Projects. Review of stand-alone applications for engineering and design, or studies, will assume that the Project is actually built and will measure the strength of the application based on how it meets the criteria of the category (HMP, Delta Specific PL 84-99 etc.) into which it would fall if it were an actual construction Project.

Applications must meet the Eligibility Criteria and other general requirements described in these Guidelines. Where applicable, applications must also meet category-specific Eligibility Criteria.

1. Project must be intended to: (a) research, study, design or construct work that will bring the levee system up to HMP or Delta Specific PL 84-99 standards, (b) conduct Delta Levee Studies or Research related to improvement of levees to HMP or Delta Specific PL 84-99 standards, (c) create, restore, enhance or protect habitat, or (d) complete a Five-Year Plan.
2. Project must not significantly impair the functionality of the levee system.
3. Where and when applicable, the Department must approve of the level of protection and/or levee standard that the Local Agency seeks to achieve through build-out of its Five-Year Plan.

[5] See Exhibit B

4. Project should address the impacts of climate change on the Local Agency levees and discuss features that allow accommodation or adaptation to future moderate changes.
5. Project must not induce growth (e.g. urbanization).
6. Project proposal must include a Project Description, Financial Plan, and a schedule.
7. Application should identify all potential beneficiaries of the proposed Project, including population estimates, infrastructure, environmental resources (terrestrial and aquatic), and other improved properties.
8. Projects must meet the requirements of California Water Code Section 12310 *et seq.*

Table 1: Project Eligibility Criteria

A) HMP Project Eligibility Requirements:

Specific Requirements	Notes
Project must be consistent with the Local Agency's Five-Year Plan (if a Plan has been completed). Local Agency must provide proof that successful construction of this Project will result in a flood protection facility that meets HMP standards. Local Agency should demonstrate that the proposed HMP Project is consistent with the Department's objective of improving all levees within a district to HMP standard. A design upgrade (overbuild) may be proposed in a HMP project to add up to 0.5 foot of extra crest elevation. An additional 0.5 foot may be added if the levee crest includes a state or county paved road, for a total of up to 1.0 foot. Additional overbuild may be considered, with DWR prior approval, if the Local Agency submits adequate engineering analysis.	The State's goal is to raise Delta Levees to HMP for the following reasons. 1) HMP is a key first-step improvement to many of the existing Delta levees. Many Local Agencies desire to improve their systems beyond this level, but HMP is an important building block. 2) Levees that are HMP rated meet FEMA standards for disaster assistance. Raising levees to HMP may help to ensure the State or Local Agencies can secure federal funds for disaster relief in case of a significant Delta flood event. Local Agencies should, generally, propose to raise all levees within its jurisdiction to HMP standard before considering work that brings all or a portion of the levees to a higher standard. Local Agencies may propose work to increase flood protection beyond HMP, particularly when completing HMP and Delta Specific PL 84-99 improvements concurrently is more efficient and cost effective.

Table 1: Project Eligibility Criteria (Continued)

B) Delta Specific PL 84-99 Project Eligibility Requirements:

Specific Requirements	Notes
Project must be consistent with the Local Agency's Five-Year Plan (if a Plan has been completed). Project must raise the length of levee addressed to the Delta Specific PL 84-99 criteria (with additional improvements responsive to Bulletin 192-82 non-urban criteria). Local Agency's Financial Plan demonstrates a plan to achieve Delta Specific PL 84-99 compliance for the entire protected area by FY 2015-2016 (assuming needed state funding is available). A design upgrade (overbuild) may be proposed in a Delta Specific PL 84-99 project to add up to 0.5 foot of extra crest elevation. An additional 0.5 foot may be added if the levee crest includes a state or county paved road, for a total of up to 1.0 foot. Additional overbuild may be considered, with DWR prior approval, if the Local Agency submits adequate engineering analysis.	The Department is committed to improving most facilities to HMP standard, but it actually intends to allocate more funds over the course of these Guidelines to Projects seeking to raise their level of protection to the Delta Specific PL 84-99 Standard. Levees that meet this standard may be able to qualify for rehabilitation assistance by the USACE when the levees are damaged.

C) Delta Aqueducts Protection Eligibility Requirements:

Specific Requirements	Notes
Project must be for work to reinforce levees that have the highest potential to suffer breaches or failure and cause harm to municipal and industrial water supply aqueducts that *cross* the Delta that are vulnerable to flood damage.	Projects that qualify for Delta Aqueduct funding will be ranked against other Delta Aqueduct Projects using a modified version of ranking criteria for HMP or Delta Specific PL 84-99, depending on the level of protection sought in the Project.

Table 1: Project Eligibility Criteria (Continued)

D) Habitat Project Eligibility Requirements:

Specific Requirements	Notes
Project assists in restoring one or more habitats that can contribute to health of the Delta or Suisun Marsh Ecosystem consistent with the net habitat improvement requirements of the Program OR Project results in a habitat bank larger than 50 acres that can be used by any eligible Local Agency within the Program to mitigate the habitat impacts of their levee repair work consistent with the program mandates. Such a habitat bank must be consistent with guidance provided by DWR and DFG and will come under a separate directed action.	The Department intends to fund habitat restoration or improvement projects that benefit habitats that have been impacted by historic levee construction. The program seeks to enhance or restore the four habitats commonly associated with the Delta Levees Program – Scrub Shrub, Riparian Forest, Freshwater Marsh, and Shaded Riverine Aquatic Habitats. Consistent with the requirements of Senate Bill X2 1, projects that improve conditions for Delta Smelt and other native fish are also considered priorities. The Department also intends to support a pilot project to develop a habitat conservation (mitigation) bank to provide mitigation for multiple islands' anticipated habitat impacts. The habitat bank must be consistent with the regulatory structures that have been developed by the Department and the Department of Fish and Game and be tailored specifically to the needs of the Program. Additional detail on this approach and specific requirements will be provided to Local Agencies in the Projects Solicitation Package.

XIV. PROJECT SELECTION CRITERIA

As discussed above, the Special Projects program covers a variety of work. As a result, Projects will be categorized for ranking purposes. This will ensure that applications compete with like applications. Local Agencies should offer sufficient information to meet the required criteria. Department retains discretion to check for reasonableness and accuracy of submitted materials. The following are Project selection tables:

To the extent that funding is limited, Eligible Projects will be ranked using category-specific Selection Criteria. There are a number of selection criteria that address similar aspects of levee projects in several ways. It is the intent of these Guidelines that credit for only one condition will apply; therefore, there will be no double counting of Selection Criteria for similar aspects of the proposed project.

Table 2: Project Selection Criteria

A) HMP Project Selection Criteria:

Selection Criteria	Notes
The Department intends to allow Local Agencies the opportunity to achieve HMP. If the amount of money available for HMP Projects is insufficient to fund qualified HMP proposals, the Department will rank proposals based on the size of geographic area to be protected by the proposed Project, the extent to which the Project protects life and safety and the likelihood that the Project will be completed in the current construction season. In addition, Projects will be selected based on the extent to which the project identifies potential habitat impacts and avoids these impacts or provides for their mitigation. Where applicable (i.e., subject to Senate Bill X2 1 proposition 84 funding), priority shall be given to projects that improve conditions for delta smelt and other native fish.	HMP Project proponents should be aware that Local Agencies seeking to raise a levee beyond HMP status must demonstrate that all of the levees and flood protection facilities in their jurisdiction have been raised to HMP.

Table 2: Project Selection Criteria (Continued)

B) Delta Specific PL 84-99 Project Selection Criteria:

Selection Criteria	Notes
Life Safety (Number of People Protected)	This criterion rates each Project based on the total number of people the Project would protect at the Delta Specific PL 84-99 level.
Infrastructure (Highways)	This criterion rates each Project based on whether and how much it will increase protection to one or more state highway systems.
Infrastructure (Emergency)	This criterion rates each Project based on whether it increases protection of utilities, roads, services, fuel center, food centers, etc.
Infrastructure (Local Assets)	This criterion rates each Project based on whether it increases protection to local assets, such as local businesses, agricultural operations and facilities, local transportation routes, etc.
Infrastructure (Water Conveyance, Water Supply Reliability)	This criterion rates each Project based on whether it increases protection to water conveyance structures.
Water Quality	This criterion rates each Project based on whether it increases protection of Delta water quality.
Habitat Impacts and Mitigation	This criterion rates each Project based on how well it meets the “no net long-term loss” of habitat requirement of the Special Projects program. Projects that avoid or mitigate habitat impacts at the time of construction will be favored. Projects that describe unavoidable habitat impacts and describe how these impacts will be mitigated at a future date will be less favored. Local Agency to offer sufficient information to meet this criterion, including documentation of any consultation with the California Department of Fish and Game to substantiate the assertions in their application. Department retains discretion to check for reasonableness and accuracy of submitted materials.

Table 2: Project Selection Criteria (Continued)

B) Delta Specific PL 84-99 Project Selection Criteria (Continued):

Selection Criteria	Notes
Habitat Improvement and Ecosystem Restoration	This criterion rates the anticipated ecological benefits of the project consistent with the Program's net long-tem habitat improvement requirement. Consistent with Senate Bill X2 1 requirements, projects that improve conditions for delta smelt and other native fish are most favored. Projects that create or improve habitats including tidal marsh, wetland, and floodplain habitats fragmented by historic levee construction, or upland habitats associated with the maintenance or improvement of levees will be priorities. All projects will be evaluated under this criteria based on their demonstrated ecological benefits, soundness of their approach, and feasibility.
Project description and permits	This criterion evaluates the completeness of the Project Description and thoroughness of Local Agency's plan to obtain the required permits (e.g., an identification of all required permits with corresponding budget and timeline).
Partnerships	This criterion evaluates how much (if any) of the Eligible Project cost is being shared by a partner.

C) Delta Aqueduct Project Selection Criteria:

Selection Criteria	Notes
Levee proximity to aqueduct	Projects will be favored if the increase in the level of protection a levee will offer the aqueduct begins close to the aqueduct and continues out from the aqueduct to a distance of 1000 feet.
Life Safety (Number of People Protected)	This criterion rates each Project based on the total number of people the Project would protect at the Delta Specific PL 84-99 level.
Infrastructure (Highways)	This criterion rates each Project based on whether and how much it will increase protection to one or more state highway systems.
Infrastructure (Emergency)	This criterion rates each Project based on whether it increases protection of utilities, roads, services, fuel center, food centers, etc.

Table 2: Project Selection Criteria (Continued)

C) Delta Aqueduct Project Selection Criteria (Continued):

Selection Criteria	Notes
Infrastructure (Local Assets)	This criterion rates each Project based on whether it increases protection to local assets, such as local businesses, agricultural operations and facilities, local transportation routes, etc.
Infrastructure (Water Conveyance, Water Supply Reliability)	This criterion rates each Project based on whether it increases protection to water conveyance structures.
Water Quality	This criterion rates each Project based on whether it increases protection of Delta water quality. Local Agency to offer sufficient information to meet this criterion. Department retains discretion to check for reasonableness and accuracy of submitted materials.
Habitat Impacts and Mitigation	This criterion rates each Project based on how well it meets the “no net long-term loss” of habitat requirement of the Special Projects program. Projects that avoid or mitigate habitat impacts at the time of construction will be favored. Projects that describe unavoidable habitat impact and how these impacts will be mitigated at a future date will be less favored. Local Agency to offer sufficient information to meet this criterion, including documentation of any consultation with the California Department of Fish and Game to substantiate the assertions in their application. Department retains discretion to check for reasonableness and accuracy of submitted materials.
Habitat Improvement and Ecosystem Restoration	This criterion rates the anticipated ecological benefits of the project consistent with the Program’s net long-tem habitat improvement requirement. Projects that create or improve habitats including tidal marsh, wetland, and floodplain habitats fragmented by historic levee construction, or upland habitats associated with the maintenance or improvement of levees will be favored. All projects will be evaluated under this criteria based on their demonstrated ecological benefits, soundness of their approach, and feasibility.
Project description and permits	This criterion evaluates the completeness of the Project Description and thoroughness of Local Agency’s plan to obtain the required permits (e.g., an identification of all required permits with corresponding budget and timeline).

Table 2: Project Selection Criteria (Continued)

C) Delta Aqueduct Project Selection Criteria (Continued):

Selection Criteria	Notes
Partnerships	This criterion evaluates how much (if any) of the Eligible Project cost is being shared by a partner.

D) Habitat Project Selection Criteria:

Habitat Improvement and Ecosystem Restoration	
Selection Criteria	**Notes**
Habitat Goals or Targets	This criterion evaluates the types and locations of habitats the project will establish and describes its relationship to other existing or emerging Delta-wide restoration plans.
Delta smelt and other native fish	This criterion evaluates the extent to which the proposed project improves habitat conditions for delta smelt or other native fish.
Ecosystem Benefits	This criterion evaluates the extent to which the project describes and demonstrates its anticipated ecological benefits, including but not limited to opportunities to improve habitats impacted by historical levee work, improve conditions for threatened and endangered species, provide a landscape-scale approach, and restore natural hydrological regimes.
Approach and Feasibility	This criterion evaluates the extent to which the project describes a restoration approach that is feasible based on the best available information, including project location, restoration methods, timing and long-term viability.
Project description and permits	This criterion evaluates the completeness of the Project Description and thoroughness of Local Agency's plan to obtain the required permits (e.g., an identification of all required permits with corresponding budget and timeline).
Technical Capacity and Resources	This criterion evaluates the technical resources of the proposed restoration project team. In addition to engineering competence, this includes restoration ecology and design professionals.
Partnerships	This criterion evaluates how much (if any) of the Eligible Project cost is being shared by a partner.
Project Performance and Adaptive Management	This criterion evaluates how the project will evaluate its own success and the robustness of its long-term management plan, including the financial resources allocated to manage or maintain the habitat in perpetuity.

XV. COST-SHARE FORMULA

The state share of the Project cost will be limited to no more than $5 million to achieve economies of scale yet maintain the ability to complete the Project in one construction season.[6] For the Delta Specific PL 84-99 work, the State share of the cost in excess of $5 million will only be at 50 percent subject to availability of funds. The State will pay a maximum of 20% for pre-construction engineering costs (e.g. planning, permitting, or design).[7]

State cost-share is determined by Project category. The Local Agency must submit, along with the rest of its application, a cost-share recommendation estimate that makes its claim to the amount of cost-share the State should offer for its proposed Project. The following table describes the cost-share approach by category:

Table 3: Project Cost-Share

A) HMP Project Cost-Share:

Category	Cost-Share
Projects meeting HMP standard.	The State will cost-share HMP Projects at a minimum of 90%.[8] HMP Project proponents may qualify for Enhanced Cost-Share, as described below (Delta Specific PL 84-99 Cost-Share). Cost share of HMP Projects will be capped at 95% of the Local Agency expenses or total Project cost.

B) Delta Specific PL 84-99 Project Cost-Share:

Category	Cost-Share
Projects meeting Delta Specific PL 84-99 standard.	Delta Specific PL 84-99 Projects will be cost-shared in accordance with the following three steps: **Base State Share** – The Base State Cost-Share for projects within the Primary Zone of the Delta, as defined under the Water Code Section 12220, will be set at 75%. The Base State Cost-Share for projects within the Secondary Zone of the Delta, as defined under the Water Code Section 12220, will be set at 50%. This share is the amount the State will contribute

[6] The Department may, in unique circumstances, fund projects with a State share of costs of more than $5 million. However, the priority shall be given to projects requesting State share of $5 million or less.
[7] This only applies to Projects that include actual construction. Any additional reimbursement exceeding the 20% will require prior approval by the Department.
[8] Local Agencies submitting an HMP Project proposal or those in the Primary Zone may not conduct a LABA for this round of funding.

Table 3: Project Cost-Share (Continued)

B) Delta Specific PL 84-99 Project Cost-Share (Continued):

Category	Cost-Share
	towards the Project before Enhanced Cost-Share is considered (assuming that the LABA does not raise the State Share). If the State or Local Agency identifies specific, discrete third-party beneficiary to the Project (such as a utility company whose transmission or gas lines will experience increased flood protection as a result of the project) and that third-party beneficiary refuses to contribute its fair share to funding the Project, the State reserves the right not to raise its share above this base level or otherwise restrain or withdraw its support for the Project. **Alternative State Share** – For all projects within the Secondary Zone the Base State Cost-Share may be increased to an Alternative State Share, based on the LABA[9]. The LABA must be performed according to Delta Levees Program methodology. *See* Exhibit C.[10] The maximum State share established by this step will be 75%, unless, at the sole discretion of the Department, it is waived. **Enhancement of State Cost-Share***:* that the State cost-share may be increased, by as much as 20%, if the proposed Project achieves a significant contribution to specific public purposes as described below. Applicants seeking to enhance their state cost-share must provide documentary information sufficient to demonstrate, to the Department's satisfaction, that the specific public purposes are significant and an Enhanced State Cost-Share is merited. Enhanced Cost-Share will apply to the entire project; however, it cannot qualify a Project for a 100% State Share. The ceiling for the overall State share (including Enhanced Cost-Share) is generally 95% of the Local Agency expenses to complete the Project (if in Partnership) or total project cost.[11]

[9] The Department will provide a cost-share of 75% for the development of a LABA, up to a maximum of $20,000. A separate funding agreement will be required for the preparation of a LABA.

[10] As an example, if a Local Agency's LABA indicates that the benefits the Local Agency will receive (locally) from the Project are 15%, the State Share will generally be raised to 75%.

[11] DWR may, at its sole discretion, waive this ceiling for projects that have primarily statewide or program-wide benefits, such as a habitat enhancement project.

Table 3: Project Cost-Share

B) Delta Specific PL 84-99 Project Cost-Share (Continued):

Category	Cost-Share
	Eligible Enhanced Cost-Share includes the following: **Emergency Response Measures** – The Local Agency should demonstrate how its proposed Project contributes to emergency response and/or preparedness. The State may increase its cost-share of the Project by the amount (expressed as a percentage of the overall Eligible Projects costs) that the emergency response aspect of the Project increases the total cost. The emergency response measures may be separable (emergency response only) costs or emergency response allocable costs. This increase will be capped at 10%. **Habitat** – The State may enhance its cost-share for Projects that fully mitigate habitat impacts prior to or at the time of construction and contribute to program-wide net habitat improvement by incorporating habitat enhancement or ecosystem restoration features consistent with the Program's net long-term habitat improvement mandate including elements that improve conditions for delta smelt and other native fish. The amount of cost-share enhancements associated with habitat features will be commensurate with the habitat benefits provided by the improvements and will be specified in applicable Projects Solicitation Packages. This increase will be capped at 10%. **Subsidence Control or Reversal** – The Local Agency should demonstrate how its proposed Project contributes to subsidence control or reversal. The State may increase its cost-share of the Project by the amount (expressed as a percentage of the overall Eligible Projects costs) that the subsidence reduction aspect of the Project increases the total cost. The subsidence reduction measures may be separable (subsidence reduction only) costs or subsidence reduction-allocable costs. This increase will be capped at 10%. **Statewide Interests** – The State may increase its cost-share for Projects that increase flood protection to statewide interests. Statewide interests may include water quality protection, water supply reliability, or public transportation or other public infrastructure. The State's cost-share of the Project may be increased up to a maximum of 10%.

Table 3: Project Cost-Share

B) Delta Specific PL 84-99 Project Cost-Share (Continued):

Category	Cost-Share
	Beneficial Reuse – The State may increase its Cost-Share for Projects that beneficially reuse dredged material. The Local Agency must demonstrate the savings that use of existing dredged material will create. The State will reimburse these savings to the Local Agencies. Any cost-share calculation will be performed after these savings have been deducted from the project cost. These savings are not to exceed 10% of the Eligible Project Costs. **Cost share Partners** – Local Agencies may receive a 50% State matching of a third party contribution to the Project, up to 95% of the Local Agency expenses or total Project cost, for secured funding outside of the Delta Levees Program for their Projects.

C) Delta Aqueduct Project Cost-Share:

Category	Cost-Share
Delta Aqueduct	Delta Aqueduct Projects will be cost-shared based on the level of protection they achieve. If HMP, then they will be cost-shared like HMP Projects, discussed above. If Delta Specific PL 84-99, they will be cost-shared like a Delta Specific PL 84-99 Project, as discussed above.

D) Habitat Project Cost-Share:

Category	Cost-Share
Habitat	Projects that assist in restoring one or more habitats that contribute to the improvement in the Delta or Suisun Marsh ecosystem on a system-wide basis consistent with the net habitat improvement requirements of the program may receive an increased cost-share of 40% over base funding[12]. Projects that provide habitat consistent with the interagency cooperative mitigation banking program for Delta levees may receive an increase of up to 40% over base funding.

[12] DWR may, at its sole discretion, waive this ceiling for projects that have primarily statewide or program wide benefits, such as a habitat enhancement project.

XVI. DIRECTED ACTIVITIES

The Department reserves the right to develop and support Projects through a collaborative process between the Department and Local Agencies.

Such Projects will be called Direct Expenditures or Directed Activities. The Department will apply these Guidelines, as it deems applicable and appropriate, to such Directed Activities. The Department will also seek guidance from Propositions 1E and 84, California Water Code Section 12310 *et. seq.*, California Water Code Section 83000 *et seq*. and prevailing California law in determining how it will direct its expenditures.

The types of Projects that DWR may implement directly are likely to be subsidence reversal and habitat Projects, but may include other kinds of Projects, such as the development of a habitat bank project for the Delta Levees Program. DWR may implement these Directed Expenditure Projects directly or through agreements with Local Agencies.

XVII. RESERVE FUND

No less than $6 million of the funds made available for the Delta Special Projects Program during the Fiscal Years governed by these Guidelines will be reserved for emergency repairs until after the flood season (April 15) each year. If any of this money is unspent, it will be used to fund additional Eligible Projects in the Delta.

XVIII. PROJECT ADMINISTRATION

Selected Projects will not be funded until a Funding Agreement is executed between the State and Local Agency. This Funding Agreement is comprehensive and will cover reporting requirements, work plans, progress reports, statements of cost, State hold-backs, and more. Five-Year Plan Projects will be governed by a streamlined Funding Agreement, but will still require a Funding Agreement.

EXHIBIT A

Requirements for the Five-Year Plan

1. Assessment of the status of existing levee system and future goals

The Plan should provide a clear description of the following:

- *a. Describe historical flood problems, including:*
  - ◊ *Dates of events*
  - ◊ *Estimated flood frequencies of events*
  - ◊ *Levee performance during these events,*
  - ◊ *Consequences of events*
- *b. What is the existing level of protection provided by the levee system? Include the source of this information. Specifically,*
  - ◊ *What portion of the levee is below or at HMP Standard?*
  - ◊ *What portion of the levee is at PL84-99?*
  - ◊ *What portion of the levee is above PL84-99?*
- *c. What level of protection is expected to be achieved at the end of the five years? Provide justifications in support of the anticipated outcomes.*

2. Strategy to meet desired level of protection

The Plan should elaborate on the desired level of protection at the end of five years (item "c" above) and discuss the following:

- *a. A complete description of the desired level of protection as a goal to achieve in the next five years.*
- *b. Phasing of the work, including a description of recommended projects needed to achieve the five year goal.*
- *c. Total estimated cost of the work and its distribution on a project-by-project basis over the five years.*
- *d. Potential cost sharing with other partners.*
- *e. Schedule of work.*
- *f. Discussion of potential obstacles to meet the desired goal.*

3. Identification of need for improvements to alleviate or minimize existing hazards

The Plan should provide an inventory of the local and non-local assets/critical infrastructures, both public and private, being protected by the levees. Local assets are those for which the Local Agency can levy assessments for flood protection; non-local assets are those the Local Agency cannot levy assessments for. The Local Agency should identify public benefits where applicable, such as:

- ◊ *Water quality*
- ◊ *Recreation*
- ◊ *Navigation*
- ◊ *Fish and wildlife*
- ◊ *Protection of State Infrastructure*
- ◊ *Other*

4. Identification of the risks for current land use based on the existing assets

The Plan needs to discuss risks associated with levee failure. In particular:

- ◊ *Consequences of levee failure or breach*
- ◊ *Existing deficiencies in the system, including existing seepage, boils, or voids under the levee*
- ◊ *Urgency of repair work*

5. Identification of opportunities for multi-objective projects

The Plan should, at a minimum, describe opportunities and significant constraints for achieving the following objectives:

- ◊ *Ecosystem restoration and habitat enhancement component*
- ◊ *Reversing land subsidence.*
- ◊ *Ensuring adequate and effective emergency response plans*
- ◊ *Benefitting water quality*
- ◊ *Improving water supply reliability*

6. Habitat Mitigation and Enhancement

The Plan should describe how work to be carried out under the plan will meet the requirements of Water Code Sections 12314 which require no net loss of habitat and consistency with net habitat improvement. The plan should describe the following:

a. *Baseline habitat conditions prior to the plan.*
b. *The anticipated impact to habitats and anticipated extent of the impact based on the identified needs for levee repair and other work outlined in the plan.*
c. *How the requirements for no net loss of habitat, and net habitat enhancement will be met.*

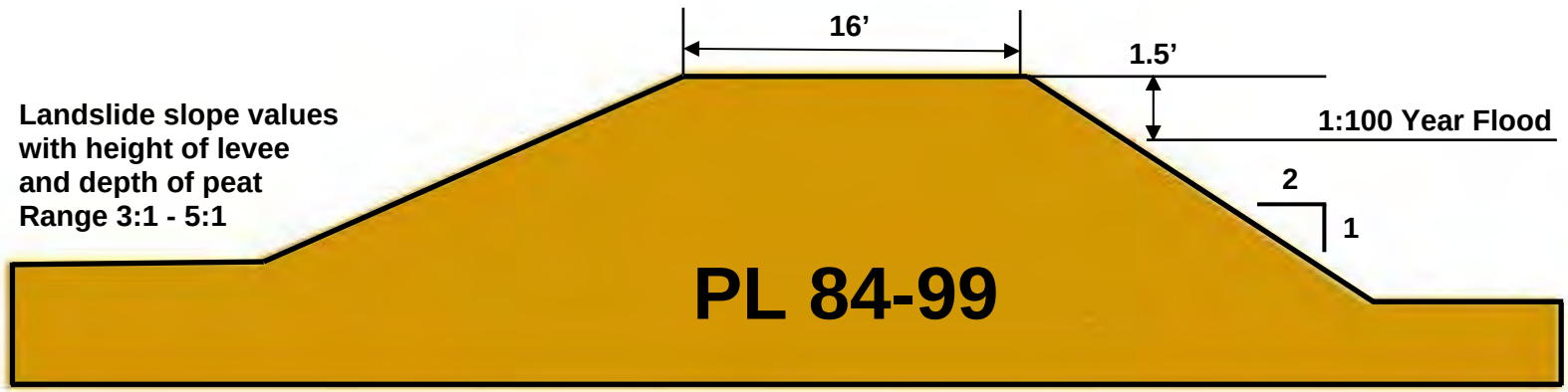
7. Compliance with CEQA and obtaining required permits

The Plan should describe all of the following:

a. *Types of permits and environmental compliance documents required.*
b. *Status of the environmental documentation.*
c. *Status of the permit process.*

Exhibit B

Typical Levee Cross-Sections



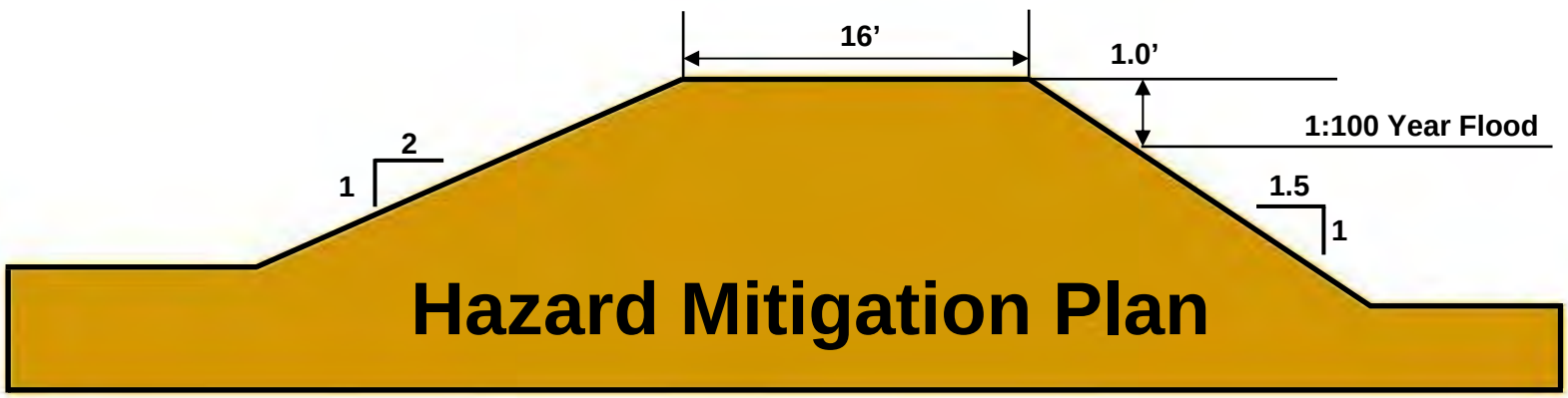


EXHIBIT C: LOCAL AGENCY BENEFIT ASSESSMENT

I. OVERVIEW

This appendix describes the methodology for a Local Agency Benefit Assessment. Applicants must complete a Local Agency Benefit Assessment if they are requesting State cost sharing based on an Alternative State Cost Share rather than the Base State Cost Share. An Alternative State Cost Share is capped at 75 percent of eligible project costs.

The purpose of the Local Agency Benefit Assessment is to estimate local flood damage reduction benefits from implementing the projects contained in the Applicant's Five-Year Plan. The Alternative State Cost Share is computed as one minus the ratio of the present value of estimated local flood damage reduction benefits to the present value of the estimated costs of plan implementation. The Applicant may request an Alternative State Cost Share when this value is greater than the State Base Cost Share. For example, if the State Base Cost Share is 50 percent and the computed value is 70 percent, the Applicant could propose an Alternative State Cost Share of 70 percent (before cost-sharing enhancements).[1].

Calculation of an Alternative State Cost Share is not necessary for projects in the Primary Zone of the Delta, since the Base State Cost Share for projects in the Primary Zone is already set to the 75 percent maximum State share. Likewise, calculation of an Alternative State Cost Share is not necessary for an HMP project, regardless of which zone it occurs in, since the Base State Cost share for HMP projects is already set to the 90 percent maximum State share.

An Alternative State Cost Share can be applied against the first $5 million of eligible project costs. State cost sharing of eligible project costs in excess of $5 million is capped at 50 percent. This restriction establishes a maximum State cost share (before enhancements). For projects costing $10 million or less, the maximum State share is 75 percent. For projects costing more than $10 million, the maximum State share is 50 percent plus an additional percentage equal to $2.5 million divided by the project's cost.

An Alternative State Cost Share is applicable to all (non-HMP) projects contained in the Applicant's Five-Year Plan. Thus, the Applicant only needs to complete a Local Agency Benefit Assessment once. The Applicant may use the results of the Local Agency Benefit Assessment on all funding applications pertaining to projects contained in its Five-Year Plan. The final State cost share on individual projects contained in the Applicant's Five-Year Plan may also include cost-sharing enhancements (see Section V of the Guidelines) and therefore may exceed the Alternative State Cost Share derived from the Local Agency Benefit Assessment.

An example is used to illustrate the process just described. For simplicity, assume the Five-Year Plan contains just one proposed project. The project would upgrade certain levees in the Secondary Zone to the Delta specific P.L.84-99 standard and has a present value cost of $20 million. A Base State Cost Share at the 50 percent level is $10 million. The Local Agency Benefit Assessment concludes the project would result in local flood damage reduction benefits

---

[1] Enhanced Cost Sharing is discussed in the Program Guidelines.

with a present value of $7 million. In this case, the Alternative State Cost Share would equal 65 percent (1 – 7/20), or $13 million. The maximum State share, however, is 62.5 percent (0.5 + 2.5/20), or $12.5 million. Therefore, the final State cost sharing (before enhancements) would be reduced to $12.5 million.

There are three possible outcomes of the Local Agency Benefit Assessment with regard to State cost-sharing, as follows:

1. The calculated Alternative State Cost Share is less than or equal to the State Base Cost Share. In this case, the Applicant would use the State Base Cost Share.

2. The calculated Alternative State Cost Share is greater than the State Base Cost Share and less than or equal to 75 percent. In this case, the Applicant would use the lesser of the Alternative State Cost Share and the maximum state share.[2]

3. The calculated Alternative State Cost Share is greater than 75 percent. In this case, the Applicant would use the lesser of the 75 percent Alternative State Cost Share and the maximum state share.

The purpose of the Local Agency Benefit Assessment is not an overall benefit-cost assessment, but rather an assessment of the benefits of the projects in the Five-Year Plan to the Applicant and its ratepayers. The Base or Alternative State Cost Share is intended to cover the costs of broader public benefits of the projects.

[2] For projects costing $10 million or less, the maximum state share is 75 percent. For projects costing more than $10 million, the maximum state share is 50 percent plus an additional percentage equal to $2.5 million divided by the project cost.

II. ESTIMATING FLOOD DAMAGE REDUCTION BENEFITS

A. Relationship to the Applicant's Five-Year Plan

Flood damage reduction benefits must be calculated in reference to the levee improvements and other flood risk mitigation actions specified in the Applicant's Five-Year Plan. The requirements for the Five-Year Plan are described in Exhibit A. This section discusses plan elements that pertain most directly to completion of a Local Agency Benefit Assessment. All discussion of benefits below refers only to the Local Agency benefits unless otherwise specified.

Information from the Five-Year Plan needed to complete the Local Agency Benefit Assessment includes the following:

- A quantitative assessment of the current and future level of flood protection provided by the levee system assuming the Five-Year Plan is not implemented;
- A quantitative assessment of the current and future level of flood protection provided by the levee system assuming the Five-Year Plan is implemented
- A description of the planned improvements, including estimates of when they will come on-line and their expected useful lives;
- A quantitative assessment of expected eligible costs of each planned improvement; and
- An inventory, valuation, and flood damage assessment of assessable structures and other property within the Applicant's service area.

A key aspect of determining flood damage reduction benefits is the specification of the *with-plan* and *without-plan conditions.*

> ***Without-plan condition*:** The without-plan condition is a forecast of conditions over the period of analysis that describes the risks of flooding if the levee improvements contained in the Five-Year Plan are not implemented. The characterization of the without-plan condition is one of the most important tasks of a flood risk management study. Specification of the *without-project* condition is described further in the USACE's *National Economic Development Manual for Flood Damage Reduction Studies*.[3] ***With-plan condition*:** The with-plan condition is a forecast of conditions over the analysis period that describes the risks of flooding if the levee improvements contained in the Five-Year Plan are implemented. Any changes in future land use and development included in the without-plan condition should be reflected in the with-plan condition. However, no future development *induced by the improvements* should be reflected in the with-plan condition if they would stimulate population growth. The *with-plan* condition must also carefully consider how flood probabilities associated with hydrologic events would change *with* the projects in the Five-Year Plan compared to *without* them.

B. Dollar Base Year and Discount Rate

[3] http://www.pmcl.com/nedprototype/index.asp

Express flood damages and eligible costs of the Five-Year Plan in current year dollars. In other words, if the Benefit Assessment is being conducted in, say, 2012, all benefits and costs shall be expressed in 2012 dollars. This will simplify the analysis and presentation of results. If dollar estimates are only available for prior years, these should be updated to current year dollars using an appropriate cost index. To update construction costs, appropriate indices include the US Bureau of Reclamation Construction Cost Indices[4], the Engineering News-Record Construction Cost Index[5], or the US Army Corps of Engineers' (USACE) Civil Works Construction Cost Index System.[6] To update building stock construction costs, Marshall & Swift (or a similar appraisal services company) comparative cost multipliers can be used.[7] Finally, a useful "all purpose" index is the Gross Domestic Product Implicit Price Deflator.[8] The analysis should identify which cost indices are used to convert prior-year benefit or cost estimates to current year dollars.

Discounting of future benefits and costs to present value should be done using a real discount rate of 6 percent. As described above, the dollar value of benefits and costs should be expressed in current year dollars prior to discounting.[9]

C. Categories of Flood Damage Reduction Benefits

Levee projects funded by the Special Projects Program provide local inundation reduction benefits. Inundation reduction benefits consist of avoided (1) physical damages or losses, (2) loss-of-function costs, and (3) emergency management costs. Each land use affected by a flood may experience losses in one or more of these areas. The following definitions of flood damages are from DWR's *Economic Analysis Guidelines: Flood Risk Management*.

> ***Physical damages*:** This category (also known as direct flood damage) is typically the most straightforward to estimate. Structures, contents, infrastructure (transportation systems, utilities, schools, hospitals, etc.), landscaping, vehicles, equipment, and crops can be damaged by flood events. The monetary damage is the cost to repair or replace the damaged property. If direct damage estimates are not available, then depth/damage curves can be used to estimate damage, at least for structures and their contents.

---

[4] www.usbr.gov/pmts/estimate/cost_trend.html

[5] www.enr.construction.com

[6] www.usace.army.mil/inet/usace-docs/eng- manuals/em1110-2-1304/entire.pdf

[7] http://www.marshallswift.com

[8] www.research.stlouisfed.org/fred2/series/GDPDEF/21

[9] The present value of D dollars received or spent n years in the future when the discount rate is i is given by the formula:

$$PV(D) = \frac{D}{(1+i)^n}$$

Structures that are potentially inundated with floodwater should be valued using depreciated replacement cost rather than full replacement costs.[10]

***Avoided loss-of-function costs*:** These costs (also known as indirect flood damage) occur when facilities are damaged thereby disrupting their normal functions. For example, occupants of residential, commercial, or public buildings may incur displacement costs for temporary quarters when flood damage makes buildings unsafe for occupation. Other costs include loss of business net income, loss of rental income, loss of wages, disruption time, and deterioration in the overall "quality of life." In addition, flooding of some types of critical facilities may have negative impacts on the community as a whole. These types of impacts would include the loss of public facilities (e.g., schools, hospitals, police/fire stations, nursing homes), transportation systems (e.g., highways, airports, ports) and utilities (e.g., water, sewer, electricity).

Emergency management costs: These costs include disaster response and recovery costs that may be incurred by a community during and immediately following a flood. Examples include avoided emergency operations costs (e.g., personnel and equipment mobilization, materials purchases), evacuation and rescue costs, debris removal/cleanup, temporary security costs, and emergency repairs to flood management systems (such as levees, floodwalls, etc.).

D. Steps to Determine Flood Damage Reduction Benefits

The steps for determining the flood damage reduction benefits for levee improvements contained in an Applicant's Five-Year Plan are outlined below.

1. Identify existing *without-plan* conditions:

i. Delineate the potential affected floodplain area;
ii. Determine floodplain characteristics (structures, infrastructure, etc.);
iii. Determine flood damages for existing floodplain conditions.

2. Identify future *without-plan* conditions:

i. Estimate future activities, structures, and land uses in the affected floodplain area (these should be the same as existing without–plan conditions unless future development is reasonably certain);
ii. Estimate annual (*without-plan*) flood-proofing costs incurred by individuals within the floodplain;
iii. Estimate annual (*without-plan*) flood damages for each year of planned life of the levee improvements.

[10] FEMA's HAZUS model is one method by which structure depreciation can be estimated.

3. Identify future *with-plan* conditions:

i. Forecast future with-plan activities, structures, and land uses in the affected floodplain area (these will usually be the same as the future without plan since population growth-inducing projects are excluded from state cost sharing consideration);
ii. Estimate the change in annual flood-proofing costs (*with-plan)* incurred by individuals within the floodplain;
iii. Estimate future (*with-plan*) flood damages for each year of planned life of the levee improvements.

4. Calculate expected annual damages as described in Section F of this appendix.

5. Calculate the expected annual flood damage reduction benefit as described in Section G of this appendix.

Chapter 6 of DWR's "Economic Analysis Guidelines: Flood Risk Management" provides sample tables for compiling and presenting the data required to calculate flood damage reduction benefits.

E. Exclusion of Non-Assessed Assets

Only include assets belonging to property owners subject to assessment by the Applicant when estimating avoided physical damage, avoided loss-of-function costs, and avoided emergency response costs. Exclude non-assessable property and assets from the analysis. For example, damage and loss-of-function costs for a state highway or county road would be excluded from a tally of flood damages unless this property was subject to assessment by the Applicant. The purpose of the analysis is not an overall benefit-cost assessment, but rather an assessment of the benefits of the projects in the Five-Year Plan to the Applicant and its ratepayers. The Base or Alternative State Cost Share is intended to cover the costs of broader public benefits of the projects.

F. Calculating Expected Annual Damage

Expected annual flood damage (EAD) is the amount of annual flood damage estimated to occur *on average*. EAD should be calculated for the without-plan and the with-plan conditions.

EAD can be determined from three variables:

1. The probability of an event occurring that could result in flooding;
2. The probability that the levee system fails given the event's occurrence; and
3. The resulting damage if the levee system fails.

Table I-1 and Figure I-1 below provide an example of how these three variables are combined to estimate EAD for the without-plan and with-plan conditions. The table identifies five hydrologic events that could result in flooding. These events are described in terms of their probability of

occurrence, the probability of levee failure for each event, and the damage that would result if the levees failed.

The probability of an event resulting in flooding depends on the without- and with-plan level of protection. In the example table, there is a 25 percent chance a 10-Year event will result in flooding without the plan. With the plan, the flood risk for this event is zero.

Expected event damage equals the damage if the levees fail times the probability that the levees will fail for this event magnitude. In this example, expected event damage is greater for the without-plan condition than for the with-plan condition.

Frequency-damage curves are generated by plotting expected event damage against the corresponding event frequency, as in Figure II-1. The area under a frequency damage curve equals the expected annual damage (EAD) from flooding. In this example, EAD is greater for the without-plan condition than for the with-plan condition.

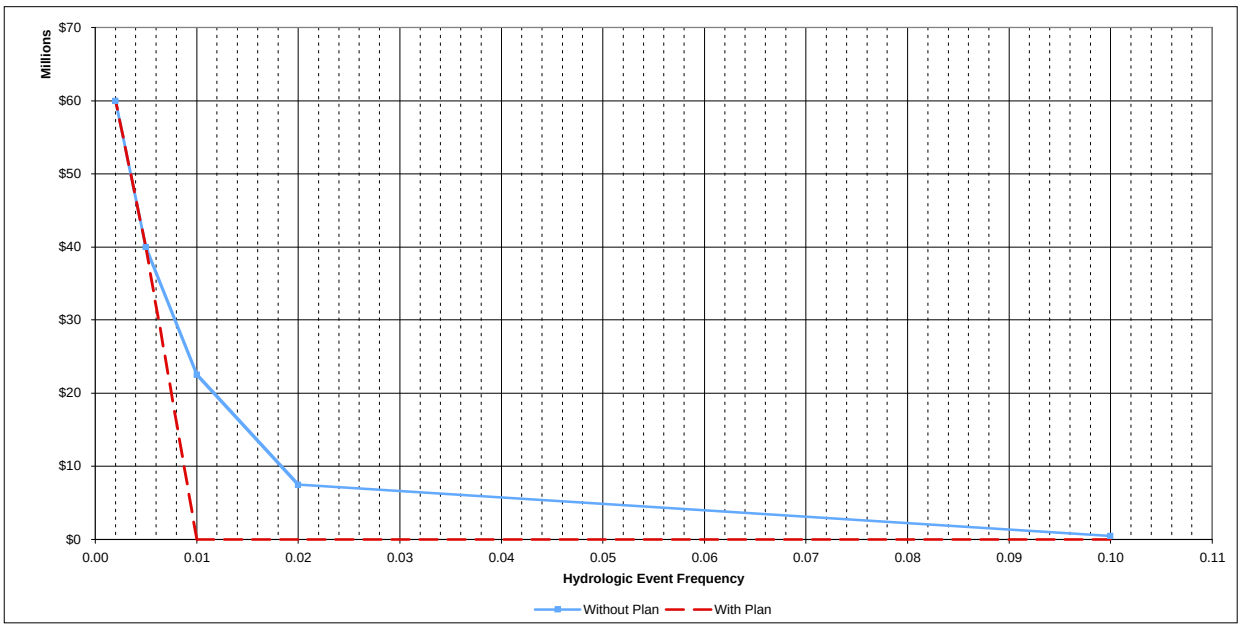
G. Calculating Expected Annual Benefit

The expected annual benefit (EAB) of the Five-Year Plan equals the difference between EAD without the plan and EAD with the plan. In the example in Table II-1, EAD without the plan is $0.9 million and with the plan is $0.37 million. Plan EAB is therefore $0.53 million.

Table I-1. Expected Annual Damage of Flood Events

Hydrologic Event	Event Frequency	Damage if Levees Fail (Million $)	Probability Levees Fail		Expected Event Damage (Million $)		Expected Event Benefit (Million $)
			Without Plan	With Plan	Without Plan	With Plan	
10-Year	0.100	$2.0	0.250	0.00	$0.5	$0.0	$0.50
50-Year	0.020	$15.0	0.500	0.00	$7.5	$0.0	$7.50
100-Year	0.010	$30.0	0.750	0.00	$22.5	$0.0	$22.50
200-Year	0.005	$40.0	1.000	1.00	$40.0	$40.0	$0.00
500-Year	0.002	$60.0	1.000	1.00	$60.0	$60.0	$0.00
Expected Annual Damage (EAD)					**$0.90**	**$0.37**	**EAB: $0.53**
Note: EAD and EAB are determined by integrating the areas under the curves shown in Figure II-1.							

Figure I-1. Frequency-Damage Curve



III. DETERMINING THE ALTERNATIVE STATE COST SHARE

Use the following steps to determine the Alternative State Cost Share:

1. Calculate the present value of 30 years of expected annual benefits by multiplying EAB (as determined in Section II.G) by 13.765.[11]

2. Divide Step 1's result by the present value cost of the levee improvements contained in the Five-Year Plan.

3. Subtract Step 2's result from one (1.0).[12]

4. If the value from Step 3 is less than 0.75, set the Alternative State Cost Share to this value. Otherwise, set the Alternative State Cost Share to 0.75.

Example: Taking EAB from Table II-1, Step 1 results in a value of $7.3 million ($0.53 x 13.765). Assume the present value cost of the plan is $24.0 million. The result of Step 2 is thus 0.304 ($7.3÷$24.0). Step 3 subtracts this value from 1.0, which equals 0.696, or 69.6%. Since this value is less than 0.75, the Alternative State Cost Share in this example is 69.6%, or $16.7 million. However, the maximum State share would be limited to $14.5 million ($5 million plus 50% of $19 million).

---

[11] The present value of 30 years of a constant annual benefit is found by multiplying the annual benefit by the factor

$$\frac{(1+r)^{30}-1}{r(1+r)^{30}}$$

where r is the real discount rate. Setting r to 6% yields a factor equal to 13.765. While levee improvements may have useful lives longer than 30 years, a 30-year period is used to reflect the typical period for long-term debt financing.

[12] Note that in cases where local benefits exceed project costs, the result will be negative, implying an Alternative State Cost Share of 0 percent.

IV. TOOLS FOR ESTIMATING FLOOD DAMAGE REDUCTION BENEFITS

A. Manuals and Guidelines for Estimating Flood Damages

The USACE has prepared a new *NED Flood Damage Reduction Manual* that provides a detailed discussion on calculating non-farm flood damages and EAD.[13] Likewise, the U.S. Water Resources Council's *Principles & Guidelines* describe the procedures for estimating crop flood damage reduction benefits.[14] Additional guidance on the estimation of flood protection benefits is available from DWR's *Economic Analysis Guidelines: Flood Risk Management.* These manuals and guidelines should be consulted prior to estimating flood hazard reduction benefits of the proposed levee improvement projects in the Applicant's Five-Year Plan.

B. Data and Models for Estimating Flood Damages

Flood damage reduction benefits should be estimated using the best information available at the time the analysis is conducted. Many of the steps described for estimating physical damages of flooding can be implemented with data and models developed for the Delta Risk Management Strategy (DRMS), as discussed in the next section.[15] The U.S. Army Corps of Engineers and FEMA also have developed analytical software and data that can be used to compute flood hazard reduction benefits. These tools are described in Chapter 5 of DWR's *Economic Analysis Guidelines: Flood Risk Management*. Although tools such as these can facilitate the computation of flood protection benefits, use of them is not a requirement of the Special Projects Program.

C. DRMS Data and Models

DRMS developed a variety of data sets and models that can facilitate the calculation of avoided physical damages, loss-of-function costs, and emergency response costs of a levee improvement project. This section briefly describes these tools and data sets.

1. Flood Rapid Assessment Model (F-RAM)

F-RAM is an Excel-based spreadsheet model designed to calculate with- and without-project EAD and to assess the benefits and costs of flood protection projects. F-RAM was originally developed to determine levee rehabilitation priorities within the San Joaquin River Basin, but it is also suited to evaluating projects located throughout the Delta. The model and user documentation are available from DWR upon request.

---

[13] http://www.pmcl.com/nedprototype/index.asp

[14] http://www.usace.army.mil/cw/cecw-cp/library/planlib.html.

[15] http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/

2. Delta Asset Inventory and Damage Tables

Calculation of physical damages to infrastructure requires an inventory of existing and projected structures and infrastructure at risk for the with- and without-project conditions. The inventory should show the following: (1) number of existing and projected structures and other point and linear assets at risk, such as residential, commercial, industrial, public facilities, etc., for without- and with-project conditions; (2) value of inventoried assets; (3) value of structure contents. DRMS compiled structure and infrastructure inventories and flood damage tables by Delta Island and land tract. Damages were estimated for two levels of inundation: (1) 100-year flood event inundation and (2) Mean-Highest-High inundation.[16] These tables are contained in the DRMS document *Delta Risk Management Strategy: Impact to Infrastructure Technical Memorandum*.[17] Prior to using a DRMS asset inventory, it should be compared to actual on-the-ground conditions to verify the accuracy and completeness of the inventory. Note that it may be necessary to update or supplement the DRMS inventory with additional information.

3. Farmland Damage Tables

Scour and inundation can damage farmland and result in the destruction of permanent crops. DRMS estimated farmland damages by Delta island and land tract for 100-year and Mean-Highest-High flood events. The estimates are presented in farmland damage lookup tables. Each table includes several examples demonstrating how to use the tables to look up farmland damage estimates. The data, assumptions, and methodology are presented in the DRMS document *Delta Risk Management Strategy: Economic Consequences Technical Memorandum.*[18] These tables are available upon request from DWR.

4. Non-Farm Loss-of-Function Costs

Loss-of-function costs from a flood event include: lost use of residential structures; disruption of non-farm commercial enterprises; disruption of public services; and disruption of farm commercial enterprises. DRMS developed data and models to estimate loss-of-function costs by Delta island or land tract. Loss of function cost estimates by Delta island and land tract are presented in Appendix A of the DRMS document *Delta Risk Management Strategy: Economic Consequences Technical Memorandum.*

---

[16] The 100-year flood level is the level of inundation that is expected to occur following a levee breach during 100-year storm event. The Mean-Highest-High flood level is the level of inundation expected to occur following a seismic event or some other "sunny day" cause of levee failure. For many interior Delta islands, the area and depth of inundation is the same for the two flood types because of their bowl-shaped topography.

[17] http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/Infrastructure_TM-updated07.pdf. This memorandum also documents the data, assumptions, and methodology used to construct the inventory and damage tables.

[18] http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/Economic_TM-updated07.pdf.

5. Farm Loss-of-Function Costs

Income losses for Farm Commercial Enterprises from a flood event depend on the time of year the flood event occurs, the time until the flooded area is dewatered, and the mix of crops affected. DRMS estimated farm income losses by Delta island and land tract for 100-year and Mean-Highest-High flood events. The estimates are presented in farm income loss lookup tables. Each table includes several examples demonstrating how to use the tables to estimate farm income losses. The data, assumptions, and methodology are presented in the DRMS document *Delta Risk Management Strategy: Economic Consequences Technical Memorandum.* The tables are available from DWR. These tables are available upon request from DWR.

6. Emergency Response Costs

Emergency costs include emergency sheltering and other public services, levee stabilization and repair, and island dewatering. DRMS estimated the costs of levee stabilization, repair, and dewatering by Delta island and land tract. These estimates are presented in the DRMS document *Delta Risk Management Strategy: Emergency Response & Repair Technical Memorandum.*[19]

[19] http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/ER&R_TM-updated07.pdf.

V. EXAMPLE LOCAL AGENCY BENEFIT ASSESSMENTS

This section provides an example that demonstrates the application of the foregoing methodology. The example considers a plan to upgrade Reclamation District No. 2029's (Empire Tract) levees to the PL84-99 standard.

RD 2029 EXAMPLE ANALYSIS

The RD 2029 example analysis consisted of applying the methodology for determining an Alternative State Cost Share for a hypothetical upgrade of RD 2029 existing levees to a 1-in-100 year level of protection consistent with the PL84-99 standard. The analysis of flood damage reduction benefits was based on existing land uses within RD 2029. No foreseeable changes in current land uses were identified, with or without the levee upgrade.

1. Overview of RD 2029 Land Uses

RD 2029, also known as Empire Tract, is located on the eastern side of the Delta close to the middle of the Delta's north-south axis (Figure V-1). Eight Mile Road bisects the district from east to west and terminates on the western edge of the island. The district comprises a total of 3,677 acres.

Most of this acreage is used for agricultural production (Figure V-2). Some acreage on the northern side of the district has been converted to hunting and wildlife habitat. A large parcel in the center of the island and just south of the existing hunting and wildlife acreage is being converted into a duck club (Figure V-2). There are currently no structures on this parcel and it is unknown whether this land will be used for commercial hunting purposes. It is also unclear whether this acreage will continue to be farmed as well. For the analysis of flood damage reduction benefits, it was assumed 50% of this acreage (about 260 acres) would remain in farming. About 350 acres of farmland on the southern side of Eight Mile Road has recently been planted to blueberries, a high-valued perennial crop (Figure V-2).[20] On the western edge of the district, adjacent to Eight Mile Road is a marina complex and ferry to Venice Island. There are few other structures within RD 2029 besides a small number of residences and farm buildings.

The marina complex on the district's western border is not subject to assessment by RD 2029, and therefore is excluded from the calculation of flood damage reduction benefits. Likewise, the county road bisecting the island is not subject to district assessment. Therefore, it also is excluded from the analysis.

The Delta Risk Management Strategy (DRMS) project identified six manufactured housing units (mobile homes) and three single-family residential structures. Table V-1 provides a summary of non-farm assets inventoried by DRMS. This inventory included the marina complex and county road, but did not include non-residential farm structures. Satellite imagery of RD 2029 shows what appear to be three farm-related structures. These structures were not included in the calculation of flood damage reduction benefits due to lack of information on their value.

Crop acreage for RD 2029 is shown in Table V-2. Field and grain crops account for approximately 85% of farmed acreage. Corn is the primary crop grown on the island. Higher valued truck crops and the new blueberry acreage account for about 15 percent of farmed acreage on the island.

---

[20] Established blueberries can produce for 20 to 25 years.

Figure V-1. Empire Tract (RD 2029)

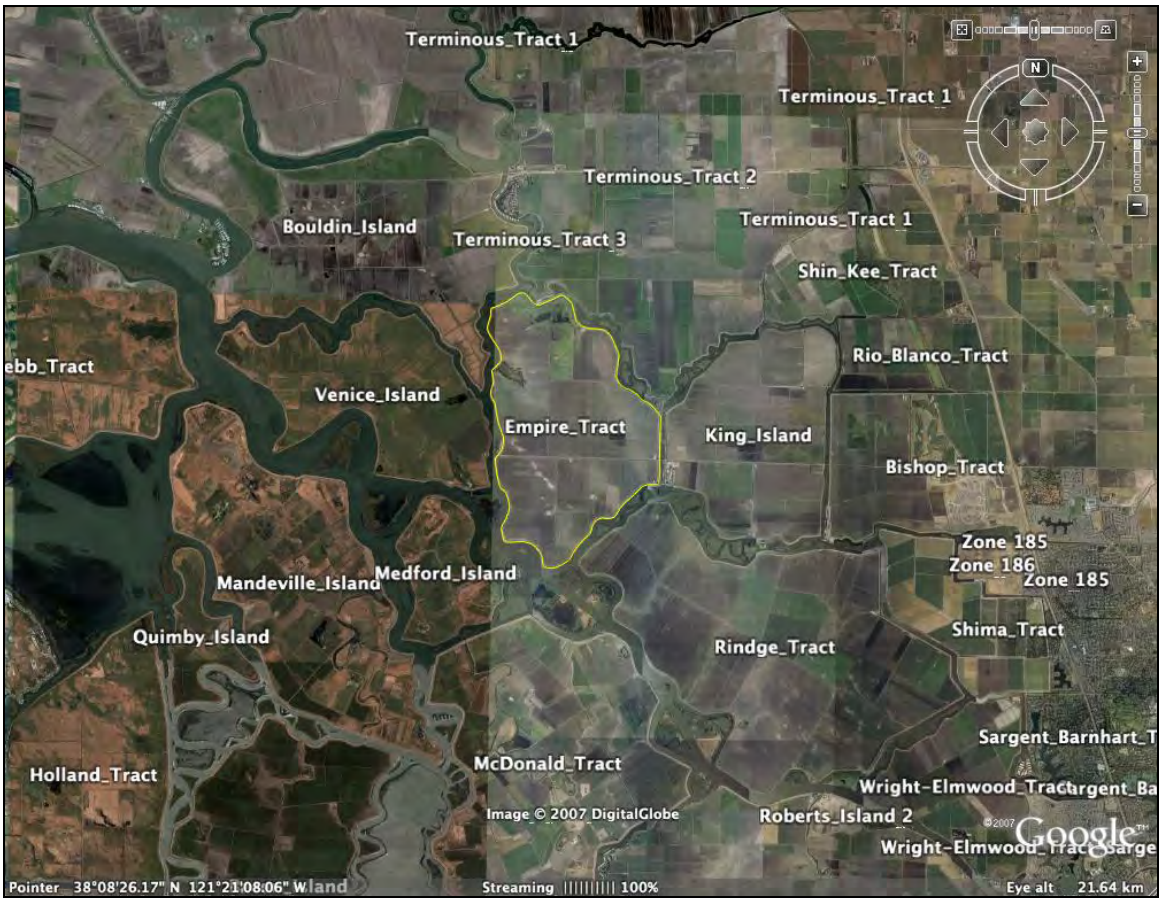


Table V-1. RD 2029 Non-Farm Asset Inventory

Asset Type	Unit	GIS Qty	Avg. Flood Depth	Total Asset Value (Thou. $)
Boat Launch, Marina*	Count	1	22	100
Delta Roads, PBSJ Minor Roads*	Length (ft)	44263	21	8853
PBSJ Gas-Oil Wells – non operational	Count	5	18	0
Residential - Manufactured Housing**	Count	6	21	326
Residential - Single Family Dwelling**	Count	3	21	512

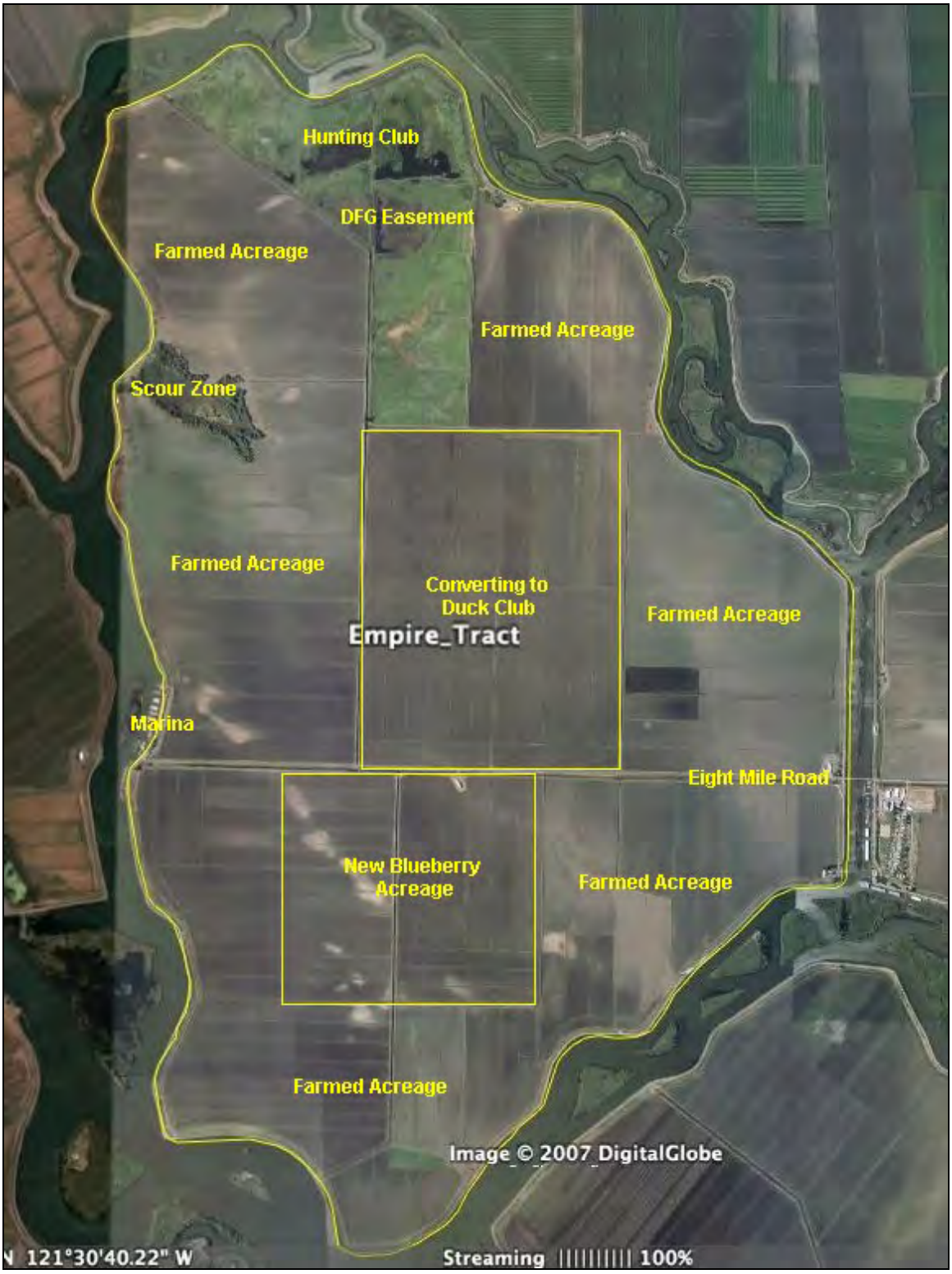
* These assets are not subject to district assessment and therefore are not included in the calculation of flood damage reduction benefits.
**Includes value of structure contents.
Source: Numbers in Table V-1 are from Tables 7-1a and 7-1b. Delta Risk Management Strategy (Phase 1), Technical Memorandum: Impact to Infrastructure, Draft 2, June 2007.

Table V-2. Empire Tract Crop Acreage

Crop	Acreage
Field crops (a)	1,981
Grain other than corn	666
Blueberries	350
Other Truck (b)	140
Total	3,138

Notes:
(a) Field crop acreage includes corn, the primary crop grown on Empire Tract.
(b) DWR/UC Davis acreage data for Empire Tract identified 490 acres of truck crop acreage. For the benefit assessment, we assume the new blueberry acreage came from this truck acreage.

Figure V-2. RD 2029 Current Land Uses



2. RD 2029 Flood Damage Estimation

a. Flood Depth

Flood damage to RD 2029 land, structures and improvements following a levee breach primarily depends on depth of inundation. Because of the island's bowl-shaped geography, depth of inundation will be the same regardless of whether a levee breach occurs during a sunny day event (e.g. a seismic event) or a flood event. All of RD 2029 is below sea level. DRMS estimated an average inundation depth of about 20 to 22 feet (Table V-1). At this level of inundation, all structures and improvements within the levees would be inundated and expected to incur significant flood damage.

b. Damage to Structures and Infrastructure

The DRMS analysis estimated the percent of damage to structures and infrastructure for each Delta tract following a flood event. The estimates for RD 2029 are shown in Table V-3. DRMS used the FEMA HAZUS method to calculate the cost of structure damages.[21] This method multiplies the percent of structure damage by the structure replacement cost. Damage estimates in Table V-3 include damages to structure contents, as well as cleanup costs. Estimation of structure contents and cleanup costs are discussed in subsequent sections.

Damages to the marina and county road are excluded from the calculation of the Alternative State Cost Share because they are not assessable properties. They are therefore not listed in Table V-3.

c. Damage to Structure Contents

Damage to structure contents is included in the DRMS structure damage estimates shown in Table V-3. DRMS used the FEMA HAZUS approach to calculating damages to structure contents. This method estimates structure contents as a percentage of the structural replacement value and multiplies this estimate by the percentage of structural damage based on HAZUS depth-damage relationships for different building types. HAZUS provides the following building content values as percentages of structural replacement values:

Residential	-	50%
Commercial	-	100%
Industrial	-	150%
Government	-	100%

[21] HAZUS is a flood damage estimation software package developed by FEMA. More information on HAZUS is available at http://www.fema.gov/plan/prevent/hazus/.

d. Debris Removal and Cleanup Costs

Debris removal and cleanup costs are included in the DRMS structure damage repair estimates shown in Table V-3. Debris removal costs are a substantial cost immediately following a flood event. After a review of the literature, DRMS concluded that these costs are highly variable, but typically constitute about 10% of total damages. In its analysis of flood damages, DRMS estimated debris removal and cleanup costs at 10% of structural and content damages.

Table V-3. DRMS Structure/Infrastructure Damage Estimates for Empire Tract

Asset Type	Inventory Unit	GIS Qty	% Damage	Total Asset Value (Thou. $)	Repair Costs (Thou. $)	Repair Time (months)
Levee Roads, Scour Damage (2)	Length (ft)	750	100	150	154	6
PBSJ Gas-Oil Wells – Non Operational	Count	5	NA	0	0	0
Residential - Manufactured Housing	Count	6	100	326	338	24
Residential - Single Family Dwelling	Count	3	100	512	544	24
Total (excludes marina and county road):				988	1,036	

Notes:
(1) County assessor's value for Boat Launch/Marina was used instead of DRMS estimate. Total asset value includes structure contents, estimated at 100% of the structure replacement value, per the HAZUS method.
(2) Assume road destroyed at breach site. Road repair cost estimate at breach site equals length of road damaged by scour divided by total road length times road asset value times 1.025 (cost escalator). Length of road damaged by scour equals breach width (500 ft) plus 50% of breach width (250 ft).
Source: Numbers in Table V-3 are from Tables 7-1a and 7-1b. Delta Risk Management Strategy (Phase 1), Technical Memorandum: Impact to Infrastructure, Draft 2, June 2007.

e. Damage Cost and Repair Time Scaling Factors

The damage and repair time estimates in Table V-3 are applicable for simultaneous flooding of up to five Delta islands. The cost and time required for repairs in the case of a larger number of simultaneous island failures is expected to be higher. DRMS used the cost and repair time scaling factors shown in Table V-4 to adjust damage cost estimates for flood events involving a large number of islands. The insurance industry refers to these scaling factors as "post event inflation" or "demand surge". The scaling factors apply to total flood damages (structure + contents + cleanup). To support the use of scaling factors, DRMS reviewed the literature from a variety of post-catastrophic events. The scaling factors shown in Table V-4 were used to estimate structure damages on RD 2029 in the case of a large number of simultaneous flood events.

Table V-4. DRMS Repair Cost and Time Scaling Factors

Number of Island Failures	Repair Cost Scaling Factors	Repair Time Scaling Factors
1 to 5	1.0	1.0

10	1.2	1.4
20	1.6	2.2
30	2.0	3.0

Source: Tables 7-7. Delta Risk Management Strategy (Phase 1), Technical Memorandum: Impact to Infrastructure, Draft 2, June 2007.

f. Residential and Commercial Displacement

A flood event would displace RD 2029 residents and businesses. Residents would need to secure temporary shelter during the period of dewatering and rebuilding. Businesses would likely be closed during the dewatering and repair period.[22] Like rebuilding costs, the period of displacement is a function of the number of structures damaged and requiring repair and the number of other islands and tracts flooded. DRMS used the FEMA HAZUS method for estimating residential displacement costs. This method assumes a one-time cost of $500 per flooded household, plus $500 per month per flooded household, plus a monthly cost based on local rental rates. DRMS estimated average monthly rental rates for typical housing of $747 for the Delta region. Residential displacement costs for a 1-to-5 flooded tract scenario are summarized in Table V-5.

Commercial displacement costs are equal to the revenues net of variable expenses businesses forgo by having to shutdown during the dewatering and repair period. The DRMS estimates for non-agricultural commercial displacement costs for a Tract 1-to-5 flooded tract scenario are shown in Table V-5. While not explicitly stated in DRMS documents, it was assumed estimated business income losses pertained to the marina complex, which is the only commercial enterprise on the island other than farming. Since the marina is not subject to district assessment, its business losses were not included in the calculation of flood damage reduction benefits.

Table V-5. RD 2029 Residential and Commercial Displacement Costs (Thou. $)

Residential*	190
Businesses (other than agriculture)**	40
Total	230
Total, excluding marina losses	190

* Based on 1-to-5 flooded tracts. Residential lost use costs based on 24 month repair time for single family dwelling units.
** These assets are not subject to district assessment and therefore are not included in the calculation of flood damage reduction benefits.
Source: LostUseCost033007.xls; Delta Risk Management Strategy (Phase 1), Technical Memorandum: Economic Consequences, Draft 2, June 2007.

[22] The only non-agricultural commercial operations on the island are the marina and ferry. These facilities are not assessable by the reclamation district and therefore are not included in the benefit assessment.

g. Agricultural Disruption Costs

DRMS estimated agricultural disruption costs for each Delta island/tract. Total costs comprised four components: (1) destruction of or damage to permanent crops, (2) loss of productive land due to scour, (3) field cleanup costs, and (4) loss of crop revenue net of variable production expenses. Agricultural losses for RD 2029 are summarized in Table V-6. The original estimates prepared by DRMS have been updated to account for the new blueberry acreage. The costs in Table V-6 assume levee repair and dewatering would be completed within four months of the breach. In the event of a large scale disaster with multiple island failures, dewatering and repair could be substantially delayed and agricultural disruption costs would be higher than shown in Table V-6. The agricultural loss estimate also assumes a flood event would result in the total loss of the blueberry investment, valued at 1/2 of the establishment cost.[23] The blueberry acreage accounts for approximately 78% of the estimated agricultural losses.

Table V-6. Empire Tract Agricultural Disruption Costs (Thou. $)

	Perm Crops	Scour Damage	Field Cleanup	Income Losses	Total
Fall/Winter Flood	$2,868	$85	$600	$3,321	$6,874
Spring/Summer Flood	$2,868	$85	$600	$3,027	$6,580
Annual Average	$2,868	$85	$600	$3,174	$6,727

Sources: Delta_Flooded_Island_Ag_Impacts_MHH.xls; Delta Risk Management Strategy (Phase 1), Technical Memorandum: Economic Consequences, Draft 2, June 2007.
UC Cooperative Extension (2002). Sample Costs to Produce Fresh Market Blueberries, San Joaquin Valley, Tulare County.

h. Levee Repair and Dewatering Costs

DRMS estimated levee repair and dewatering costs for single breach events for each island/tract in the Delta. For RD 2029, DRMS estimated a cost of $3.4 million to repair a single levee breach and dewater the tract.[24] DRMS assumed the same cost scaling factors previously discussed would apply to levee repair and dewatering.

i. Summary of RD 2029 Flood Damages

Table V-7 summarizes the flood damage estimates. For purposes of this example analysis, it is assumed that the district or its landowners would incur the costs of levee repair and dewatering.

[23] The loss could occur at any time during the useful life of the blueberry bushes, so on average, the loss will occur at the midpoint of the useful life.

[24] The source of the repair cost estimate is Table 12-1 of the Delta Risk Management Strategy Phase 1 Draft Report, June 2007. Repair and dewatering time is from Table 5-4 of the DRMS Emergency Response and Repair Technical Memorandum, draft 2, June 2007. Repair costs assume a single, 500 ft wide breach with a 500 x 2000 square foot scour zone. Fill material is assumed to cost $55/ton; dewatering costs $35/AF pumped.

Table V-7. Empire Tract Flood Damage Costs (Million $)

Island Failures	Up to 5	Up to 10	Up to 20	Up to 30
Structures (1)	$1.04	$1.25	$1.66	$2.08
Res. & Comm. Displace. (2)	$0.19	$0.27	$0.42	$0.57
Ag. Disrupt. (3)	$6.73	$6.73	$10.30	$10.30
Levee Repair (1)	$3.40	$4.20	$5.44	$6.80
Total	$11.36	$12.45	$17.82	$19.75

Notes:
(1) Damage costs for more than 5 flooded islands based on cost scaling factors from Table V-4.
(2) Lost use costs for more than 5 flooded islands based on repair time scaling factors from Table V-4.
(3) Assumes one year of production is lost for 10 or fewer flooded islands; two years for more than 10 flooded islands. Field clean up cost for more than 10 flooded islands is multiplied by a scaling factor of 1.4. The second year of agricultural income loss is based on the value for a fall/winter flood event. The calculation is: 6.727+0.240+3.321 = 10.288, which is rounded to 10.3 in the table.

3. Expected Annual Flood Damage Without the Plan

Expected annual flood damage (EAD) is equal to the estimated damages from a flood event times the probability of occurrence. Estimated flood damages shown in Table V-7 are based on the number of islands and tracts flooded in an event. DRMS estimated the probabilities for simultaneous island flooding. These probabilities were used to estimate the average damage for an RD 2029 flood event. Sunny day and hydrologic events were considered.

Sunny day events can be divided into two categories: seismic and non-seismic. For non-seismic sunny day events, DRMS concluded that the probability of more than one simultaneous island/tract failure is negligible.[25] Therefore, the expected annual flood damage for a non-seismic sunny day event is equal to the probability of occurrence times the damage for 1 to 5 failures.[26] For RD 2029, DRMS estimated a 0.11% annual probability of a non-seismic sunny day failure, such as the Jones Tract failure in 2004.[27] This is approximately a 1-in-1000 year flood risk of a sunny day failure. The expected annual damage from a non-seismic sunny day event given current land uses is therefore approximately $12,500 (0.0011 x $11.36 million).

The same seismic risks were assumed with and without the hypothetical level improvement.[28] Thus, expected damages from sunny day seismic events would be the same with and without the plan and therefore do not need to be calculated.

---

[25] Section 13.2.1, Delta Risk Management Strategy (Phase 1) Draft Report, June 2007.

[26] Sunny day flood depths are determined by tidal level, and therefore damages for MHHW flood depths rather than hydrologic event flood depths are relevant.

[27] See Table 13-1, Delta Risk Management Strategy (Phase 1) Draft Report, June 2007.

[28] The hypothetical levee improvement did not include seismic upgrading to enable the levees to survive large seismic events

For flood events, DRMS estimated the probabilities of multiple island/tract failures shown in Table V-8. These probability estimates were combined with the damage estimates in Table V-7 to calculate the expected damage of a hydrologic flood event, as shown in Table V-9. The expected damage from a hydrologic flood event is $11.65 million.

Table V-8. DRMS Probability Estimates of Multiple Island/Tract Failures

Number of Island/Tract Failures	Probability of Exceedance
1	60.5%
3	28.1%
10	3.4%
20	0.9%
30	0.4%

Source: Table 13-5, Delta Risk Management Strategy (Phase 1) Draft Report, June 2007.

DRMS estimated a 4.41% annual probability (a 1-in-23 chance) of a flood-related failure under the *without plan condition*.[29] EAD for hydrologic events for the without plan condition is equal to the expected damages shown in Table V-9 times this probability, or approximately $514,000.

The total EAD for the *without plan condition* is equal to EAD for sunny day events and EAD for hydrologic events, which equals $526,500 ($514,000 + $12,500).

[29] Table 13-6. Delta Risk Management Strategy (Phase 1) Draft Report. June 2007.

Table V-9. RD 2029 Expected Flood Damage from Hydrologic Flood Events

(1)	(2)	(3)	(4)	(5)	(6)
Flooded Islands	DRMS Exceedance Probability [From Table V-8*]	Probability flooded islands less than or equal to Col. (1) [1-Col. (2)]	Probability flooded islands equals Col. (1) [Row n – Row n-1]	RD 2029 Damages (million $) [From Table V-7*]	[Col. (4) x Col. (5)]
1	**0.6050**	0.395	0.3950	**11.36**	4.487
2	*0.4430*	0.557	0.1620	**11.36**	1.840
3	**0.2810**	0.719	0.1620	**11.36**	1.840
4	*0.2457*	0.754	0.0353	**11.36**	0.401
5	*0.2104*	0.790	0.0353	**11.36**	0.401
6	*0.1751*	0.825	0.0353	*11.58*	0.409
7	*0.1399*	0.860	0.0353	*11.80*	0.416
8	*0.1046*	0.895	0.0353	*12.01*	0.424
9	*0.0693*	0.931	0.0353	*12.23*	0.432
10	**0.0340**	0.966	0.0353	**12.45**	0.439
11	*0.0315*	0.969	0.0025	*12.99*	0.032
12	*0.0290*	0.971	0.0025	*13.52*	0.034
13	*0.0265*	0.974	0.0025	*14.06*	0.035
14	*0.0240*	0.976	0.0025	*14.60*	0.036
15	*0.0215*	0.979	0.0025	*15.14*	0.038
16	*0.0190*	0.981	0.0025	*15.67*	0.039
17	*0.0165*	0.984	0.0025	*16.21*	0.041
18	*0.0140*	0.986	0.0025	*16.75*	0.042
19	*0.0115*	0.988	0.0025	*17.28*	0.043
20	**0.0090**	0.991	0.0025	**17.82**	0.045
21	*0.0085*	0.992	0.0005	*18.01*	0.009
22	*0.0080*	0.992	0.0005	*18.21*	0.009
23	*0.0075*	0.993	0.0005	*18.40*	0.009
24	*0.0070*	0.993	0.0005	*18.59*	0.009
25	*0.0065*	0.994	0.0005	*18.79*	0.009
26	*0.0060*	0.994	0.0005	*18.98*	0.009
27	*0.0055*	0.995	0.0005	*19.17*	0.010
28	*0.0050*	0.995	0.0005	*19.36*	0.010
29	*0.0045*	0.996	0.0005	*19.56*	0.010
30	**0.0040**	0.996	0.0005	**19.75**	0.010
31	*0.0036*	0.996	0.0004	**19.75**	0.008
32	*0.0032*	0.997	0.0004	**19.75**	0.008
33	*0.0028*	0.997	0.0004	**19.75**	0.008
34	*0.0024*	0.998	0.0004	**19.75**	0.008
35	*0.0020*	0.998	0.0004	**19.75**	0.008
36	*0.0016*	0.998	0.0004	**19.75**	0.008
37	*0.0012*	0.999	0.0004	**19.75**	0.008
38	*0.0008*	0.999	0.0004	**19.75**	0.008
39	*0.0004*	1.000	0.0004	**19.75**	0.008
40	*0.0000*	1.000	0.0004	**19.75**	0.008
				Expected Damages	**$11.648**

* Bold values are from Table V-7 or V-8. Italic values are linearly interpolated.

4. Expected Annual Flood Damage With the Plan

The hypothetical levee improvement would reduce the risk of levee failure from hydrologic events from 1-in-23 years to 1-in-100 years. The hypothetical improvement would not appreciably change the risk of non-seismic sunny day events. Therefore, EAD for the *with-plan condition* is equal to the previously calculated EAD for sunny day events and EAD for hydrologic events based on the lower flood risk. EAD for hydrologic events is equal to the expected damages shown in Table V-9 times the 1 percent probability of failure, or approximately $116,500.

The total EAD for the *with-plan condition* is equal to EAD for sunny day events and EAD for hydrologic events, which equals $129,000 ($116,500 + $12,500).

5. Expected Annual Benefit for RD 2029

The expected annual flood damage reduction benefit (EAB) of the plan is equal to the difference between EAD *without the plan* and EAD *with the plan*. This amount is $397,500. Multiplying this amount by 13.765 gives the present value of EAB.[30] This amount is approximately $5.5 million.

6. Determining the Alternative State Cost Share for RD 2029

DRMS estimated it would cost approximately $49 million to improve RD 2029's levees to meet PL84-99 standards and provide 1-in-100 year flood protection from hydrologic events.[31]

The ratio of the present value of EAB to the present value of the project cost ($5.5 million ÷ $49 million) is equal to 0.112. Subtracting this amount from 1 yields 0.888. Because this value is greater than 0.75, the Alternative State Cost Share (before cost sharing enhancements) would be 0.75, or $36.75 million. However, the maximum State share on this project would be limited to $27 million ($5 million plus 50% of $44 million).

---

[30] Based on a real discount rate of 6% over 30 years.

[31] DRMS did not provide a numeric estimate of the reduction in seismic risk from improving the levees to PL84-99 other than to indicate the risk reduction would be small to negligible.

Attachment C-5
Figure 5-3 from the Fifth Staff Draft Delta Plan

Figure 5-3
Recommended Areas for Prioritization and Implementation of Habitat Restoration Projects
Source: DFG 2011

Attachment C-6
Appendix E from the Fifth Staff Draft Delta Plan

Appendix E
Addressing Multiple Stressors and Multiple Goals in the Delta Plan (memorandum)

DELTA STEWARDSHIP COUNCIL

980 NINTH STREET, SUITE 1500
SACRAMENTO, CALIFORNIA 95814
WWW.DELTACOUNCIL.CA.GOV
(916) 445-5511

Chair
Phil Isenberg

Members
Randy Fiorini
Gloria Gray
Patrick Johnston
Hank Nordhoff
Don Nottoli
Felicia Marcus

Executive Officer
P. Joseph Grindstaff

January 26, 2011

To: Phil Isenberg, Chair, Delta Stewardship Council
Members of the Delta Stewardship Council

From: Delta Independent Science Board

Re: Addressing Multiple Stressors and Multiple Goals in the Delta Plan

On August 18, 2010, some members of the California Legislature wrote to you requesting that the Delta Science Program and the Delta Independent Science Board (Delta ISB) "…conduct an assessment of stressors on populations of native fish species in the Delta, the Sacramento and San Joaquin rivers, and the tributaries of those rivers below the rim dams of the central valley." In your response dated September 15, 2010, you stated, "It is my intent to ask our science team, including the Independent Science Board, to develop a list of 'stressors' to the Delta and then prioritize the stressors."

Based on the members' experience, a quick survey of key environmental management efforts around the world, and information gleaned from a one-day workshop organized by the Delta Science Program, the Delta ISB notes that environmental planners, managers, and scientists worldwide are struggling with the assessment and prioritization of multiple stressors. Given the clear urgency around developing an approach to handling multiple stressors for the Delta Plan, the Delta ISB notes and advises:

1. The Council's decisions will necessarily blend scientific and political judgment. There is at present no broadly agreed upon objective methodology for prioritizing multiple stressors, but there are scientific tools, discussed in the attached supporting material, that can add rigor to subjective prioritization.
2. The Council, with the help of the Science Program and review by the Delta ISB, needs to make sure that there are strong causal connections between the stressors addressed in the Delta Plan and particular objectives within the broad coequal goals of the Plan. Sound science and improved modeling can help further ensure these causal connections as the Plan is implemented.
3. A large number of stressors need to be addressed. The Delta ISB has found no reason to think that reducing one stressor, or several stressors, will solve even a particular problem such as the pelagic organism decline (POD). The Delta ISB has prepared a list of key stressors, provided as Attachment 2 to this memo. These are organized under the following four categories:
    a. Global drivers that cannot be controlled by the Delta Plan but whose impacts can be reduced through adaptation,
    b. Legacy stressors resulting from past actions in the Delta watershed that cannot be undone,
    c. Anticipated stressors that can be foreseen resulting from present or future activities, and

    d. Current stressors that result from ongoing activities such as water management practices, agricultural practices, and waste discharges.
4. The Council should plan around the long-term drivers that are producing multiple stressors effecting the major changes in the Delta for the foreseeable future. Climate change, population growth, and pollution are driving numerous particular stressors causing unwanted impacts. Some of these drivers and their associated stressors cannot be mitigated by local action (e.g. temperature increase and changes in precipitation patterns from climate change) and the main planning response must be adaptation. Informed planning can mitigate other drivers and stressors (e.g. patterns of urban expansion from population growth).
5. The success of the Delta Plan depends on the strength of the system of environmental monitoring and adaptive management it establishes. The response of the Delta to management actions is uncertain and will be more so as climate change and other drivers shift the Delta system into new states. The Delta Plan needs to support substantially more intensive monitoring, strong ecological analytical capability, and clear mechanisms for review and updating all aspects of policy and management over time.
6. The implementation of the Delta Plan can improve over time through better integration of Delta science. The Delta Science Program and the prior efforts under CALFED provide the primary journal, conference venue, research support, and shared modeling efforts integrating the scientific understanding of the Delta. This coordinating role needs to be strengthened and expanded. The DRERIP (Delta Regional Ecosystem Restoration Implementation Plan) models, developed as part of CALFED, provide the most relevant set of scientific tools for assessing the significance of different stressors in the Delta, but the models need further development to be useful as dynamic tools for policy and planning.

The supporting material attached elaborates on the findings of the Delta ISB. The content of this memo and supporting material was approved for transmittal to the Council by a quorum of the Delta ISB on January 24, 2011.

Attachment 1

Supporting Material

The implementing legislation for the Delta Stewardship Council and Delta Plan, SBX7-1, specifies in Section 83502(c) that: "The Delta Plan shall include measures that promote all of the following characteristics of a healthy ecosystem" including (4) "reduced threats and stresses on the Delta ecosystem." Thus, threats and stressors and their reduction must be addressed in the Delta Plan.

Members of the Delta ISB, with assistance from the Delta Science Program, reviewed the approaches used for classifying and prioritizing stressors in a wide variety of environmental planning and management efforts in the United States and around the world. A list of key stressors was also developed. Then, the Delta Science Program and Delta ISB organized a workshop held in Sacramento on January 12, 2011, at which invited experts, members of the Delta ISB and the Science Program Lead Scientist addressed two questions: 1) Is it feasible to classify stressors in terms of their importance to the goals of Delta management; and 2) What methods could be used to accomplish that classification? The workshop also helped the Board assess the available science for use in Delta planning and recommend sustaining the science for future needs.

We elaborate on the key points of our discussion about multiple stressors and best available science as follows:

1. *There is no broadly agreed upon methodology for classifying and prioritizing multiple stressors*

In the collective experience of the Delta ISB, the issues of multiple stressors and multiple objectives are pervasive, are of considerable concern to scientists, and are still being evaluated in the Delta, as they are for ecosystem planning and management worldwide. For a variety of reasons noted below, the ranking of stressors is especially difficult. With present understanding, it is not possible to identify a small number of key stressors preventing the achievement of the coequal goals. Nonetheless, the Board finds that there are several approaches that can be used to assist in classifying and prioritizing stressors. Council decisions about which stressors to address at which time will involve a blend of science and political judgment. The scientific tools that can help with this process are discussed further in the following sections.

2. *The importance of a stressor depends on the importance of the management objective it impedes*

The Delta Reform Act of 2009 specifies four basic goals for the Delta (section 29702) and further identifies a number of subgoals and characteristics of the Delta ecosystem and reliable water supply that the Delta Plan shall address (section 85302). These goals, subgoals and characteristics suggest an integrated set of objectives that the Delta Plan must try to address. Stressors can be considered as variables or aspects of the Delta system that are obstacles to meeting the objectives. Thus, stressors and objectives are tightly linked in the sense that

objectives define the important stressors and stressors affect the difficulty, or even possibility, of reaching the objectives.

Because of this tight linkage between policy and management objectives and stressors, the relative importance of stressors cannot be assessed, or prioritized, independent of the relative importance of the objective that is stressed. Scientists rarely address the relative values of different social objectives explicitly, and, as a consequence, the scientific literature provides little information about the relative importance of stressors.

3. *Assessing, or ranking, stressors is very complex for many reasons*

For example:

a) Multiple stressors typically affect an objective in complex, interactive ways that can make it very difficult to ascertain that one stressor is more important than another.
b) Objectives can also be interconnected.
c) A stressor that impedes reaching one objective may have positive effects on achieving another objective.
d) The action and importance of a stressor can vary over seasons or from year to year, or from place to place.
e) Objectives and stressors can vary in importance, for example, as they are assessed at different spatial and temporal scales.
f) There are two broad categories of stressors, those that can be mitigated and those to which the Delta Plan must adapt, and prioritizing across these categories is probably counterproductive.

In developing the Delta Plan, it will be important for the Council to look closely at the relationship between stressors and objectives to ensure that the most important stressors are identified and addressed in the Plan. At the same time, for the reasons noted in a-f above, this will be difficult and will require interactive scientific and political judgment.

4. *The terminology for describing and classifying stressors is not standardized*

Some environmental scientists use quite elaborate terminology to describe how systems respond to stressors and how stressed ecosystems can be managed, splitting terms that other scientists lump together. Even when referring to the same phenomenon, such as something that has a negative effect on an ecosystem attribute, some scientists refer to them as stressors, others call them threats. The inconsistent terminology can be quite frustrating, but this is the state of the science available for crafting The Delta Plan.

The DPSIR (Driver, Pressure, State, Impact and Response) framework has been adopted by the European Environment Agency for describing the challenges of environmental management.[1] We have modified the DPSIR terminology slightly to tailor it to the needs of planning in the Delta (the relationships among these components are shown in the conceptual model of section 5):

[1] http://enviro.lclark.edu:8002/rid=1145949501662_742777852_522/DPSIR%20Overview.pdf).

- *Drivers* are the sources or creators of stress that exert pressure on the ecosystem; for example, altered flows through the Delta.
- *Pressures* are the *stressors*, the factors that act to determine the condition of a system attribute of interest; for example, altered flows result in increased salinity as well as other stressors (temperature, currents, etc.).
- *Key system attributes* are the components of the system that are of interest or concern; for example, the condition (e.g., physiology, reproduction, productivity) of wetland vegetation. Other examples of key system attributes might include the specific life-history stage of a species that is affected by a particular stressor, the population size of a listed species, or the availability of irrigation water for agricultural crops.
- *Responses* are the actions that are taken to maintain or improve the condition of key system attributes. For example, this could be changing the flow regime to reduce salinity stress at critical times of the year. Responses can be directed at the drivers or the stressors, to remove or mitigate their effects, or at the key system attributes, to facilitate adaptation to the stressors. For example, one response would be to manage flows—the driver, to reduce salinity—the stressor. Other management actions could be directed at the wetland vegetation (e.g., protecting critical areas or vegetation restoration), but management directed at the stressor itself, in this case salinity, is less likely.
- *Objectives* describe preferred outcomes of management actions on key system attributes; for example, restoring or improving wetland functioning.
- *Performance measures* are metrics describing the state of key system attributes that can be used to assess progress in meeting objectives; for example, progress might be evaluated by monitoring measures of productivity, biomass, or biodiversity.
- All elements of this conceptualization – the linkages among drivers, stressors, key system attributes, responses, objectives, and performance measures – are parts of an ongoing, dynamic process of *adaptive management*.

Note that, depending on the key system attributes of interest, what is a driver of stressors in one case can be a stressor in another. This has led some scientists to lump drivers and stressors together. This is the situation for the DRERIP (Delta Regional Ecosystem Restoration Implementation Plan), in which a driver-linkage-outcome terminology is used.[2] The DRERIP approach also underlies the POD (Pelagic Organism Decline) studies and BDCP (Bay Delta Conservation Plan).[3] The U.S. Environmental Protection Agency has developed the "Causal Analysis/Diagnosis Decision Information System" or CADDIS that uses source, stressor, outcome terminology.[4] Each of these approaches has different strengths and weaknesses. It is important to recognize, however, that the different approaches and terminologies are conceptually rather similar. Mainly, they differ in the degree to which they may aggregate causal

[2] see: http://www.dfg.ca.gov/delta/erpdeltaplan/

[3] http://science.calwater.ca.gov/pod/pod_index.html (http://baydeltaconservationplan.com/Home.aspx).

[4] http://www.epa.gov/caddis

factors and in the labels they apply to different aspects of the system linking causes to outcomes. It is important to distinguish between what is stressing a system attribute (e.g., a species population, water quality) and what is producing or driving the stress, because this could affect the likelihood of successfully realizing goals and objectives. However, management actions can target different levels in the chain of causation depending on circumstances.

5. *Ecosystem management models are a critical element in the characterization and assessment of stressors*

The Delta ISB believes that defining and delineating stressors is best accomplished by developing a conceptual model that clearly specifies the relationships between cause and effect with respect to the attributes of interest. Such models have been successfully used as a template for structuring an ecosystem-management approach in numerous regional assessments. For example, they have been used as a basis for management programs in the Everglades of south Florida[5] (Gentile et al. 2001) and Alaska[6] and are the foundation of conservation planning in The Nature Conservancy[7] and the Conservation Measures Partnership.[8] In these programs, the conceptual models have been used to identify risks and develop performance criteria as well as to provide a clear understanding of stressors in the systems. Conceptual models also are a prominent part of DRERIP, which includes both species life-history models and ecosystem-component models. Because they are specific to the Delta, the DRERIP models provide a valuable resource for characterizing causal linkages between stressors and objectives and for prioritizing stressors.

The following diagrams illustrate (on the left) a conceptual model of the pathways linking drivers to outcomes and objectives and how stressors fit into this causal chain and provide a hypothetical example (on the right, described in section 4) to clarify the components and linkages of this conceptualization. The elements within the oval are the components linking drivers and stressors to system attributes, management responses, and objectives. The box below the oval indicates how all of these components feed into the monitoring and performance assessment that are at the core of adaptive management, and the arrows encircling the oval indicate that adaptive management is a continuous, ongoing process.

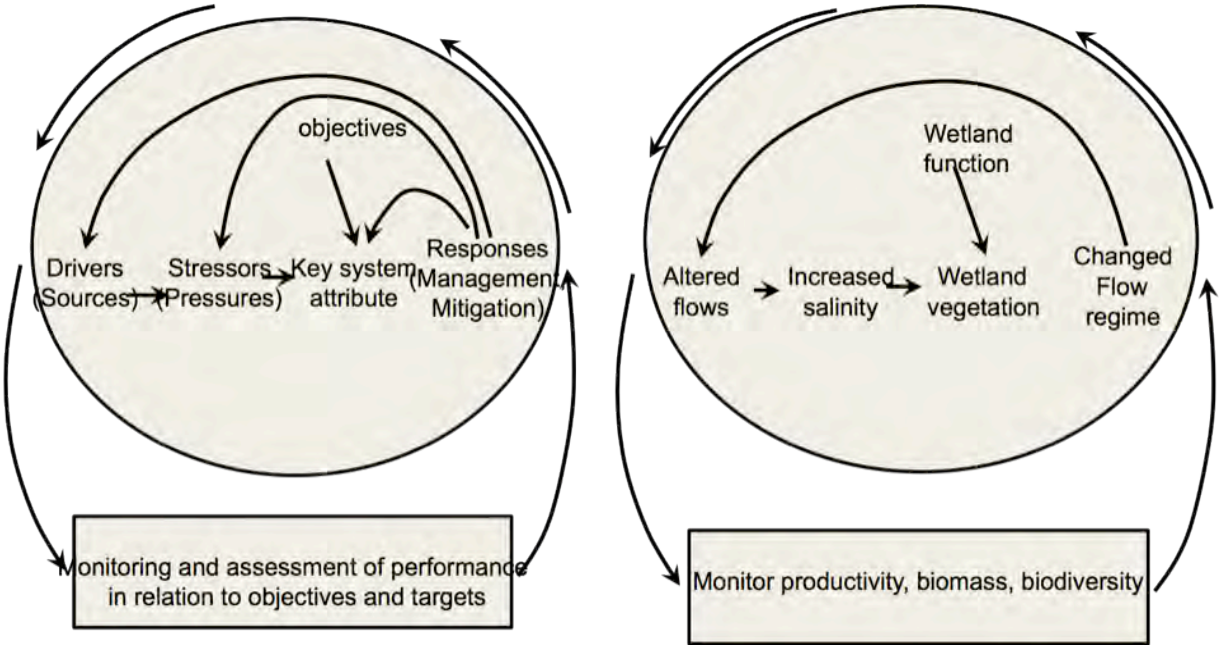
---

[5] Gentile, J.H., M.A. Harwell, W. Cropper Jr., C.C. Harwell, D. DeAngelis, S. Davis, J.C. Ogden, and D. Lirman. 2001. Ecological conceptual models: a framework and case study on ecosystem management for South Florida sustainability. *Science of the Total Environment* 274: 231-253.

[6] Harwell, M.A., J.H. Gentile, K.W. Cummins, R.C. Highsmith, R. Hilborn, C.P. McRoy, J. Parrish, and T. Weingartner. 2010. A conceptual model of natural and anthropogenic drivers and their influence on the Prince William Sound, Alaska, ecosystem. *Human and Ecological Risk Assessment* 16: 672-726.

[7] see http://conserveonline.org/workspaces/cbdgateway/cap/index.html

[8] see http://www.conservationmeasures.org/



This conceptual model is derived from the DPSIR approach and generally follows the approach of Gentile et al. (2001). The DRERIP models, in general, represent the left three steps within the large oval (Drivers, Stressors, Key ecosystem attribute, which in DRERIP terms are Drivers, Linkages, Outcomes).

Understanding how particular factors fit into this conceptualization – as drivers, stressors, or key system attributes – and developing scientifically sound conceptual models of the causal relationships is critical because it affects where management actions can be most effective and what to expect (and monitor) as a result of the actions. In general, actions directed at a driver (e.g., water flow) will affect multiple stressors (e.g., water temperature, seasonality, chemistry, as well as salinity), whereas actions directed at stressors will have more targeted effects. Importantly, **a stressor should be defined in terms of its effect on a key system attribute and an objective for that attribute**. In the above example, increased salinity may be a widespread or frequent consequence of altered flows, but it will differ in its effects (i.e., its status as a stressor) on different species or system components. Furthermore, there are temporal and spatial dimensions to the presence of a stressor; salinity levels may vary seasonally and be dependent on location in the Bay-Delta system. Finally, stressors are scale-dependent – some stressors may act broadly, others only in localized situations. Proper assessment of stressors requires consideration of temporal and spatial variation and the operating scales at which drivers are linked to stressors and attributes. Management actions need to be commensurate with the scale of the stressor.

6. *Different kinds of stressors call for different kinds of responses*

Stressors can be classified in various ways; in terms of origin, mode of action, spatial and temporal breadth of impact, whether or not managers have the ability to affect their action, and so on. Classifying stressors is an essential step toward understanding, and eventually to assessing

them. The Delta ISB found the following four categories of stressors to be helpful in our own discussions of the Delta:

- Globally determined stressors—stressors, like the effects of climate change or human population growth, which cannot be eliminated or mitigated within the purview of the Delta Plan. Management actions must adapt to the continued effects of these stressors in the Delta.
- Legacy stressors—stressors that result from past actions in the Delta watershed that cannot be undone. These include stressors such as the continuing effects of sediment and mercury discharge during the gold mining era. Infrastructure that causes stress on the Delta and is not likely to be significantly altered, such as upstream dams and the network of levees, can also be treated as legacy stressors. Although these stressors cannot be eliminated, management actions can reduce their effects on the Delta.
- Anticipated stressors—stressors that scientists can anticipate will result from present or future activities. The Delta Plan can modify these stressors in such a way as to prevent or reduce the stressor or better adapt to the stressor.
- Current stressors—stressors that result from ongoing activities, such as water management practices, agricultural practices, waste discharges, etc. Management actions can either change those practices, take steps to reduce their effects-on the Delta, or both.

Note that the legacy stressors exist because of an historic failure by Californians to anticipate and prevent or mitigate the long-term effects of human activity. They serve as a good reminder to us of the importance of anticipating stressors and reducing them through planning.

We list “current stressors” last because The Delta Plan needs to take the long temporal view. To the extent that current stressors are expected to carry on into the future, including how water is managed, the DSC should address them.

In preparing for the workshop on January 12, the Delta ISB compiled a list of stressors affecting the Delta. These are organized in relation to the categories above in Attachment 2. The list of stressors is not comprehensive, nor has it as yet been vetted in terms of how the various stressors relate to the objectives, subobjectives and characteristics listed in SBX7-1. However, the list serves to illustrate the broad range of kinds of stressors that must be considered in developing the Delta Plan and some of the constraints on opportunities to mitigate their effects.

Some long-term stressors, such as sea level rise, cannot be mitigated and must be adapted to. In some cases, when confronted with such stressors, objectives will have to be modified to fit the reality of the stressor. In other cases, the objective might be reached, or partially reached, through adaptation, for example, by improving levees. Where adaptation is necessary, the stressor requires us to reconsider the objective.

Where mitigation is possible, specific objectives are needed simply to identify what the stressors are. For example, section 83502(c)(1) specifies the objective of having “viable populations of native resident and migratory species.” To determine which stressors are preventing viable populations of native species, one typically must look at particular species – Chinook salmon, Sandhill crane, etc. – and what has been stressing them. In the process of identifying stressors, one might logically overlook less valued species or less valued states of the environment except

to the extent they are important to valued species or valued states of the environment. A focus on particular species (listed species, for example) may lead to management measures that are detrimental to other species. Thus, even where a stressor can be mitigated, the outcome may not be universally positive. Trade-offs will be necessary as will vigilance in assessing the broad consequences of stressor reduction.

7. Pay attention to the long-term drivers

Decision-makers need to plan management in the context of the directional changes that are occurring in the Delta as well as the potential for catastrophic change if Delta levees fail. Decision-makers need to be looking 30-50 years into the future as they develop policy. Experience has shown that the development and implementation of major policies can take more than a decade and response times to policy change are also on the order of a decade or more. In essence, policies to manage for the coequal goals will need to be flexible and nimble enough to succeed in the context of continual but uncertain long-term directional change.

Climate change is driving directional change in several key variables affecting the coequal goals. Although total precipitation is not changing much, less is falling as snow so that the winter snowpack is decreasing. Because the snowpack is the major storehouse of water for spring and summer irrigation, loss of snowpack strongly affects the amount of water that is available for human and other uses. With warming temperatures, snowpack is melting earlier and winter flows are less stable. Consequently, peak flows occur earlier and over a shorter period of time. Air temperatures are also increasing so that both patterns of inflow to the Delta and water temperature are changing over time. Rising sea level is changing the salinity of the Delta and also increasing the risk to Delta levees. In addition to changes resulting from climate change, the likelihood of an earthquake within this century that will cause catastrophic breaks in Delta levees is high. Thus, there is significant risk that a number of Delta islands may be flooded in the future. Economic considerations will influence any decision about restoration of the levees, so that the future Delta may include a number of flooded islands as large deep lakes. Such flooding of islands will have important implications for the hydrodynamics and salinity of the Delta, will affect the quality of water exported from the Delta, and will impact Delta land use. New species continue to be introduced to the Delta so scientists expect that the biological community will continue to change with uncertain implications for native species. These kinds of broad-scale changes will also affect terrestrial ecosystems; changing habitat conditions for plants and wildlife, particularly migratory birds. Exotic species are also invading terrestrial habitats, with effects on productivity and food webs for native species. Processes of continual change also derive from population growth, urban expansion, agricultural practice and a host of other human activities in and around the Delta.

These continual processes of change greatly complicate development of effective management policy to protect, restore and enhance the Delta and maintain reliable water supply. Indeed, some analysts suggest that the Delta has entered a new ecological regime significantly different from its historic regime or even the recent past. This may not be a stable regime but rather a transitory condition that will continue to change as climate change and other unmanageable stressors continue to change the Delta. As changing climate increases stress on listed species, conservation may demand more water for environmental protection, further reducing the flows available for

other uses.

8. Policies to deal with multiple stressors have highly uncertain consequences

Although the Delta is a relatively well-studied environmental system, our ability to predict the Delta of the future is not strong. Scientific inferences are quite uncertain because the ongoing, serial change that is occurring in the Delta makes future states difficult to predict. Relationships that appear relatively well developed at one point in time (e.g., the relationship between abundance of four species in the Pelagic Organism Decline, and X_2 (The distance upstream from Golden Gate of the isopleth of two practical salinity units)) tend to break down as additional years of data are accumulated. Another consequence of change and non-linear responses to stressors is that even in circumstances where there is a clear dose/response relationship between change in a stressor and response of the system in the past, removing the stressor may not result in a reversal of the observed dose response relationship. A consequence of this uncertainty is that simply relieving stressors may not lead to desired outcomes. This fact speaks strongly to the need to implement policy as adaptive management experiments in which there is a clearly developed process for gathering information on the effectiveness of the policy and a mechanism for review and updating of all aspects of the policy over time. This need includes problem definition, conceptual model, indicator variables, and policy response.

SBX7 defines adaptive management in section 85052. "'Adaptive management' means a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvement in management planning and implementation of a project to achieve specified objectives." This definition is a fairly standard one. In applying adaptive management to the Delta, however, it is not reasonable to assume that the system is stable over time. The directional change that is occurring in the Delta means that the adaptive approach cannot assume that uncertainty will decline as more information is gathered. Planning and management must include rigorous programs of data gathering to assess the effectiveness of policy, but it needs also to recognize that policies may fail not only because of uncertainty in system behavior but because the system is actually changing over time in fundamental ways. In practical terms this makes monitoring programs and timely analysis of the data generated more important. There will also need to be ongoing research in the Delta to identify and anticipate the emergence of conditions that could undermine the effectiveness of policy.

9. *Support Delta science*

The Delta ISB is impressed with the variety and depth of past scientific study and ongoing research in the Delta. The Delta Science Program plays a central role in communicating and coordinating Delta science as well as funding and publicizing critical scientific initiatives. But the Delta ISB is also concerned that Delta science needs stronger integration and coordination. In this sense, the Delta ISB found the DRERIP models and approach to be an especially good start with considerable potential for further development. Although designed to evaluate restoration actions, the DRERIP models also provide an objective, science-based set of tools for evaluating stressors. The models do not, as yet, cover all the aspects that are of concern to the Council and at present they are static models that require staff to work out the effects of varying a stressor qualitatively. The usefulness of these models would be greatly enhanced if they were made

dynamic and interactive. Support to accomplish this through the Delta Science Program would give the Science Program and the Council a powerful, locally designed set of tools for assessing stressors now and in the future.

10. *Expect surprises*

As noted earlier, the Delta is changing over time. Some changes, like the effects of changing hydrology and sea level rise due to climate change, can be anticipated and modeled. In addition to changing climate, the 21st century Delta faces the likelihood of earthquakes that may leave a number of islands permanently flooded. Other changes are more contingent on unforeseeable circumstances, like species invasion or levee failure by decay. Regardless, uncertainty virtually guarantees that large, unexpected events will occur from time to time. From the perspective of analysis and prioritization of drivers and stressors, this has several implications. First, scientists and managers need to be continually alert for the emergence of new drivers and stressors. Second, the governance process needs to be nimble enough to adjust policy and management to respond to emerging problems. Third, even if management is focused on a subset of stressors, monitoring should continue to gather information on a broad spectrum of stressors as a means to monitor the “pulse” of the Delta. Such broad scale monitoring also has the potential to identify emerging issues and stressors before their effects are irreversible.

Attachment 2

Some Key Drivers and Stressors Demonstrating a Possible Classification

As noted in section 6 of Attachment 1, the Delta ISB has found the following categorization of drivers and stressors to be helpful.

- **Globally Determined stressors (Global) -** stressors, like the effects of climate change or human population growth, which cannot be eliminated or mitigated within the purview of the Delta Plan. Management actions must adapt to the continued effects of these stressors in the Delta.
- **Legacy stressors (Legacy) -** stressors that result from past actions in the Delta watershed that cannot be undone. These include stressors such as the continuing effects of sediment and mercury discharge during the gold mining era. Infrastructure that causes stress on the Delta and is not likely to be significantly altered, such as upstream dams and the network of levees, can also be treated as legacy stressors. Although these stressors cannot be eliminated, management actions can reduce their effects on the Delta.
- **Anticipated stressors (Anticipated) -** stressors that scientists can anticipate will result from present or future activities. The Delta Plan can modify these stressors in such a way as to prevent or reduce the stressor or better adapt to the stressor.
- **Current stressors (Current) -** stressors that result from ongoing activities, such as water management practices, agricultural practices, waste discharges, etc. Management actions can either change those practices, take steps to reduce their effects-on the Delta, or both.

The Delta ISB also prepared a list of drivers and stressors for the Delta. We present these under the categories suggested above with notes with respect to each stressor's impact.

Table of Some Key Drivers and Stressors in the Bay-Delta [Notes include both changes in state of the ecosystem as well as examples of impacts.]

PLEASE NOTE THAT THE FOLLOWING LIST OF DRIVERS AND STRESSORS IS NOT TO BE CONSIDERED A COMPLETE LISTING OF ALL POTENTIAL DRIVERS AND STRESSORS IN THE SYSTEM. THE ORDER OF THEIR OCCURRENCE ON THIS TABLE IS NOT INTENDED TO DENOTE ANY FORM OF PRIORITIZATION.

Type	Whether Driver (D) or Stressor (S)	Notes
Global		
	D Climate change	
	S Reductions in inflow and outflow	Possibly lower water yield
	S Alterations in hydrograph	Changes in seasonal patterns (earlier, smaller freshest)
	S Higher temperatures	Seasonal temperature variation; altered phenology (e.g., timing mismatch between predators and prey, flower and pollinator); species and biogeochemical processes impacted

Type	Whether Driver (D) or Stressor (S)	Notes
		by temperature
	S Sea level rise	Salinity intrusion, levee breaches, altered rates of erosion and deposition. Shifting species distribution and food web dynamics
	S Changes in ocean conditions	Many Delta species spend part of their lives living or feeding in the ocean
Global		
	D Earthquakes	Levee and highway damage
	D Population growth	Places increasing pressure on land and water resources
	D California economy	Patterns of development, agriculture, recreation are driven by economics
Legacy		
	S Habitat loss and alteration	Loss or reduction of seasonal and tidal wetlands, riparian habitats, gallery forests and native grasslands; simplified system of leveed agricultural islands separated by deep channels with leveed shorelines; small, unconnected fragments of natural habitat; channels unconnected to floodplain; uplands less connected to Delta; channels dredged, interconnected, and simplified; terrestrial diversity reduced; impacts include: changing competition and predation, loss of access to breeding sites
	S Changed pattern of flow	Channel simplification and interconnection changed flow velocity and pattern; infrequent floodplain inundation; impacts include: migration barriers, altered migration corridors, improved water conveyance to south Delta, salt entrainment affects domestic water supply, loss of access to breeding sites, greater tidal excursion and salt penetration into Delta
	S Methyl-mercury from released mercury	Changing Delta conditions can affect the methylation of mercury stored in sediments; impacts include mercury bioaccumulation in the foodweb
	S Selenium	Past practices resulting in residual toxins in the food web
	S Subsidence	Loss of peat soils in islands; impacts include increased risk of levee breaks with loss of structures and habitat
	S Changing sediment loads	Sediment delivery increased with European colonization and is now declining; impacts include: turbidity declines, altered erosion and deposition, SAV expansion, smelt distribution
	S Artificial levees	Isolated land and water ecosystems that made possible the development of the Delta's cultural and economic character

Type	Whether Driver (D) or Stressor (S)	Notes
	D Water management infrastructure	Increases reliability of water delivery; habitat loss; altered migration corridors
	S Levee breaks	Permanent flooding of multiple islands would likely raise salinity in the south Delta; native fish may not use deeply flooded islands
Legacy		
	D Upstream dams	Loss of access to breeding sites; existence and operation affect virtually every aspect of Delta environment, society and economy
	D Federal-state agricultural policies	Ag subsidies affect land use and habitation patterns
	D Development, zoning, building codes	Affects land use, lifestyle choices and many other human decisions affecting the Delta
	S Invasive species	Low prey; changes food web; changing competition; higher predation; agricultural pests
Anticipated		
	S Subsidence	Loss of peat soils in islands; impacts include increased risk of levee breaks with loss of structures and habitat
	D Landscape change	Delta's habitat mosaic is constantly changing as human land and water use evolves
	D Urban expansion	Affects the Delta in many ways that threaten native species and ecosystems, water quality and demand, unique Delta attributes
	D Upstream land use	Affects the quantity and quality of water entering the Delta, sediment load, habitat for species migrating through Delta
	D Upstream dams	Existence and operation affect virtually every aspect of Delta environment, society and economy
	D Lifestyle choices	Decisions about where and how to live affect species, habitats, water demand
	D Urban-rural migration patterns	Dominant human migration patterns are rural to urban and inland to coastal
	S Invasive species	Low prey; changed food web; changing competition; higher predation
Current		
	S Changed hydrograph; reduced inflow and outflow	Upstream water withdrawals; water project and in-Delta withdrawals reduce flow through Delta; reduced seasonal flow variation; improved seasonal availability of water for agriculture; impacts include: salinity intrusion, less salinity variability, seasonal temperature changes, water residence time more uniform, stranding, low DO and thermal migration barriers
	S Entrainment at pumps & other diversions	Effect of OMR flows on fish movement and water supply; in-Delta withdrawals for agriculture, domestic water, power plants. Mortality of

Type	Whether Driver (D) or Stressor (S)	Notes
		entrained fishes, including threatened species
	S More nitrate, ammonium and less phosphorus	Excess nutrients from agriculture and domestic waste; altered N/P ratios; impacts include: low DO, SAV expansion, *Microcystis* blooms, reduced phytoplankton production, can favor invasive species
Current		
	S Selenium release	Releases by agriculture and industry can be toxic through the food web
	S Pesticide release	Agriculture, industry, and residential use (pyrethroids and organophosphates of concern)
	S Other trace metals and toxics	Lead, chromium, copper, surfactants, endocrine mimics and disruptors introduced from agriculture, industry, domestic waste, and storm water
	S Dredging	Channel dredging mobilizes sediment and toxins; impacts benthic organisms
	S Legal harvest	Incidental take of threatened species
	S Illegal harvest	Illegal take of threatened species
	D Hatchery impacts	Alters genetic makeup affecting ability to perform in the wild and the wild conspecifics with which they breed. Introduction of diseases to wild populations
	D Federal-state agricultural policy	Ag subsidies affect land use and habitation patterns
	D Development, zoning, building codes	Affects land use, lifestyle choices and many other human decisions affecting the Delta

Attachment C-7
Appendix G from the Fifth Staff Draft Delta Plan

Appendix G
Delta Dredged Sediment Long-Term Management Strategy

U.S. Army Corps of Engineers

San Francisco District

DELTA DREDGED SEDIMENT LONG-TERM MANAGEMENT STRATEGY (PINOLE SHOAL MANAGEMENT AREA) STUDY WORK PLAN

MANAGEMENT COMMITTEE REVIEW DRAFT

U.S. Army Corps of Engineers
San Francisco District
333 Market Street
San Francisco, California 94105

May 9, 2007

EXECUTIVE SUMMARY v

1 INTRODUCTION 1
1.1 Project Background 1
1.2 Project Purpose and Need 2
1.3 LTMS Structure Participants and Roles 2
1.4 Study Goals and Objectives 8
1.5 Federal, Non-Federal, and Public Concerns 10
1.5.1 Environmental/Permitting 10
1.5.2 Technical 10
1.5.3 Economics 11
1.5.4 Political 12
1.6 Adaptive Management and Integration Plan 12
1.7 Summary of Work Plan Organization 12

2 DELTA LTMS STUDY AREA 14
2.1 Geographic Boundaries 14
2.2 Historical and Projected Dredge Volumes 14
2.3 Sediment Physical and Chemical Characteristics 14

3 DELTA LTMS DEVELOPMENT PROCESS 16
3.1 List of Initial Tasks 16
3.1.1 Define Goals, Objectives, and Information Needs 16
3.1.2 Formation and Coordination of Technical Work Groups 16
3.1.2.1 Regional Dredging and Reuse Permitting Work Group 18
3.1.2.2 Testing Protocols Review Work Group 21
3.1.2.3 Programmatic Biological Assessment Development Work Group 23
3.1.2.4 Dredge Material Disposal and Reuse Alternatives Development Work Group 26
3.1.3 Sediment Quality Database Development 28
3.1.4 Develop Hypothetical Project Scenarios 30
3.1.5 Identification and Evaluation of Management Alternatives 30
3.1.6 Development of a Programmatic EIS/EIR 31
3.1.6.1 Environmental Baseline Conditions 32
3.1.6.2 Project Scenarios and Alternatives Development 32
3.1.6.3 Technical Analyses 32
3.1.6.4 Impacts Analysis and Programmatic 404(b)(1) Evaluation 33
3.1.7 Sediment Management Plan Report Development 33
3.2 Project Schedule and Task Relationships 33
3.3 Estimated Task Costs 35
3.4 Task Responsibility Assignment 38

4 TECHNICAL QUALITY CONTROL PLAN 41
4.1 Quality Control Plan Objective 41
4.2 Guidelines Followed For Technical Review 41
4.3 Document/Work Product Review Steps 41
4.4 Deviations from the Approved Quality Control Plan 43

5 PUBLIC INVOLVEMENT AND COORDINATION 44

6 DELTA LTMS/SMP AGENCY IMPLEMENTATION STRATEGY 44

7 REFERENCES 45

List of Tables

Table 3-1 Summary of Estimated Costs 35
Table 3-2 Responsibility Assignment Matrix 38
Table 4-1 Minimum Technical Review Steps for Delta LTMS Work Products 42

List of Figures

Figure ES-1 Delta Dredged Sediment LTMS Development Process xi
Figure 1-1 Plan View of Delta Region 3
Figure 1-2 Organizational Structure 4
Figure 2-1 Delta Levees and Federal Areas of Concern 15
Figure 3-1 Delta Dredged Sediment LTMS Development Process 17
Figure 3-2 Delta LTMS Project Schedule 34

List of Appendices

Appendix A LTMS Charter and Framework
Long-term Management Strategy for Dredged Material in the Delta – Process Framework
Long-term Management Strategy for Dredged Material in the Delta – Charter
Appendix B Levees of Federal Concern

BA	Biological Assessment
BMPs	Best Management Practices
CBDA	California Bay-Delta Authority
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESPD	U.S. Army Corps of Engineers South Pacific Division
COCs	Constituents of Concern
Corps	U.S. Army Corps of Engineers
CVP	Central Valley Project
CVRWB	Central Valley Regional Water Board
DDRS	Delta Dredging and Reuse Strategy
DMMO	Dredged Material Management Office
DMMP	dredged material management plan
DPC	Delta Protection Commission
DWR	California Department of Water Resources
DWSC	Deep Water Ship Channel
EIS/EIR	Environmental Impact Statement/Environmental Impact Report
GI	General Improvement
HQUSACE	Headquarters of the U.S. Army Corps of Engineers
IWG	Interagency Working Group
SPK	U.S. Army Corps of Engineers Sacramento District
SPN	U.S. Army Corps of Engineers San Francisco District
LTMS	Long-Term Management Strategy
MC	Management Committee
NAS	network analysis system
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Association
NMFS	National Marine Fisheries Services
OBS	organizational breakdown structure
PEIS	Programmatic Environmental Impact Statement
PMP	Project Management Plan
QA/QC	quality assurance/quality control
RAM	Responsibility Assignment Matrix

SMP	sediment management plan
SQO	Sediment Quality Objectives
SRG	Strategy Review Group
State Water Board	the State Water Resources Control Board
SWP	State Water Project
TWG	Technical Work Group
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VSA	Value Stream Analysis
WBS	work breakdown structure

EXECUTIVE SUMMARY

Background

The Delta estuary is the largest estuary on the West Coast. Covering more than 738,000 acres in five counties, it is a maze of tributaries, sloughs, and islands and a haven for plants and wildlife, supporting more than 750 plant and animal species, including more than 110 species listed as "species of concern." The Delta is critical to California's economy, supplying drinking water for two-thirds of Californians and irrigation water for more than 7 million acres of the most highly productive agricultural land in the world.

The Delta is also the hub of California's two largest water distribution systems – the Central Valley Project (CVP) operated by the U.S. Bureau of Reclamation (Reclamation) and the State Water Project (SWP) operated by the California Department of Water Resources (DWR). Maintaining high quality water in the Delta is critical for drinking water supplies, agricultural irrigation, and ecosystem function. More than 1,100 miles of levees protect the water conveyance functions, ecosystem, and land uses on Delta islands. The Sacramento and San Joaquin River channels also provide important waterborne commerce access to the Ports of Sacramento and Stockton.

In recent years, conflicts about levee rehabilitation, dredging, and placement of dredged sediments have been increasing. There is an ongoing need to dredge Delta channels for navigation, water conveyance, flood control, and levee maintenance. At the same time, there are increasing regulatory concerns about the potential impacts to water quality and the ecosystem from levee work, dredging activities, and dredge materials placement and reuse.

In the last several years, agencies (Federal, State, and local), the public, political leaders, and the media have become increasingly concerned about the urgent need for levee rehabilitation in the Delta. Sediment management and reuse from dredging activities is a potential source of material for Delta levee rehabilitation. At the same time, the Delta environment is showing signs of major stress and dysfunction, as evidenced by the rapid decline of pelagic species in recent years.

Concerns about the complex and sensitive environment in the Delta have resulted in stringent regulatory requirements for dredging and sediment reuse and placement in the Delta. These two apparently conflicting objectives, protection of the Delta environment and increased dredging and sediment reuse and placement, highlight the need for better coordination and management of Delta dredging and sediment management and reuse requirements.

In late 2004, local sponsors of Delta dredging projects and the U.S. Army Corps of Engineers (Corps) met to explore the feasibility of developing a long-term management strategy (LTMS) for dredging and dredged materials placement or reuse in the Delta. A similar

process was used to successfully develop a collaborative, coordinated approach to dredging and sediment management in San Francisco Bay.

Project Goals and Objectives:

The five initial participating agencies (Corps, U.S. Environmental Protection Agency [USEPA], DWR, California Bay-Delta Authority [CBDA], and Central Valley Regional Water Board [CVRWB]) agreed to examine the sediment issues and needs within the Delta. The participating agencies drafted a three-part project purpose statement:

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

To achieve these goals, the Delta LTMS seeks to improve coordination and planning efforts between dredging proponents and regulatory agencies, and to streamline, wherever possible, the regulatory approval process for future Delta dredging and sediment management activities. The following lists some of the specific objectives identified through stakeholder interviews that participants would like to see achieved during the LTMS development process. Some of these items may eventually be found not to be suitable for this group, but have been retained in this document in an effort to address all stakeholder concerns:

- Develop a streamlined permitting process to facilitate and improve coordination and cooperation among agencies with dredging management responsibilities or regulatory authority over dredging and placement activities.
- Develop a Standardized Sediment Characterization Manual that addresses stakeholder concerns pertaining to appropriate tests, protocols, and methods for various disposal options.
- Review and summarize regional best management practices (BMPs) for the dredging and disposal of contaminated and non-contaminated dredged sediments.
- Review regional disposal alternatives for contaminated and non-contaminated dredged sediments.
- Identify environmental restoration and/or enhancement opportunities that are directly related to the dredging and disposal of sediments.
- Develop a Sediment Management Plan to include: (i) approved regional disposal sites and/or identify treatment alternatives; (ii) BMPs for dredging and disposal operations; (iii) a consolidated and consistent plan for regulatory review; (iv)

chemical trigger levels for sediment/elutriate testing and disposal alternative selection; and, (v) a tiered approach for site suitability to dispose dredged sediments.
- Develop a programmatic BA to facilitate dredging and placement activities while ensuring the protection of resources (fish species).
- Prepare a programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to implement the Delta disposal management alternatives.
- Ensure that the SMP and EIS/EIR are consistent with CVRWB regulations for the surface and groundwater quality.
- Facilitate beneficial use of dredged materials for levee stabilization or other uses while protecting surface and groundwater quality.

Organization

The Delta LTMS is organized in a management process to include an executive committee, management committee, interagency working group, strategy review group, and science advisory teams as described in this section. In addition, public meetings will be held periodically to provide additional opportunities for input and feedback from interested parties.

Executive Committee

At the top level, an Executive Committee will direct the overall program, set policy direction, and provide oversight of the study. The directors of each of the following agencies will serve on the Executive Committee. The appointed executive managers should have the decision-making authority to represent the agency on the policy and regulatory issues to be addressed. The Agency Executive Committee will meet annually or as necessary to set policy direction for the study and keep abreast of the progress of the study.

- U.S. Army Corps of Engineers, Commander, South Pacific Division
- U.S. Environmental Protection Agency, Regional Administrator, Region 9
- State Water Resources Control Board (State Water Board), Chairperson
- Central Valley Regional Water Board, Chairperson
- California Department of Water Resources, Director
- California Bay-Delta Authority, Chairperson
- Delta Protection Commission, Chairperson

Management Committee

The Management Committee will consist of the deputy-level managers for the State and Federal agencies. The Management Committee will oversee the work of the Interagency Working Group (IWG) and the associated Strategy Review Group, review policy recommendations, study plans, budget proposals, and provide recommendations to the Executive Committee. The Management Committee will meet quarterly. Members of the Management Committee are:

- U.S. Army Corps of Engineers, District Commander, San Francisco District
- U.S. Army Corps of Engineers, District Commander, Sacramento District
- California Department of Water Resources, Deputy Director, Public Safety

- U.S. Environmental Protection Agency, Director, Water Management Division, Region 9
- California Bay-Delta Authority, Executive Director
- State Water Board, Executive Officer
- Central Valley Regional Water Board, Executive Officer
- NOAA Fisheries, Southwest Region, Executive Director
- U.S. Fish & Wildlife Service, Pacific Region, Director
- California Department of Fish & Game , Executive Director
- Delta Protection Commission

Interagency Working Group

An Interagency Working Group (IWG) includes program-level staff at five agencies. The IWG will serve as the primary program managers of the Delta LTMS process and steering committee for the Strategy Review Group. The IWG will coordinate with the Management Committee, the Strategy Review Group and others with an interest in Delta activities and the LTMS process. The IWG's role is to identify study issues and questions to be addressed such as: identify technical work groups and expert resources, confirm purpose, charter, and assignments for the science advisory teams and technical review groups, discuss and review study work plans and scopes, discuss and review study budgets and resource needs, prepare and approve study reports, develop management and policy options for the Management and Executive Committees, and escalate issues to the Executive Committee that cannot be resolved at the Management Committee. The members of the IWG currently consist of the following:

- USEPA
- Corps
- CVRWB
- CBDA
- DWR

The Management Committee may identify other participants in the IWG.

Strategy Review Group

Study activities will be conducted in coordination with a Strategy Review Group consisting of representatives of other agencies, stakeholders, and interest groups in the Delta working in or affected by dredging and reuse activities for navigation, levee stability, or ecosystem restoration. The Interagency Working Group will coordinate meetings monthly or as needed with the Strategy Review Group to identify, review, and discuss: (1) the Delta sediment issues of concern to be addressed by the Delta LTMS study and in what order; (2) lines of inquiry that the science advisory teams (described below) will be tasked to pursue; and (3) coordinated regulatory approach for Delta dredging to be approved by the Executive Committee.

Members of the Strategy Review Group may also provide public comment at the Executive Committee meetings. In addition to the agencies on the Executive Committee, the Strategy Review Group also includes, but not be limited to the following organizations:

- NOAA Fisheries, Southwest Region
- U.S. Fish & Wildlife Service, Pacific Region
- California Department of Fish & Game
- Delta Protection Commission
- State Lands Commission
- Reclamation Board
- Reclamation Districts
- Contra Costa, Sacramento, Solano, Yolo, and San Joaquin Counties
- North, Central, and South Delta Water Agencies
- The Ports of Sacramento and Stockton
- Bay Planning Coalition
- DeltaKeeper
- The Nature Conservancy
- The Bay Institute
- Environmental Water Caucus
- California Sportfishing Protection Alliance
- California Farm Bureau Federation
- State Water Contractors
- California Delta Chamber

Technical Work Groups

The Management Committee will establish specific technical work groups to address Delta LTMS issues. The technical work groups will consist of agency staff with expertise in the relevant subject areas. Technical work groups are open to interested participants from any agency, interest group, or the public. With the direction and approval of the Management Committee, technical work groups will identify study needs, develop study scopes and work plans, identify resources, and review results and conclusions. The Management Committee will identify the leader for each technical group. The initial technical work groups created for the LTMS include the following:

- Regional Dredging and Reuse Permitting;
- Testing Protocols Review;
- Programmatic BA Development; and
- Disposal and Reuse Alternative Development.

Other Stakeholders/Interested Public

Other interested parties will have the opportunity to learn about the Delta LTMS process and activities by viewing the project website (www.deltaltms.com) and attending the public meetings to be held on an as needed basis, at project milestones.

Science Review Panel

The Management Committee will establish a Science Review Panel made up of independent scientists. The purpose of the Science Review Panel is to provide an independent science review process for Delta LTMS studies. The Management Committee will approve the leader and participants for the Science Review Panel. The Science Review Panel will evaluate existing information; identify gaps, and review results and conclusions.

Anticipated Project Tasks

Early in the development phase for Delta LTMS, a project process flow diagram was created (see Figure ES-1) to present an outline for an overall strategy for identifying and prioritizing project needs, identifying and evaluating management alternatives, forming technical work groups to contribute scientific information and policy direction, and key steps needed to successfully complete the LTMS. Similar approaches have been used successfully to develop long-term sediment management plans in San Francisco, Los Angeles, and Puget Sound. The initial technical tasks identified for this project and described in this Work Plan have been organized to follow the key tasks identified in that process diagram, including the following:

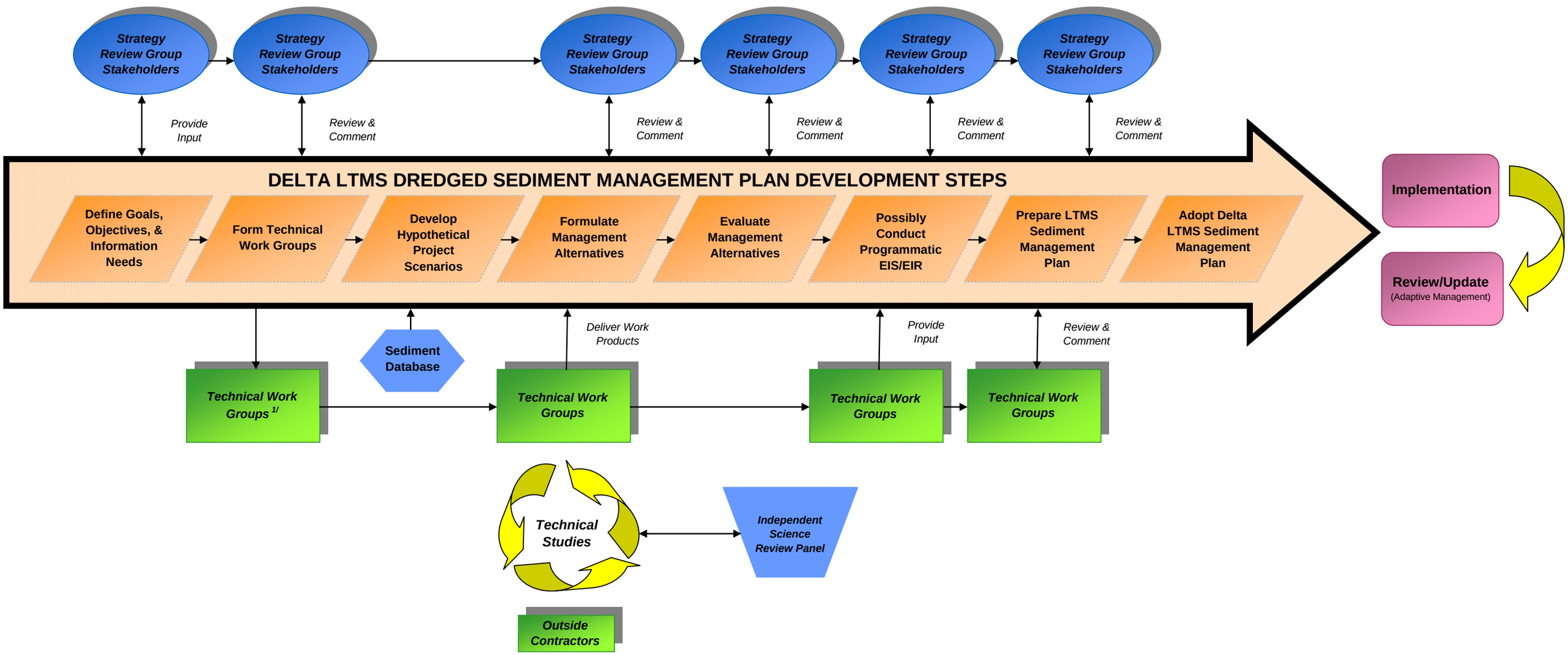
- Review and define project goals and objectives;
- Form technical work groups to address specific technical issues;
- Develop hypothetical project scenarios to frame potential management solutions;
- Formulate management alternatives;
- Evaluate management alternatives;
- Possibly conduct a programmatic EIS/EIR
- Prepare a sediment management plan to summarize project efforts; and
- Adopt and implement the LTMS sediment management plan.

Anticipated Project Schedule

The anticipated project schedule for completing the Delta LTMS sediment management plan is approximately 3 years. Several interim work products (e.g., possible formation of a Dredged Materials Management Office (DMMO), consolidated dredging permit application, sediment quality database, etc.) will be completed before that date and would be implemented upon completion.

Anticipated Project Budget

It is too early in the development process to accurately estimate the exact cost to complete the LTMS sediment management plan and associated technical studies; however, the planning level estimate based on the level of efforts required to complete similar projects in other regions is a little over $6 million.



Footnote: 1/ Ex: Work groups include Scientific Technical Studies & Permitting Coordination Activities

Figure ES-1
Delta Dredged Sediment LTMS Development Process
Management Committee Review Draft

1 INTRODUCTION

1.1 Project Background

In late 2004, local sponsors of Delta dredging projects and the U.S. Army Corps of Engineers (Corps) met to explore the feasibility of developing a long-term management strategy (LTMS) for dredging and dredged material placement and/or reuse in the Delta. In 2005, the Corps worked with multiple stakeholders including other Federal and State agencies to define a cooperative, collaborative approach to address the problems, challenges, and opportunities related to levee repairs, dredging, and beneficial reuse of dredge materials in the Delta.

As a result of these discussions, the Corps began working with other Federal and State agencies – the U.S. Environmental Protection Agency (USEPA), the California Bay Delta Authority (CBDA), California Department of Water Resources (DWR), Delta Protection Commission (DPC), and the Central Valley Regional Water Board (CVRWB) – to develop the initial Process Framework describing a cooperative approach for developing the Delta dredged sediment LTMS (Delta LTMS) Program for the Delta region.

The Process Framework describes the overall purpose and structure of the effort so that participating agencies can assess the study objectives, gauge their level of required participation, and assign resources to assist in developing the Delta LTMS Program. As with any cooperative planning effort, the Process Framework will be refined as participation increases and implementation proceeds.

In conjunction with the Process Framework document, the five agencies listed above used the framework as the basis for establishing a charter to promote participation and commitment to achieving the goals and addressing the concerns identified in the framework process document. Agencies signing the charter agreed to fully participate in the study activities and operate under the final Charter. Copies of the Final Delta LTMS Charter and Process Framework can be found in Appendix A).

The Delta LTMS Process Framework (Corps et al. 2006) summarizes the initial framework for the Delta LTMS, identifying the following components:

- Study purpose, goals, and objectives
- Structure, participants, and roles

- Authorities and decision making
- Related programs
- Study activities and phases

Based on those items, a Federal Project Management Plan (PMP) was developed by the Corps of Engineers to guide their internal managers on appropriate project direction, schedule, work assignments and potential costs. Because a Corps PMP follows a strict systems generated outline, not always easily understood by most non-Federal stakeholders, it was decided to also prepare this Study Work Plan to present those same topics and provide the operating framework for preparing the Delta LTMS.

1.2 Project Purpose and Need

Accurate estimates of historical dredge volumes within the Delta (Figure 1-1) are sometimes difficult to calculate because some of the smaller dredging projects do not have detailed records of the specific volumes removed and final placement destination. Accurate estimates are available, however, or all recent projects and the larger historical projects. The bulk of the dredging within the Delta (at least on a volume basis) occurs in either of the two deepwater shipping channels to the Ports of Stockton and Sacramento. Between 1966 and 2006, the average annual volume of material removed from these channels was 320,000 cubic yards (Stockton DWSC) and 593,000 cubic yards (Sacramento DWSC). Specific dredge volumes removed from the Stockton DWSC range from a low of 15,000 cubic yards in 1971 to a high of 841,000 cubic yards in 1978. Specific dredge volumes removed from the Sacramento DWSC range from a low of 35,000 cubic yards in 2005 to a high of 2.2 million yards in 1966. Additional, detailed information of historical and projected dredge volumes is provided later in this report in Section 2.2.

1.3 LTMS Structure Participants and Roles

The Delta LTMS is organized (Figure 1-2) in a management process to include an Executive Committee, Management Committee, Interagency Working Group (IWG), Strategy Review Group (SRG), Technical Work Groups (TWGs) and an Independent Science Review Panel as described in this section. In addition, public meetings will be held periodically to provide additional opportunities for input and feedback from interested parties.

Figure 1-1
Plan View of Delta Region
Management Committee Review Draft
Source: CALFED Bay-Delta Program

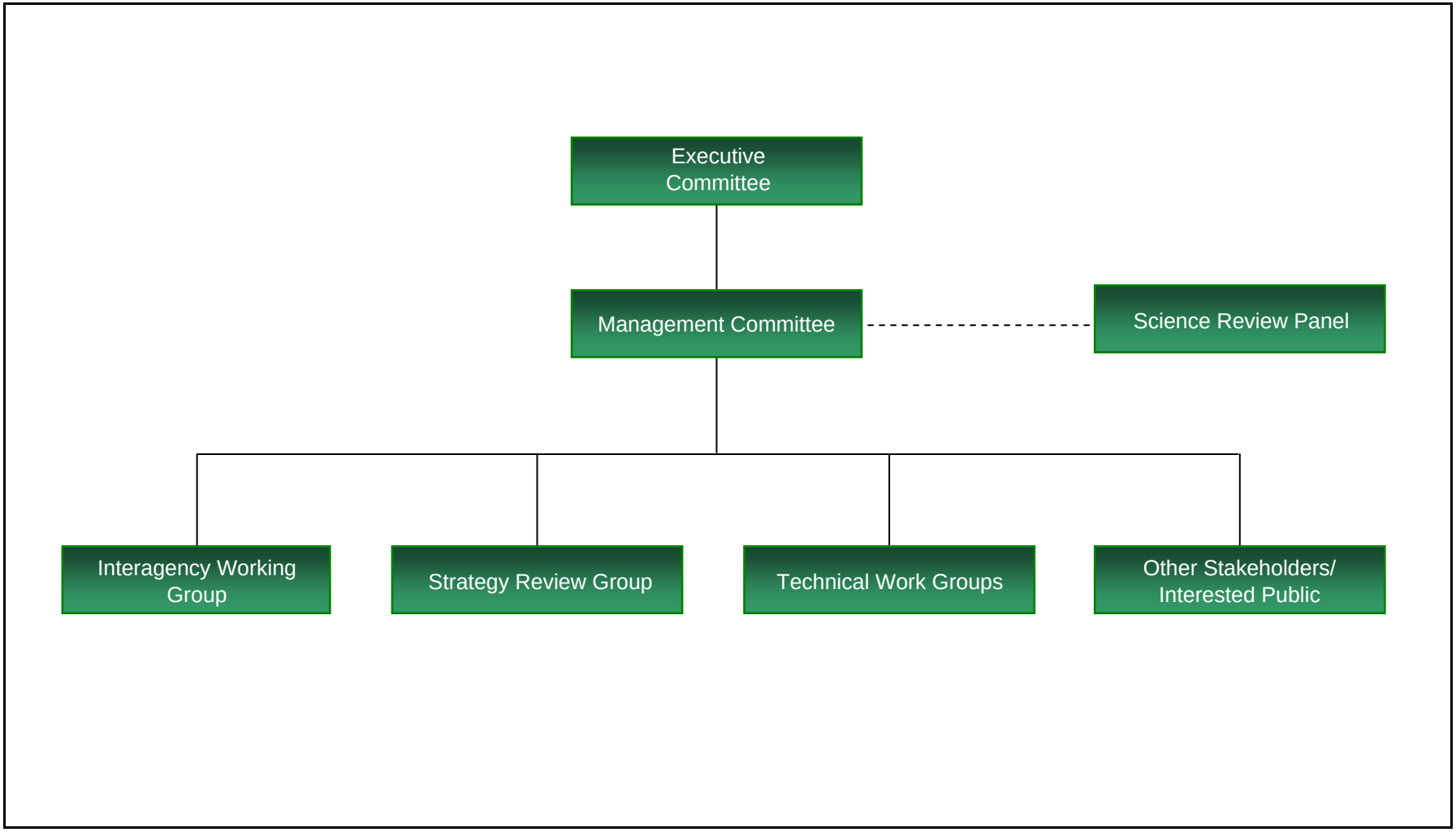


Figure 1-2
Organizational Structure
Management Committee Review Draft

Executive Committee

At the top level, an Executive Committee directs the overall program, sets policy direction, and provides oversight of the study. The directors of each of the following agencies serve on the Executive Committee. The appointed executive managers should have the decision-making authority to represent the agency on the policy and regulatory issues to be addressed. The Executive Committee will meet annually or as necessary to set policy direction for the study and keep abreast of the progress of the study.

- U.S. Army Corps of Engineers, Commander, South Pacific Division
- U.S. Environmental Protection Agency, Regional Administrator, Region 9
- State Water Resources Control Board (State Water Board), Chairperson
- Central Valley Regional Water Board, Chairperson
- California Department of Water Resources, Director
- California Bay-Delta Authority, Chairperson
- Delta Protection Commission, Chairperson

Management Committee

The Management Committee consists of the deputy-level managers for the Federal and State agencies. The Management Committee will oversee the work of the IWG and the associated Strategy Review Group, review policy recommendations, study plans, budget proposals, and provide recommendations to the Executive Committee. The Management Committee will meet quarterly. Members of the Management Committee are:

- U.S. Army Corps of Engineers, District Commander, San Francisco District
- U.S. Army Corps of Engineers, District Commander, Sacramento District
- California Department of Water Resources, Deputy Director, Public Safety
- U.S. Environmental Protection Agency, Director, Water Management Division, Region 9
- California Bay-Delta Authority, Executive Director
- State Water Board, Executive Officer
- Central Valley Regional Water Board, Executive Officer
- NOAA Fisheries, Southwest Region
- U.S. Fish & Wildlife Service, Pacific Region
- California Department of Fish and Game

Interagency Working Group

An IWG includes program-level staff at five agencies. The IWG serves as the primary program managers of the Delta LTMS process and steering committee for the Strategy Review Group. The IWG will coordinate with the Management Committee, the SRG and others with an interest in Delta activities and the LTMS process. The IWG's role is to identify study issues and questions to be addressed such as: identify technical work groups and expert resources, confirm purpose, charter, and assignments for the science advisory teams and technical review groups, discuss and review study work plans and scopes, discuss and review study budgets and resource needs, prepare and approve study reports, develop management and policy options for the Management and Executive Committees, and escalate issues to the Executive Committee that cannot be resolved at the Management Committee. The members of the IWG currently consist of the following:

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- Central Valley Regional Water Board
- California Bay-Delta Authority
- California Department of Water Resources
- The Management Committee may identify other participants in the IWG

Strategy Review Group

Study activities will be conducted in coordination with a SRG consisting of representatives of other agencies, stakeholders, and interest groups in the Delta working in or affected by dredging and reuse activities for navigation, levee stability, or ecosystem restoration. The Interagency Working Group will coordinate meetings monthly or as needed with the Strategy Review Group to identify, review, and discuss:

1. The Delta sediment issues of concern to be addressed by the Delta LTMS Study and in what order;
2. Lines of inquiry that the science advisory teams (described below) will be tasked to pursue; and
3. Coordinated regulatory approach for Delta dredging to be approved by the Executive Committee.

Members of the SRG may also provide public comment at the Executive Committee meetings. In addition to the agencies on the Executive Committee, the SRG also includes, but is not limited to the following organizations:

- NOAA Fisheries, Southwest Region
- U.S. Fish & Wildlife Service, Pacific Region
- California Department of Fish and Game
- Delta Protection Commission
- State Lands Commission
- Reclamation Board
- Reclamation Districts
- Contra Costa, Sacramento, Solano, Yolo, and San Joaquin Counties
- North, Central, and South Delta Water Agencies
- The Ports of Sacramento and Stockton
- Bay Planning Coalition
- DeltaKeeper
- The Nature Conservancy
- The Bay Institute
- Environmental Water Caucus
- California Sportfishing Protection Alliance
- California Farm Bureau Federation
- State Water Contractors
- California Delta Chamber

Technical Work Groups

The Management Committee will establish specific science and technical work groups to address Delta LTMS issues. The science and technical work groups will consist of agency staff with expertise in the relevant subject areas. Technical work groups are open to interested participants from any agency, interest group, or the public. With the direction and approval of the Management Committee, technical work groups identify study needs, develop study scopes and work plans, identify resources, and review results and

conclusions. The Management Committee identifies the leader for each technical work group. Currently planned TWGs include the following:

- Regional Dredging and Reuse Permitting;
- Testing Protocols Review;
- Programmatic Biological Assessment (BA) Development; and
- Dredged Sediment Disposal and Reuse Alternative Development.

These work groups (discussed in more detail in Section 3.1.2) will be formed by the IWG and authorized by the Management Committee.

Other Stakeholders/Interested Public

Other interested parties will have the opportunity to learn about the Delta LTMS process and activities by viewing the project website and attending public meetings to be held on an as needed basis, at project milestones.

Science Review Panel

The IWG and Management Committee will establish a Science Review Panel made up of independent scientists. The purpose of the Science Review Panel is to provide an independent science review process for all Delta LTMS studies. The Management Committee will approve the leader and participants for the Science Review Panel.

1.4 Study Goals and Objectives

The five initial participating agencies (Corps, USEPA, DWR, CBDA, and CVRWB) agreed to examine the sediment issues and needs within the Delta. The participating agencies drafted a three-part project purpose statement:

1. The Delta Dredged Sediment Long-Term Management Strategy development process will examine and coordinate dredging needs and sediment management in the Delta to assist in maintaining and improving channel function (navigation, water conveyance, flood control, and recreation), levee rehabilitation, and ecosystem restoration.
2. Agencies and stakeholders will work cooperatively to develop a sediment management plan (SMP or Long-Term Management Strategy) that is based on sound science and protective of the ecosystem, water supply, and water quality functions of the Delta.

3. As part of this effort, the sediment management plan will consider regulatory process improvements for dredging and dredged material management so that project evaluation is coordinated, efficient, timely, and protective of Delta resources.

To achieve these goals, the Delta LTMS seeks to improve coordination and planning efforts between dredging proponents and regulatory agencies, and to streamline, wherever possible, the regulatory approval process for future Delta dredging and sediment management activities. The following lists some of the specific objectives identified through stakeholder interviews, conducted during the project planning phase by Circle Point, that participants would like to see achieved during the LTMS development process. Some of these items may eventually be found not to be suitable for this group, but have been retained in this document in an effort to address all stakeholder concerns.:

a) Develop a streamlined permitting process to facilitate and improve coordination and cooperation among agencies with dredging management responsibilities or regulatory authority over dredging and placement activities.
b) Develop a Standardized Sediment Characterization Manual that addresses stakeholder concerns pertaining to appropriate tests, protocols, and methods for various disposal options.
c) Review and summarize regional best management practices (BMPs) for the dredging and disposal of contaminated and non-contaminated dredged sediments.
d) Review regional disposal alternatives for contaminated and non-contaminated dredged sediments.
e) Identify environmental restoration and/or enhancement opportunities that are directly related to the dredging and disposal of sediments.
f) Develop a Sediment Management Plan to include: (i) approved regional disposal sites and/or identify treatment alternatives; (ii) BMPs for dredging and disposal operations; (iii) a consolidated and consistent plan for regulatory review; (iv) chemical trigger levels for sediment/elutriate testing and disposal alternative selection; and, (v) a tiered approach for site suitability to dispose dredged sediments.
g) Develop a programmatic BA to facilitate dredging and placement activities while ensuring the protection of resources (fish species).
h) Prepare a programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to implement the Delta disposal management alternatives.
i) Ensure that the SMP and EIS/EIR are consistent with CVRWB regulations for the surface and groundwater quality and resource agencies.

j) Facilitate beneficial use of dredged materials for levee stabilization or other uses while protecting surface and groundwater quality.

1.5 Federal, Non-Federal, and Public Concerns

A number of concerns related to planning needs and constraints have been identified during the plan development process for the Delta LTMS Program and are described below. Initial concerns were received through meetings and interviews with the potential sponsor(s), other agencies, dredging proponents, and interested parties.

1.5.1 Environmental/Permitting

Identified concerns with the current permitting framework include:

1. Difficulties obtaining permits for dredging and placement of material at either designated disposal sites or beneficially reusing the material (i.e., levee maintenance, restoration, construction grade) have been identified as a primary driver for developing the LTMS.
2. Clarifying agency jurisdiction to dredging stakeholders and responsibility regarding Delta dredging, disposal and beneficial reuse actions.
3. Streamlining the permitting process by developing a General Order including National Environmental Policy Act, Clean Water Act, and California Environmental Quality Act (CEQA) compliance.
4. Due to perceived differences in agency policies, general permitting requirements, and overlapping jurisdiction, a need to facilitate better coordination between agencies regulating dredging, disposal, and reuse was identified by some stakeholders.

1.5.2 Technical

Technical questions and desired investigations thus far identified include:

1. As part of the overall characterization of sediment quality impacts and perceived lack of agreed upon sediment quality thresholds, the permitting/authorization process and the ability to efficiently plan dredging operations should be reviewed. Thus, developing sediment screening criteria for specific disposal/reuse applications has been identified as a task to assist in determining sediment suitability.

2. Summarizing contaminant exposure pathways for upland and wetland placement of dredged material, and potential impacts to water quality and biological resources will assist in developing a guidance manual for assessing sediment quality for various disposal options. Impacts from dredging operations could include: (i) turbidity, noise, depletion of dissolved oxygen, and/or degradation of air quality; (ii) potential resuspension of contaminants in the water column; and (iii) chemical advection and diffusion at dredge material placement sites.
3. Review BMPs to address potential construction impacts of dredge and disposal operations on air/water quality, ambient noise, turbidity, dissolved oxygen and vessel traffic, and mechanical and logistics modifications required to reduce impacts need to be identified.

1.5.3 Economics

Regional economic issues associated with dredging and placement of material include:

1. The cost to the Federal government, Non-Federal Sponsors and regulatory applicants for finding suitable sites for disposal and beneficial reuse of dredged material must be assessed. The desire to identify economically feasible options for disposal management and ensuring levee stability has been identified as an issue by all participants.
2. The potential economic degradation of regional and national economies due to the inability to efficiently dredge channels.
3. Reuse, redevelopment, modernization and expansion of facilities at the Ports of Stockton and Sacramento should be evaluated.
4. Potential economic impacts of levee failure should be considered when prioritizing suitable reuse alternatives.
5. A benefit-cost analysis (for Federal projects) for the dredging and disposal of sediments for levee stabilization and habitat restoration/enhancement should be established.
6. The desire to beneficially reuse dredge material has been identified as a priority for the Delta LTMS. Factors that can impact beneficial reuse of dredge material such as costs, feasibility, re-handling, and transportation need to be identified and evaluated.
7. Evaluate ways to encourage more opportunities for dredging companies to cost effectively operate in the Delta (longer dredging windows, lack of experienced crews, etc.).
8. Evaluate ways for cost effective rehandling and reuse of dredge materials.

1.5.4 Political

Identified political questions and issues include:

1. The perception that there is a lack of consensus regarding the permitting, testing, and suitability determinations for dredged material has been voiced by various participants, including some agency participants.
2. Conflicting mandates from different agencies with regard to levee repair and associated water quality and biological impacts versus the impacts of potential levee failure.
3. Identification of other stakeholder groups with an interest in the program, including resource agencies, environmental groups, and dredgers. Public perception will be crucial in the development and continued success of the program.

1.6 Adaptive Management and Integration Plan

Because planning is an iterative process, more or less funding and time may be required to accomplish the formulation and evaluation of the study objectives, specific management alternatives, and ultimately the Sediment Management Plan. With clear descriptions of the scopes and assumptions outlined in the PMP and the Work Plan, deviations are easier to identify. The impact in either time or money is easily assessed and decisions can be made on how to proceed. The PMP and Work Plan are intended to be living documents, periodically updated and revised as necessary as the project progresses and study findings require adjustments to the study program as agreed to by the Executive and Management Committees.

1.7 Summary of Work Plan Organization

Using the components of the Corps' PMP document, this Work Plan has been arranged in the following format:

Chapter 1 – Introduction. A description of the Work Plan and the LTMS in general, including structure and goals.

Chapter 2 – Delta LTMS Study Area. A description of the Study Area, including geography, historical, and projected dredge areas and volumes, and sediment characteristics.

Chapter 3 – Delta LTMS Development Process. A detailed discussion of the tasks and coordination involved in the LTMS.

Chapter 4 – Technical Quality Control Plan. A brief description of the project Quality Control Plan.

Chapter 5 – Public Involvement and Coordination. Description of key public involvement tasks and coordination activities for the Delta LTMS Study.

Chapter 6 – Delta LTMS/SMP Agency Implementation Strategy. Describes how the agencies and stakeholders will implement the plan.

Chapter 7 – References. Lists all project references.

2 DELTA LTMS STUDY AREA

2.1 Geographic Boundaries

One of the first tasks for the Technical Work Groups to address will be to review and finalize the geographic boundaries for the Delta LTMS Study. Until the point that it is revised, this document assumes that the Study Area will be that known as the "Legal Delta" according to the Delta Vision program (www.deltavision.ca.gov). Located roughly between the cities of Sacramento, Stockton, Tracy, and Antioch (Figure 1-1), the "Legal Delta" extends approximately 24 miles east to west and 48 miles north to south, including parts of five counties (Sacramento, San Joaquin, Contra Costa, Solano, and Yolo).

The delta consists of a myriad of small natural and man-made channels (locally called sloughs), creating a system of isolated lowland islands and wetlands (defined by dikes or levees). The extensive system of earthen levees has allowed wide-spread farming throughout the delta, one of the most fertile agricultural areas in California.

Today, the Delta provides critical habitat to many of California's fish species residing in the region, including several threatened and endangered species. Recreationally, the Delta contains 635 miles of boating waterways which are served by approximately 95 marinas containing over 11,000 in-water boat slips and dry storage space for an additional 5,000 boats.

An additional, critical early task to be addressed by the Technical Work Groups and IWG members will be to identify and prioritize which areas of the Delta may be most suitable for developing dredge material beneficial reuse opportunities for levee repairs. Figure 2-1 presents an overview of the Delta levee system showing the areas of greatest concern with regards to the Federal (project) levee system according to a recent report prepared by the Corps (Appendix B). It should be noted, however, that this map does not show the hundreds of miles of levees in need of repair that are part of the State (non-Project) flood protection system.

2.2 Historical and Projected Dredge Volumes

Additional data is still being collected to complete this section.

2.3 Sediment Physical and Chemical Characteristics

Additional data is still being collected to complete this section.

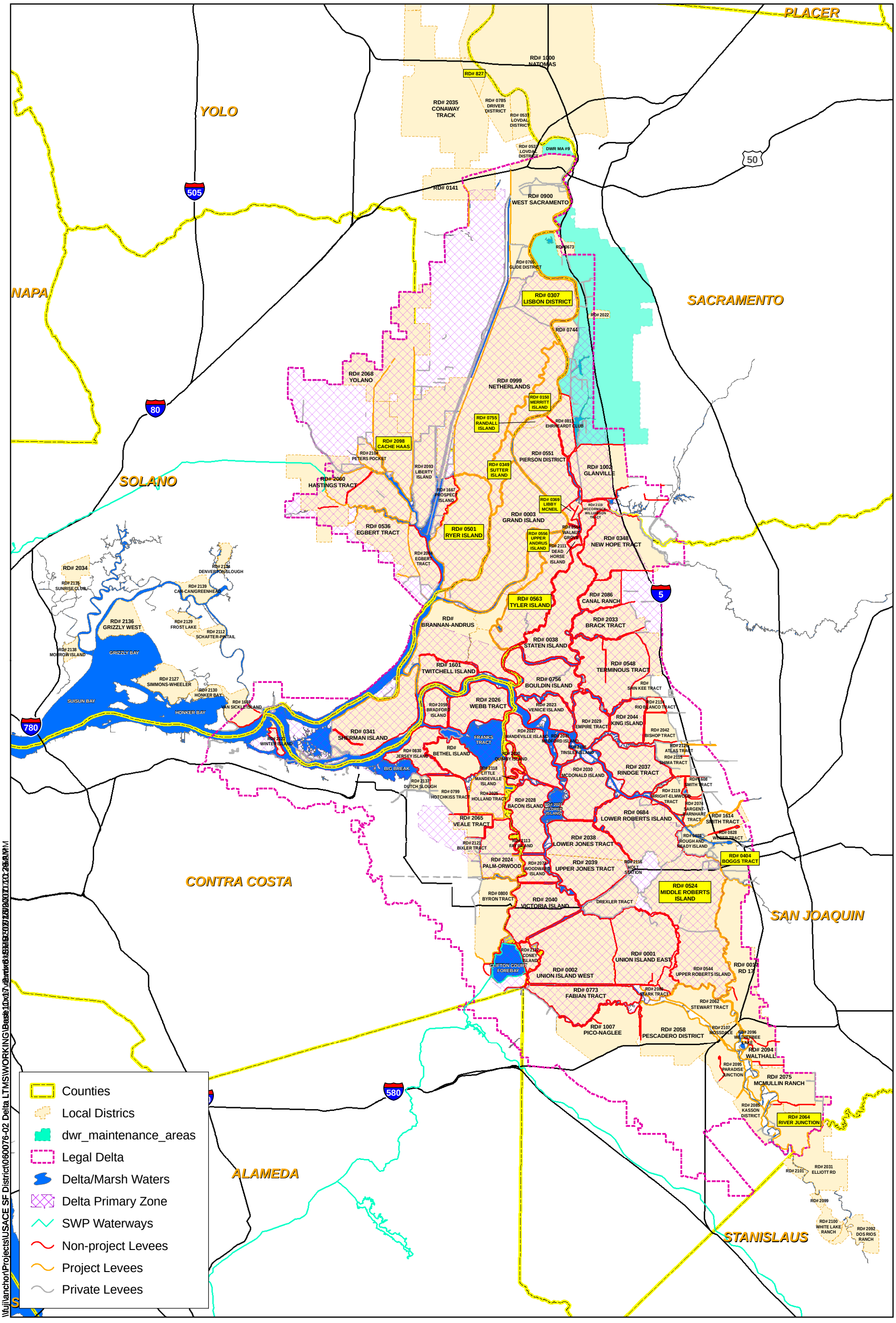


Figure 2-1

Delta Levees and Federal Areas of Concern

Management Committee Review Draft

3 DELTA LTMS DEVELOPMENT PROCESS

Early in the development phase for Delta LTMS, a project process flow diagram was created (see Figure 3-1) to present an outline for an overall strategy for identifying and prioritizing project needs, identifying and evaluating management alternatives, forming technical work groups to contribute scientific information and policy direction, and key steps needed to successfully complete the LTMS. Similar approaches have been used successfully to develop long-term sediment management plans in San Francisco, Los Angeles, and Puget Sound. The technical tasks described in this Work Plan have been organized to follow the key tasks identified in that process diagram, as described below.

3.1 List of Initial Tasks

3.1.1 Define Goals, Objectives, and Information Needs

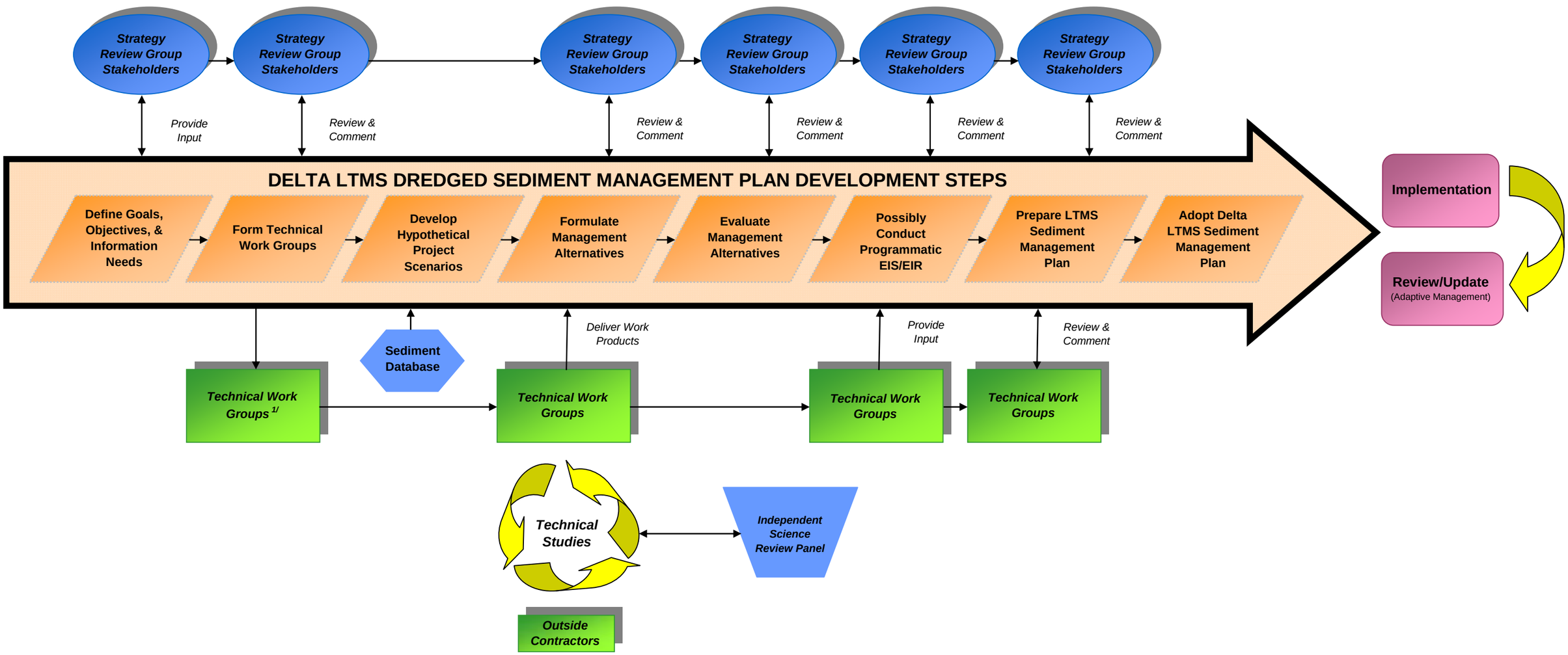
As described in Section 1.3, a series of stakeholder meetings, one-on-one interviews and targeted outreach programs were used to develop a list of overall goals, specific project objectives, and, subsequently, informational needs required to successfully prepare a regional sediment management plan for the Delta. That task has already been completed so is not included in this section.

3.1.2 Formation and Coordination of Technical Work Groups

The technical framework of the Delta LTMS will be driven by four key TWGs:

- Regional Dredging and Reuse Permitting;
- Testing Protocols Review;
- Programmatic BA Development; and
- Disposal and Reuse Alternative Development.

A key first step in the LTMS development process, therefore, has been working to form these groups and identify the scope and direction for each. Coordination between these groups and IWG/SRG will be critical to prevent overlap and to remain focused on project priorities. Group participation will be open to all LTMS stakeholders and participants can choose to attend whenever interests arise. Overall direction and approval will be provided by on a daily basis by the IWG and, ultimately, the Management Committee.



Footnote: 1/ Ex: Work groups include Scientific Technical Studies & Permitting Coordination Activities

Figure 3-1
Delta Dredged Sediment LTMS Development Process
Management Committee Review Draft

Each TWG will be led by an appropriate agency person chosen from amongst the agency stakeholders to be the primary point-of-contact for that group. Anchor Environmental will provide a technical liaison to each TWG for purposes of meeting coordination, note taking, document production services, etc. Once the point-of-contact for each TWG is chosen, its members will assemble for an initial kick-off meeting to review the scope and direction for the group, and choose a satisfactory meeting schedule and venue for future gatherings. The following sections describe the initial direction expected for each of the four TWGs.

3.1.2.1 Regional Dredging and Reuse Permitting Work Group

The purpose of this Work Group will be to review and summarize the current procedures required for each stakeholder agency, and address perceived confusion and inefficiencies regarding the proper regulatory steps required for permitting various dredging, disposal and reuse projects within the Delta.

Five key agencies currently have jurisdiction over different aspects of the dredging process within the Delta: the Corps, National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and the CVRWB. In addition to these organizations, various ordinances and land use restrictions of local agencies, such as the county or municipality, may apply to dredging projects with land disposal. In some cases, other agencies such as the California Department of Transportation, California Department of Conservation, and Reclamation Board also may require permits.

Prior studies conducted by the CALFED Bay-Delta Program and summarized in the June 2002 Delta Dredging and Reuse Strategy (DDRS) report identified specific areas where the current regulatory process could be enhanced, and recommended several key topics for future study. These include:

1. Developing general order Waste Discharge Requirements to help streamline the Regional Board's approval process;
2. Prepare a programmatic EIR/EIS that addresses all of the requirements of CEQA and National Environmental Policy Act (NEPA) for all impacts associated with maintenance dredging, disposal and reuse projects – a

general order already exists for maintenance dredging of the deep water ship channels which could be used as a starting point for additional general orders;

3. Develop regional permits to reduce redundancy in the process and expedite agency review;
4. Develop programmatic biological opinions (addressed by separate Work Group); and
5. Form multi-agency review committee for dredging projects to meet routinely and review processes and potential improvements.

The members of this Work Group should use the information developed for the CALFED program as a basis for beginning this evaluation and build upon it to reach consensus among the members for making recommendations to the Management Committee.

In order for this Work Group to be successful, staff participation from the following Delta LTMS stakeholders must occur:

- Corps (Sacramento and San Francisco Districts);
- USEPA;
- DWR;
- CBDA; and/or
- CVRWB.
- Staff participation and technical contributions from other agencies (State or Federal) or stakeholders would be beneficial to assist completing the proposed tasks.
- Other agencies that will be crucial and may have permitting authority for dredging or disposal sites include: State Lands Commission, Department of Water Resources.

A total of three main deliverables are expected from this Work Group along with monthly updates in the form of progress memos or verbal updates at the IWG and/or SRG meetings.

1. Permitting Summary/Value Stream Analysis – The first deliverable will be a summary of the current permitting processes required for dredging, disposal and reuse of sediments within the Delta system, including areas where agencies overlap in their jurisdiction. This information should be separated by upper and lower reaches, and again by navigable waters and flood control channels. Input will be required from the Work Group created to identify current and future potential disposal and reuse opportunities. Core agency participants should take the lead in preparing this deliverable. The likely method to develop this summary and identify opportunities and constraints will be through a Corps directed Value Stream Analysis under the Lean-Six-Sigma program currently in use throughout the Corps' South Pacific Division.
2. Joint Permit Application – The second deliverable will be a draft consolidated permit application including all required information to meet the needs of the appropriate agencies with jurisdiction over regional dredging projects. The goal of this deliverable will be to create a template that can be used by the Management Committee in the short-term.
3. Dredged Material Management Office (DMMO) – The third deliverable will be a review , and possibly a recommendation (if deemed beneficial), for the formation of a Delta DMMO, similar to those in place for the Bay Area and the Northwest states. If implemented, a Delta DMMO should be led by the Corps of Engineers Sacramento District, and involve assigned regulatory agency personnel from dredging stakeholder groups. If the work group ultimately recommends the formation of a DMMO, a strategy should be developed to outline issues associated with individual agency participation, jurisdiction for each dredging, disposal and reuse strategy, funding sources within each agency, meeting procedures, permit application submittal and review and approval processes. A draft Strategy should be submitted for Management Committee and IWG approval. Comments on the draft will then be incorporated into a final version for review and comment by the rest of the Delta LTMS Stakeholders.

Formation of a DMMO is a large logistical issue requiring significant input from agencies, especially the Corps and USEPA. As such, the task to decide if one is warranted for the Delta Region is included as an early step in the LTMS process to promote early coordination and allow time for resolution of staffing, funding, and other logistical issues. The DMMO formation, if it occurs, will largely be a parallel

track, and the LTMS stakeholders should expect some periodic updates from the Corps and USEPA on this task.

It is anticipated that, at a minimum, the Work Group will meet once a month to collaborate on achieving the tasks specified and addressing priority of short and long-term issues pertaining to the permitting process. Work Group participants should also anticipate a minimum of 10 hours a month to review, produce, or discuss documents relevant to the permitting deliverables listed below. The Value Stream Analysis may require a one-time commitment of 2 to 4 consecutive days by all key participants.

3.1.2.2 Testing Protocols Review Work Group

The Strategy Review Group identified reviewing appropriate testing protocols for the characterization of sediments proposed for dredging and disposal as a critical issue for the Delta LTMS program. Existing methods and protocols for the evaluation of dredged material will be reviewed and documented.

The DDRS provides a technical analysis of potential contaminants in dredge material related to impacts on water quality, human health and biological resources. This document provides a foundation with which the Work Group can move forward. It provides a summary of the existing information (e.g., chemistry, dredging project, etc.) and water testing protocols within the Delta (2002). The DDRS made recommendations in Chapter 6 for future research and analyses for specific tests and evaluating new contaminants of concerns. The Work Group should review and if appropriate prioritize these recommendations for implementation.

Utilizing the DDRS as a starting point, the Work Group will have a head start on the subtasks identified below:

1. Literature Search – The Work Group will conduct a review of the current methods and protocols used to characterize sediments proposed for dredging and disposal, as well as any information regarding the method's technical accuracy. As previously stated, the DDRS (Volumes I and II) provides a solid foundation for this information. The Work Group will need to update this summary with current testing protocol information accessible from the

sediment database developed under a separate task as well as from other programs around the nation such as the Northwest Regional Sediment Evaluation Framework (Corp et al. 2006). Once testing protocol information has been updated, the Work Group can then identify new procedures possibly developed for other regions.

2. The Work Group will review regional sediment quality data from LTMS data base.
3. A sediment characterization framework for dredging and disposal will identify a list of chemicals of concern, physical parameters; elutriate tests, and biological tests appropriate for characterizing Delta sediments. This framework will use a risk based approach, will be adaptive, and integrate new methods or processes as they are approved by the Work Group, IWG, and possily a DMMO (if created).
4. The final report will provide recommendations for testing protocols for dredging, disposal, and beneficial use of dredged sediment in the Delta. It will also include a process for annual reviews to assess the accuracy and predictability of the testing framework. This review process will include implementation of adaptive management, introducing new methods or testing protocols where pertinent.

Overall, the key focus of this group should be to determine what testing methods most accurately characterize dredge material and their placement sites in terms of possible impacts to water quality. For example, the group should be focused on how soil conditions in the delta may attenuate contaminants at dredge placement and reuse sites. The goal is to reduce the uncertainty of dredge material placement on water quality so more informed decisions can be made by the Board and more certainty for the dischargers. In order for this Work Group to be successful, staff participation from the following stakeholders must occur:

- Corps (Sacramento and San Francisco Districts);
- USEPA;
- DWR;
- CBDA; and/or
- CVRWB.

- Experienced staff participation and technical contributions from other agencies (State or Federal) or stakeholders would be beneficial to assist completing the proposed tasks.

The primary deliverables for this Work Group are expected to include:

- A list of chemicals of concern;
- Sediment screening guidelines established using a risk based approach;
- Elutriate tests for various disposal options;
- Biological tests for various disposal options; and
- A Final Report detailing recommendations for a comprehensive characterization framework and annual review process. Recommendations for additional studies will also be included with this report.

These deliverables will focus on developing a strategy for applying the correct test to the right application rather than developing new tests. The draft report will be submitted to the IWG for review and approval. A draft final report will then be submitted to the Strategic Review Committee for review and comment. If approved, the framework will then be incorporated into each of the agencies current dredging project approval process. The Work Group chair will provide monthly updates in the form of progress memos or verbal updates at the IWG and/or SRG meetings.

It is anticipated that, at a minimum, the Work Group will meet once a month to collaborate on achieving the tasks specified and addressing priorities of short and long-term issues pertaining to the permitting process. Work Group participants should also anticipate a minimum of 10 hours a month to review, produce, or discuss documents relevant to the regional disposal and reuse alternative deliverables listed below.

3.1.2.3 Programmatic Biological Assessment Development Work Group

The Strategy Review Group identified a potential need for developing a programmatic biological opinion as a critical issue for the Delta LTMS. Currently, individual projects are reviewed by NMFS and USFWS and often have been time consuming and difficult on all parties due to the lack of data. Therefore, to address

the lack of consolidated data related to biological resources and potential impacts from dredging and disposal within the Delta, several tasks are proposed to help formulate a programmatic BA.

The Work Group will need to accomplish the following components listed below before a Programmatic Biological Assessment can be written and implemented for Delta dredging projects:

1. Literature Search/Review Summary Report – A comprehensive review of existing data related to the physical and biological baseline conditions within the Study Area will be conducted. The participating resource agencies will provide the federally- and state-listed species and critical habitat in the Delta and their status. They will also provide each species life history and population dynamics. Stakeholders and other interested parties can submit pertinent information to the group for their review and inclusion in the baseline. This baseline will be used to determine how projects may affect biological resources and physical conditions, and whether there have been significant changes in habitat values and resources compared to historical conditions. The literature search will also identify data gaps to help prioritize the need for additional studies such as biological surveys or water quality monitoring.
2. Biological Surveys – Data gaps for biological resources identified in the previous component will be prioritized. Once prioritized, the Work Group will present a study design specific for the biological resource identified. These will then be distributed to the SRG to seek support and funding for completion. Once a survey/study is completed the Work Group will review the data and integrate it into the overall BA.
3. Evaluation of Impacts – In the interim of finalizing additional studies or surveys, preliminary environmental windows could be established for species with sufficient supporting data. This approach will need to be discussed and reviewed with the resource agencies as well as other regulatory agencies. Regardless of an interim approach, the final programmatic BA will evaluate the potential impacts from proposed dredging projects (e.g., maintenance dredging) to resources and provide biological windows when dredging and disposal may occur while still providing resource protection.

In order for this Work Group to be successful, staff participation from the following Delta LTMS stakeholders must occur:

- Corps (Sacramento and San Francisco Districts);
- USEPA;
- DWR;
- CBDA; and/or
- CVRWB.
- The Resource Agencies: Marine National Fisheries Service, U.S. Fish and Wildlife Service, and California Department of Fish and Game are critical participants in this process. Staff from these agencies must participate.
- Experienced staff participation and technical contributions from other agencies (State or Federal) or stakeholders would be beneficial to assist completing the proposed tasks.

The primary deliverables for this Work Group are expected to include:

- A list of species of concern, their life history and population dynamics;
- An environmental baseline for the Study Area (Delta);
- Proposed additional studies;
- BMP recommendations for use by the Permitting Review Work Group;
- Interim environmental windows; and
- A Final Programmatic Biological Assessment.

The Work Group chair will provide monthly updates in the form of progress memos or verbal updates at the IWG and/or SRG meetings. The Science Review Panel will be asked to review this information, as appropriate.

It is anticipated that, at a minimum, the Work Group will meet once a month to collaborate on achieving the tasks specified and addressing priority of short and long-term issues pertaining to the permitting process. Work Group participants should also anticipate a minimum of 10 hours a month to review, produce, or discuss documents relevant to the regional disposal and reuse alternative deliverables listed below.

3.1.2.4 Dredge Material Disposal and Reuse Alternatives Development Work Group

This Work Group will develop a list of current regional disposal sites, reuse alternatives and hypothetical project scenarios. The list will provide information on project types, sediment type and quality, volumes dredged, disposal allocations and disposal site capacities. Once this information is compiled and existing conditions are mapped out – typical and atypical project scenarios can be generated. This process will dovetail with the permitting process and may generate changes in the permitting application or testing to address standardization.

Proposed activities for the Regional Disposal and Reuse Alternatives Development Work Group shall include the following items:

- Review and summarize what alternatives currently exist for Delta projects and how often they are used;
- Determine how successful past projects have been;
- Review and evaluate alternatives from other regions for use in Delta;
- Assess recommendations for screening criteria and testing processes for reuse alternatives (See Testing Protocols);
- Identify end users and/or disposal sites for use in Delta;
- Evaluate and identify a centralized dredged material re-handling facility;
- If needed, identify improvements to existing alternatives;
- Identify long-term sediment management needs (i.e., capacity accommodations for increasing or decreasing volume of material of the next 50 years); and
- Develop a decision making policy and sediment management plan.

The members of this Work Group should use the information developed for the CALFED DDRS as a basis for beginning this evaluation and build upon it to reach consensus among the members for making recommendations to the Management Committee. Other key sources of information that should be considered include the following documents:

- Long-term management strategy (LTMS) for the placement of dredged material in the San Francisco Bay region. Management Plan 2001. Prepared

by U.S. Environmental Protection Agency, Region IX; U. S. Army Corps of Engineers, San Francisco District; San Francisco Bay Conservation and Development Commission; and San Francisco Bay Regional Water Quality Control Board, California State Water Resources Control Board. San Francisco, CA.

- Contaminated Sediments Task Force, Los Angeles Region. Long-Term Management Strategy. Prepared for the CSTF by Anchor Environmental CA, L.P., Everest International Consultants, Inc., and AMEC Earth and Environmental, Inc.
- U.S .Environmental Protection Agency. 1994. ARCS Remediation Guidance Document. USEPA 905-B94-003. Chicago, Ill.: Great Lakes National Program Office.
- Northwest Sediment Evaluation Framework. Interim Final 2006. Prepared by Corps Seattle District, USEPA Region X, Washington Department of Ecology, Washington Department of Natural Resources, Oregon Department of Environmental Quality, Idaho Department of Environmental Quality, National Marine Fisheries Service, U.S. Fish and Wildlife.

In order for this Work Group to be successful, staff participation from the following Delta LTMS stakeholders must occur:

- Corps (Sacramento and San Francisco Districts);
- USEPA;
- DWR;
- CBDA; and/or
- CVRWB.
- Experienced staff participation and technical contributions from other agencies (State or Federal) or stakeholders would be beneficial to assist completing the proposed tasks.

The primary deliverable for this Work Group will be a list of agency approved, cost effective, and technically feasible disposal and reuse alternatives for use with Delta dredging projects. Alternatives should be separated, as appropriate, by sub-region, and type of dredge scenario. Recommendations for additional study, if needed, would be developed by this Work Group and presented to the Management

Committee for approval and to assist in developing funding opportunities. The Science Review Panel will also review this information, as appropriate. The report will form the basis for the management alternatives evaluated in the EIR/EIS.

It is anticipated that at a minimum the Work Group will meet once a month to collaborate on achieving the tasks specified and addressing priority of short and long-term issues pertaining to the permitting process. Work Group participants should also anticipate a minimum of 10 hours a month to review, produce, or discuss documents relevant to the regional disposal and reuse alternative deliverables listed below.

3.1.3 Sediment Quality Database Development

A sediment quality database is being developed to assist in identifying and quantifying past and planned dredging activities for navigation, flood control, water conveyance, recreation, and other Delta functions. The goal of this task is to develop and document a database on sediment quality and populate it with data from the San Francisco Bay Delta. The database will be used for characterizing sediments in areas planned for dredging to assess quality and aid in selecting appropriate management approaches. Example management approaches include selection of potential material suitable for wetland creation, rehabilitation, and restoration; levee maintenance; and other dredge material beneficial re-use schemes. The database should also have the potential to support other possible purposes as well, including, but not limited to applied research.

The database will be prepared using: (1) data from the Corps which contains information prior to 2001 from Sacramento District which has already been compiled; (2) data the contractor (Exa) is in possession of for related projects; and (3) additional sources. Efforts will be focused on quality assurance of the existing pre-2001 data as well as compiling post-2001 data not already in the database. The work will incorporate the DDRS database compiled by CDFG in 2002. The work will also be coordinated with the State's Sediment Quality Objectives (SQOs) project conducted by the State Water Board to the extent possible, and related efforts conducted by the CVRWB, and other possible partners to be identified at a later time, to optimize these efforts and provide cost sharing efficiencies.

Data from the various sources may be in a variety of digital and hard copy formats. The type of data used should include sediment contamination, toxicity, benthic fauna, fish and tissue data as well as other incidentally collected water quality (dissolved oxygen, temperature at the time of data collections) or other data that may aid in understanding sediment quality and toxicity issues. The database documentation will include a description of the elements in the database and an evaluation of its contents will also be provided.

Documentation should answer questions such as:

- Which sediment contaminants were measured?
- What collection and analytical methods were used?
- Do the method detection limits meet QA/QC guidelines?
- Are toxicity test protocols using standard ASTM methods?
- Were appropriate laboratory methods used?
- Which species, tissue type, methods used, etc.?
- Which contaminants were measured?
- Where were samples taken?

The format of the database will be easily transferable to other database types and formats, including those that can be used across a web interface and easily convertible to GIS format with measurements as attributes. Further, the database will be structured such that new data may be added in a relatively straightforward manner. The database will be easily usable by a broad range of stakeholders, including the Corps, other Federal, State, and local agencies as well as non-governmental concerns. It is anticipated that in the future, data should be available in a web-based format requiring no specialized programs and/or cost for the typical end-user. Determining such structure will be an important part of the task and should be accomplished in part with input from the Corps.

Because the quantity and quality of data available are not clearly known, a first priority will involve documenting data sources. It is realized that the product to be produced is one which will be complete and usable as delivered, but may of necessity document

steps required to incorporate data which could not be completely addressed due to logistic difficulties.

3.1.4 Develop Hypothetical Project Scenarios

The Disposal and Reuse Alternative Development TWG will lead in developing a series of hypothetical project scenarios as part of its mandate. Significant input will be required from all the Technical Work Groups, as well as the IWG and Management Committee members.

Hypothetical project scenarios consist of dredging projects that most (i.e., 75 percent or more) of the typical dredging projects in the Study Area. For example, one hypothetical scenario will likely be maintenance dredging of deep-water ship channels. This project scenario would then describe a "typical" project in terms of volume, material type, equipment, and disposal locations/issues. Once the project scenarios are developed, they become the critical element in forming the "project description" component of the LTMS EIS/EIR.

3.1.5 Identification and Evaluation of Management Alternatives

The Disposal and Reuse Alternative Development TWG will also be charged with the lead in developing a series of dredged material management alternatives (see 3.1.2.4) and evaluating them against a series of criteria, also to be developed by the group. All information developed by the work group will be presented to the IWG for comment and approval.

Example alternative evaluation criteria may include: short and long-term effectiveness, implementability, environmental impacts, environmental benefits, cost, and public acceptance. Based on these evaluations, a recommended decision framework should be developed for each hypothetical project scenario. These analyses and the decision framework will eventually form the basis of the technical evaluation in the LTMS EIS/EIR.

3.1.6 Development of a Programmatic EIS/EIR

Corps policy described in EC 1165-2-200 requires each Corps District to develop a dredged material management plan (DMMP) (or LTMS) for each harbor or jurisdiction to address dredged material management. This policy encourages the development of a range of feasible management alternatives that are cost effective and environmentally acceptable, use sound engineering techniques, and that optimize the beneficial reuse of dredged materials. The LTMS also ensures that sufficient confined disposal facilities and beneficial reuse opportunities are available for at least the next 20 years. A management plan is usually developed for an individual harbor; however, as part of the Delta LTMS program, the Corps is proposing to develop a master LTMS for the Study Area. The environmental documentation for the LTMS would take the form of a Programmatic EIS (PEIS).

The primary objective of this PEIS is to identify potential environmental impacts of the proposed LTMS on a regional basis. Components of the LTMS would summarize the future (20 years) disposal/management needs for the Region, the expected physical and chemical characteristics of the dredged material, the potential available reuse and disposal alternatives in the Region, and a strategy for evaluating and selecting the most appropriate management alternative given varying project scenarios. To accomplish this task, hypothetical project scenarios will be developed and evaluated by the technical work groups.

In order for this EIS/EIR and Sediment Management Plan to be completed, staff participation from the Corps of Engineers must include participation from the Regulatory, Real Estate, Planning, Engineering, and Programs and Project Management Functions. LTMS stakeholder agencies will provide comments on the draft and final documents, and the output of the TWGs is crucial to the EIS/EIR technical analyses (as described before). Comments will be solicited from all participating LTMS agencies and the public.

The primary deliverable will be the completed Programmatic EIS/EIR, which will be a key component of the Sediment Management Plan. It is anticipated that completion of the EIS/EIR will take between 12 and 18 months. Some of the specific subtasks for the Delta LTMS PEIS are described below.

3.1.6.1 Environmental Baseline Conditions

Development of the environmental baseline within the Delta is necessary for accurate evaluation of existing conditions and impacts of various alternatives. Baseline condition evaluations will include the general sediment characteristics of the region; water resources within the region; amounts and frequency of dredging; and a description of the environmental baseline for relevant NEPA/CEQA and Clean Water Act variables including all relevant aspects of the human and biological environment.

- *Sediment and Dredged Material Characteristics* – Will describe the typical characteristics of dredged material in the Study Area. Utilize the typical scenarios developed under the Hypothetical Project Scenarios Task (and Technical Work Group).
- *Biological Surveys* – The results of the Biological Assessment Work Group effort will be incorporated into an evaluation of biological resources in the region, and inform the evaluation of impacts.

3.1.6.2 Project Scenarios and Alternatives Development

The hypothetical project scenarios and management alternatives framework developed by that TWG will be the basis of the technical evaluation.

3.1.6.3 Technical Analyses

- *Real Estate Analyses/Report* – Conduct a baseline and with-project analysis of property values and potential for changes in property value resulting from potential dredging and discharge of dredged materials within the Study Area.
- *Air Quality Report* – Conduct a baseline and with-project analysis of air quality, including potential air quality impacts of dredging and discharges of dredged material at a programmatic level.
- *Cultural Resources Report* – Conduct an inventory level assessment of listed and eligible sites under the auspices of Section 106 of the National Historic Preservation Association (NHPA).
- *Geotechnical Investigation Report* – Conduct a qualitative geotechnical evaluation of the condition of levees and channels within the Study Area, consisting primarily of a detailed literature search and, possibly, new field assessments if deemed necessary by the technical working groups.

- *Hydrologic Investigation Report* – Conduct a hydrologic evaluation of the Sacramento and San Joaquin River systems.
- *Cost Estimates* – Evaluate costs associated with management alternatives presented and calculate B/C ratios.
- *Public Process Documentation* – Summarize public involvement, including progress meetings, agency coordination, NEPA/CEQA scoping, workshops, etc.

3.1.6.4 Impacts Analysis and Programmatic 404(b)(1) Evaluation

Based on the suite of management alternatives developed, baseline conditions identified, and technical analyses identified, conduct a NEPA/CEQA impacts evaluation and programmatic 404(b)(1) evaluation for each hypothetical dredging scenario. Discuss relative benefits and impacts of each management alternative for each hypothetical dredging scenario.

3.1.7 Sediment Management Plan Report Development

The results of the EIS/EIR will form the basis of the Sediment Management Plan, which will contain management level recommendations for hypothetical project scenarios and function as an Executive Summary of the process. This document will essentially become the long-term management strategy document for the Delta. It will summarize the entire development process, individual work products, stakeholder meetings, alternative development and evaluation process and conclusions made by the various committees. It is intended to be a living document that will be reviewed and updated though an adaptive management process.

3.2 Project Schedule and Task Relationships

Using the list of initial tasks presented in Section 3.1, and the LTMS developmental process flow chart presented in Figure 3-1, an example project schedule (Figure 3-2) was developed for each main task and key deliverable expected over the duration of the Delta LTMS Study. Where appropriate, task inter-relationships have been identified and mapped. The content and relationships presented in this figure are intended purely to describe the planned activities as of the time this Work Plan was prepared. This information will be updated frequently as additional details become available. In addition, the colors used in the figure are not of significance and are only intended to represent visual breaks in the tasks.

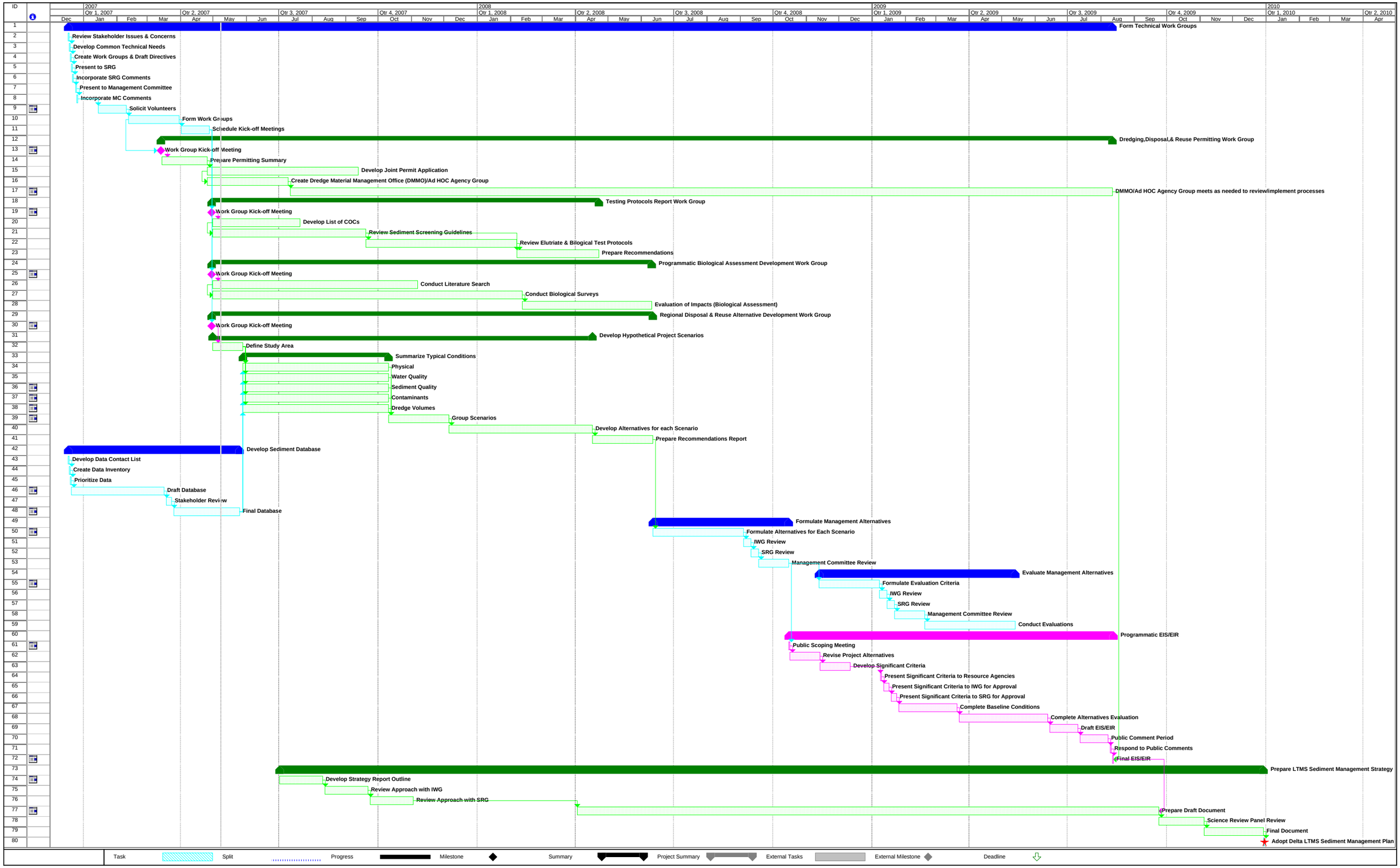


Figure 3-2
Delta LTMS Project Schedule
Management Committee Review Draft

3.3 Estimated Task Costs

Estimated project costs have been developed purely for planning level purposes based on assumptions developed for similar efforts conducted in San Francisco, Los Angeles, and Puget Sound (Table 3-1). When possible, cost estimates have been adjusted to match the estimated level of effort expected for Delta-specific investigations. These costs should not be used for anything other than to project an expected level of effort for each of the primary steps in the development process based on the assumptions currently available. More refined estimates will be prepared as additional details become available. While Table 3-1 presents line items for specific sub-tasks, cost estimates are only provided for higher level categories.

Table 3-1
Summary of Estimated Costs

Corps Work Level [1]/	Description	Federal costs	Non-Fed in-Kind	Total costs
1	**Delta LTMS Program**	---	---	---
5	**IWG meetings**	$150,000	$150,000	$300,000
5	**SRG meetings**	$200,000	$200,000	$400,000
5	**Formulation of Science Advisory Committee**	$200,000	---	$200,000
2	**Strategy Development Process**	$50,000	$25,000	$75,000
3	**Identify Issues of Concern and Responsible Working Groups**	---	---	---
5	*Finalize Issues of Concern*	$15,000	---	$15,000
5	*Formation of Working Groups*	$15,000	---	$15,000
5	Testing Protocols Working Group	$250,000	$150,000	$400,000
5	Biological Windows Working Group	$250,000	$150,000	$400,000
5	Permitting Working Group	$250,000	$150,000	$400,000
5	Regional Disposal and Reuse Alternatives Working Group	$250,000	$150,000	$400,000
4	*Testing Protocols Report*	$50,000	$25,000	$75,000
5	Formulate Working Committee	---	---	---
5	Literature Search	---	---	---
5	Evaluation of Procedures	---	---	---
5	Present Preliminary findings to IWG and SRG	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
4	*Programmatic Biological Opinion*	$250,000	$150,000	$400,000
5	Literature Search	---	---	---
5	Interagency Meetings with Resource Agencies	---	---	---
5	Biological Surveys	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
4	*Regulatory Permitting Process Report*	$300,000	$150,000	$450,000

Table 3-1
Summary of Estimated Costs
(continued)

Corps Work Level [1]/	Description	Federal costs	Non-Fed in-Kind	Total costs
5	Formation of Working Group	---	---	---
5	Lean Six Sigma Value Stream Analysis	---	---	---
5	Development of Draft Joint Permit Application	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
3	**Develop Hypothetical Project Scenarios**	$150,000	$150,000	$300,000
4	*Regional Disposal and Reuse Alternatives*	---	---	---
5	Sediment Database	---	---	---
5	Evaluate Delta Sediment Characteristics	---	---	---
5	Assess Reuse and Placement Capacities	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
3	**Development and Evaluation of Management Alternatives**	$250,000	$150,000	$400,000
4	*Management Alternatives Report*	---	---	---
5	Formation of Working Group	---	---	---
5	Correlate reports from previous Groups and Identify Alternatives	---	---	---
5	Evaluate Management Alternatives	---	---	---
5	Prioritize Management Alternatives	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
2	**EIR/EIS**	$750,000	$100,000	$850,000
4	*Environmental Baseline Conditions within the Delta*	---	---	---
4	*Sediment and Dredged Material Characteristics*	---	---	---
4	*Water and Groundwater Quality w/in Project Area*	---	---	---
4	*Biological Surveys*	---	---	---
4	*Environmental Control Measures for Dredging/Disposal*	---	---	---
4	*Policy level mitigation measures and alternative development*	---	---	---
5	Draft EIS/EIR Report	---	---	---
5	Final EIS/EIR Report	---	---	---
5	With Project Economic Evaluations	---	---	---
5	*Real estate Analyses/Report*	---	---	---
5	Baseline Conditions	---	---	---
4	With Project Economic Evaluations	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
5	*Air quality Report*	---	---	---
5	Baseline Conditions	---	---	---
4	With Project Evaluations	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
5	*Cultural Resources Report*	---	---	---
5	Baseline Conditions	---	---	---
4	With Project Evaluations	---	---	---

Table 3-1
Summary of Estimated Costs
(continued)

Corps Work Level [1]/	Description	Federal costs	Non-Fed in-Kind	Total costs
5	Draft Report	---	---	---
5	Final Report	---	---	---
5	*Geotechnical Investigation Report*	---	---	---
5	Literature Search	---	---	---
4	Levee Investigations	---	---	---
5	Channel Investigations	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
5	*Hydrological Investigation Report*	---	---	---
5	Literature Search	---	---	---
4	Sacramento and San Joaquin River Summary	---	---	---
5	Draft Report	---	---	---
5	Final Report	---	---	---
5	*Cost Estimates*	---	---	---
5	Appraisal of Management Alternatives	---	---	---
4	Appraisal of EIR/EIS (mitigation measures)	---	---	---
5	Appraisal of SMP (cost implications)	---	---	---
5	*Public Involvement Documents*	---	---	---
5	Progress Meetings	---	---	---
4	Coordination with Agencies	---	---	---
5	Public Workshops in Support of SMP Development	---	---	---
5	Public Meetings/CEQA – NEPA Scoping	---	---	---
5	Public Meeting SMP scoping	---	---	---
2	**Sediment Management Plan**	$800,000	$250,000	$1,050,000
5	Draft Plan	---	---	---
2	Final Plan	---	---	---
5	*Supervision and Administration*	---	---	---
5	Planning Division	---	---	---
4	Engineering Division	---	---	---
5	Contracting Division	---	---	---
5	*Technical Review of Documents*	---	---	---
5	Technical Review – Working Group Reports	---	---	---
4	Technical Review – EIR/EIS	---	---	---
5	Technical Review – SMP	---	---	---
5	Technical Review – PMP	---	---	---
5	*Programs and Project Management and Budget Documents*	---	---	---
5	PM to Support Working Groups	---	---	---
4	PM to Support IWG and SRG meetings	---	---	---
5	PM to Support EIR/EIS development	---	---	---
5	PM to Support SMP development	---	---	---
	Total of Federal and Non-Federal Work	**$4,340,000**	**$2,100,000**	**$6,440,000**

[1]/ "Corps work level" is a term used in the Project Management Plan to define task levels. It has been carried over to this document to maintain consistency.

3.4 Task Responsibility Assignment

Although is has not been determined exactly which LTMS stakeholder will execute each of the tasks identified in this Work Plan, the Corps has committed (pending appropriate budget allocation) to complete most of the main categories. As such, Table 3-2 presents a responsibility matrix that identifies which specific tasks the Corps expects to complete and which tasks other stakeholders will be responsible.

Table 3-2
Responsibility Assignment Matrix

Corps Work Level [2]/	Description	Federal	Non-Fed	Other
1	**Delta LTMS Program**	X		
5	IWG meetings	X		
5	PRG meetings	X		
5	Formulation of Science Advisory Committee	X		
2	**LTMS Sediment Management Strategy Development**	X	X	X
3	**Identify Issues of Concern and Responsible Working Groups**	X		
5	*Finalize Issues of Concern*	X		
5	*Formation of Working Groups*	X		
5	Testing Protocols Working Group	X	X	X
5	Biological Windows Working Group	X	X	X
5	Permitting Working Group	X	X	X
5	Regional Disposal and Reuse Alternatives Working Group	X	X	X
4	*Testing Protocols Report*	X	X	X
5	Formulate Working Committee	X	X	X
5	Literature Search		X	X
5	Evaluation of Procedures	X	X	X
5	Present Preliminary findings to IWG and PRG	X	X	X
5	Draft Report	X	X	X
5	Final Report	X	X	X
4	*Programmatic Biological Opinion*	X	X	X
5	Literature Search	X	X	X
5	Interagency Meetings with Resource Agencies	X	X	X
5	Biological Surveys	X	X	X
5	Draft Report	X	X	X
5	Final Report	X	X	X
4	*Regulatory Permitting Process Report*	X	X	X
5	Formation of Working Group	X	X	X
5	Development of Draft Joint Permit Application	X	X	X
5	Draft Report	X	X	X
5	Value Stream Analysis	X		
5	Final Report	X	X	X
3	**Develop Hypothetical Project Scenarios**	X		

Table 3-2
Responsibility Assignment Matrix
(continued)

Corps Work Level [2]/	Description	Federal	Non-Fed	Other
4	*Regional Disposal and Reuse Alternatives*	X	X	X
5	Sediment Database	X		
5	Evaluate Delta Sediment Characteristics	X	X	X
5	Assess Reuse and Placement Capacities	X	X	X
5	Draft Report	X	X	X
5	Final Report	X	X	X
3	**Development and Evaluation of Management Alternatives**	X		
4	*Management Alternatives Report*	X	X	X
5	Formation of Working Group	X		
5	Correlate reports from previous Groups and Identify Alternatives	X		
5	Evaluate Management Alternatives	X	X	X
5	Prioritize Management Alternatives	X	X	X
5	Draft Report	X	X	X
5	Final Report	X	X	X
2	**EIR/EIS**	X		
4	*Environmental Baseline Conditions within the Delta*	X	X	X
4	*Sediment and Dredged Material Characteristics*	X	X	X
4	*Water and Groundwater Quality w/in Project Area*	X	X	X
4	*Biological Surveys*	X	X	X
4	*Environmental Control Measures for Dredging/Disposal*	X		
4	*Policy level mitigation measures and alternative development*	X		
5	Draft EIS/EIR Report	X		
5	Final EIS/EIR Report	X		
5	With Project Economic Evaluations	X		
5	*Real Estate Analyses/Report*	X		
5	Baseline Conditions	X		
4	With Project Economic Evaluations	X		
5	Draft Report	X		
5	Final Report	X		
5	*Air quality Report*	X		
5	Baseline Conditions	X		
4	With Project Evaluations	X		
5	Draft Report	X		
5	Final Report	X		
5	*Cultural Resources Report*	X		
5	Baseline Conditions	X		
4	With Project Evaluations	X		
5	Draft Report	X		
5	Final Report	X		
5	*Geotechnical Investigation Report*	X		
5	Literature Search	X		

Table 3-2
Responsibility Assignment Matrix
(continued)

Corps Work Level [2]/	Description	Federal	Non-Fed	Other
4	Levee Investigations	X		
5	Channel Investigations	X		
5	Draft Report	X		
5	Final Report	X		
5	*Hydrological Investigation Report*	X		
5	Literature Search	X		
4	Sacramento and San Joaquin River Summary	X		
5	Draft Report	X		
5	Final Report	X		
5	*Cost Estimates*	X		
5	Appraisal of Management Alternatives	X		
4	Appraisal of EIR/EIS (mitigation measures)	X		
5	Appraisal of SMP (cost implications)	X		
5	*Public Involvement Documents*	X		
5	Progress Meetings	X		
4	Coordination with Agencies	X		
5	Public Workshops in Support of SMP Development	X		
5	Public Meetings/CEQA - NEPA Scoping	X		
5	Public Meeting SMP scoping	X		
2	**Sediment Management Plan**	X		
5	Draft Plan	X		
2	Final Plan	X		
5	*Supervision and Administration*	X		
5	Planning Division	X		
4	Engineering Division	X		
5	Contracting Division	X		
5	*Technical Review of Documents*	X		
5	Technical Review - Working Group Reports	X		
4	Technical Review - EIR/EIS	X		
5	Technical Review – SMP	X		
5	Technical Review – PMP	X		
5	*Programs and Project management and Budget Documents*	X		
5	PM to Support Working Groups	X		
4	PM to Support IWG and SRG meetings	X		
5	PM to Support EIR/EIS development	X		
5	PM to Support SMP development	X		
5	*Contingencies*	X		

[2]/ "Corps work level" is a term used in the Project Management Plan to define task levels. It has been carried over to this document to maintain consistency.

4 TECHNICAL QUALITY CONTROL PLAN

Maintaining strict quality control throughout the development of the Delta LTMS is critical to the entire agency stakeholder group. To assist in ensuring that all work products are of the highest scientific credibility, a technical quality control plan has been developed.

4.1 Quality Control Plan Objective

The overriding objective of the LTMS Quality Control (QC) Plan is to ensure that all project deliverables are scientifically reviewed at multiple levels to ensure not only their technical efficacy, but also their appropriate use within the development of the Delta LTMS work products. Achieving this QC Plan objective will be accomplished through internal contractor review, internal agency review with each of the IWG members, stakeholder review by the SRG members, and independent technical review by unaffiliated representatives. Sections 4.2 through 4.4 provide additional details on this process.

4.2 Guidelines Followed For Technical Review

The following guidelines will be observed for QC of Delta LTMS deliverables:

- Deliverables will be easily understood by the public and agency stakeholders, and be properly formatted and of professional quality;
- Deliverables will be scientifically accurate, i.e., unit conversions and measurements;
- Statements of fact will be supported based on peer reviewed literature, past agency studies, and the testimony of experts;
- Deliverables will contain accurate references to environmental regulations, and not propose or suggest processes that violate any regulation; and
- Deliverables will be reviewed at the appropriate level dependent on the task and responsible work group.

4.3 Document/Work Product Review Steps

All LTMS deliverables will be subject to QC Plan review. Deliverables include but are not limited to this Work Plan; all TWG deliverables; the EIS/EIR, including technical analyses/reports; sediment database; and the final Sediment Management Plan.

Table 4-1 provides a summary of the *minimum* review steps that must be conducted for each LTMS work product. It should be noted that this list is very conservative because there will likely be several levels of review conducted within each of the IWG member organizations that is not listed in the Table. For example, within the Corps, all primary deliverables/ work products will be reviewed by each branch assigned by the Corps' Project Manager within the San Francisco and Sacramento Districts (i.e., real estate, regulatory, planning, operations, project management, legal, construction, engineering, etc.).

Table 4-1
Minimum Technical Review Steps for Delta LTMS Work Products

Work Product/Function	Primary Review Team	Secondary Review Team
• Data Calculations	• 100% of all calculations by internal contractor review • Appropriate use in work product by contractor review	• IWG Review • Independent Technical Review team
• Database Entries	• See Section 4.3	• See Section 4.3
• Technical Studies Recommended/Conducted by TWGs	• Internal contractor review • IWG • SRG	• Independent Technical Review team
• Programmatic EIS/EIR	• Internal contractor review • IWG • SRG	• Independent Technical Review team • Management Committee • Executive Committee
• Final Sediment Management Plan	• Internal contractor review • IWG • SRG	• Independent Technical Review team • Management Committee • Executive Committee

The DREDGE Database was originally created in support of the Delta Dredging and Reuse Strategy (DDRS) document (CDFG 2002), and has been modified for use in the Delta. For every table in the DREDGE, the following checks were employed:

- The number of records were tracked – any deleted records were saved in a separate table and the reason for deletion stored;
- The uniqueness of the records were evaluated, and reason for duplicates were assessed;
- The relationships between that table and others were assessed to ensure that there were no orphan records (for example, chemistry records with no record in the sample table);

- Each field within each table was evaluated for gaps (nulls) – if possible these gaps were filled;
- Each table was evaluated for consistency among the fields within each study – details are provided below; and
- Unreasonable data was identified within possible limits, including sample depths, dates, locations, and results outside of statistical ranges – an effort was made to find the original data to check these data.

4.4 Deviations from the Approved Quality Control Plan

Any deviations from the QC Plan will be subject to the review and discretion of the IWG and/or Management Committee.

5 PUBLIC INVOLVEMENT AND COORDINATION

The LTMS group is designed to be transparent to the public and aggressive in promoting public involvement. A number of measures are/will be employed to ensure a successful public involvement process. Some of the key steps taken by the IWG members to ensure public involvement and coordination include:

- Creating an open format structure for monthly meetings held to update the project's progress and solicit stakeholder input;
- Creating a website (www.deltaltms.com) to provide status reports, meetings schedules, meeting notes and handouts, technical reports, contact information and links to other useful websites;
- Developing fact sheets and press releases when key milestones are met to inform the public of the project's status;
- Presenting routine updates and technical studies at regional and national conferences;
- Preparing a Programmatic EIS/EIR with all necessary NEPA/CEQA public involvement elements; and
- Seeking public comment on all technical and policy-related work products, as well as the Sediment Management Plan.

6 DELTA LTMS/SMP AGENCY IMPLEMENTATION STRATEGY

Implementation of the LTMS and SMP is expected to occur either through the development of a Sacramento Delta DMMO or, at a minimum, the development of an ad-hoc permitting agency review group. If created, the DMMO would utilize the LTMS and SMP as part of its mandate and, like in other regional DMMOs, would conduct annual review meetings to evaluate and update technical processes (e.g., biological and chemical testing protocols and screening criteria) and policy guidelines. If an actual Delta DMMO is not created, the individual permitting agencies should still plan to meet on a routine basis to review upcoming projects and discuss strategies for implementing and updating the SMP. This latter approach has been adopted successfully in Southern California by the Advisory Committee of the Los Angeles Regional Contaminated Sediments Task Force (http://www.coastal.ca.gov/sediment/sdindex.html).

7 REFERENCES

Anchor Environmental CA, L.P., Everest International Consultants, Inc., and AMEC Earth and Environmental, Inc. 2005. Contaminated Sediments Task Force, Los Angeles Region. Long-Term Management Strategy. Prepared for the CSTF.

U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, California Bay-Delta Authority, and Central Valley Regional Water Quality Control Board. June 2006. Delta LTMS Process Framework.

U.S. Army Corps of Engineers Seattle District, USEPA Region X, Washington Department of Ecology, Washington Department of Natural Resources, Oregon Department of Environmental Quality, Idaho Department of Environmental Quality, National Marine Fisheries Service, U.S. Fish and Wildlife. 2006. Northwest Sediment Evaluation Framework. Interim Final 2006.

U.S .Environmental Protection Agency. 1994. ARCS Remediation Guidance Document. USEPA 905-B94-003. Chicago, Ill.: Great Lakes National Program Office.

U.S. Environmental Protection Agency, Region IX; U. S. Army Corps of Engineers, San Francisco District; San Francisco Bay Conservation and Development Commission; and San Francisco Bay Regional Water Quality Control Board, California State Water Resources Control Board. 2001. Long-term management strategy (LTMS) for the placement of dredged material in the San Francisco Bay region. Management Plan 2001. San Francisco, CA.

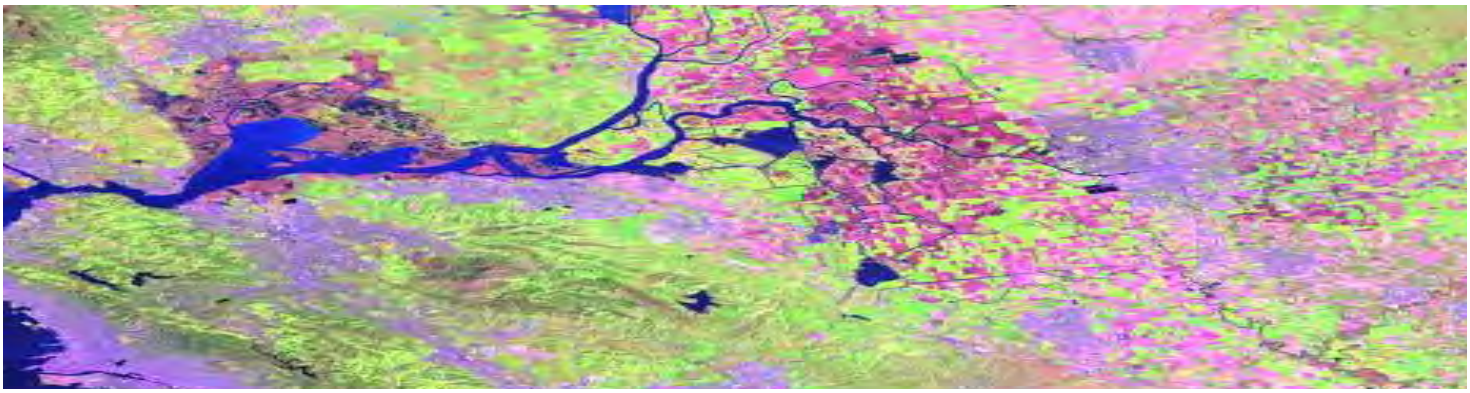
APPENDIX A

LTMS CHARTER AND FRAMEWORK

Long Term Management Strategy for Dredged Material in the Delta

(Delta LTMS)

PROCESS FRAMEWORK



Source: http://glovis.usgs.gov/

Long Term Management Strategy for Dredged Material in the Delta (Delta LTMS)

Process Framework

Pinole Shoal Management Study

November 2006

Delta LTMS Process Framework

1 INTRODUCTION AND BACKGROUND 1

2 STUDY PURPOSE 2
2.1 Problems, Challenges, and Opportunities 2
2.2 Study Purpose Statement 3

3 GOALS & OBJECTIVES 4
3.1 Study Goals 4
3.2 Study Objectives 4

4 STRUCTURE, PARTICIPANTS, AND ROLES 5
4.1 Executive Committee 5
4.2 Management Committee 5
4.3 Interagency Working Group 6
4.4 Strategy Review Group 6
4.5 Science and Technical Work Groups 7
4.6 Science Review Panel 8

5 AUTHORITIES AND DECISION MAKING 8
5.1 Dredging 8
5.2 Water Quality 8
5.3 Natural Resources 8
5.4 Levees 9
5.5 Land Use 9

6 STUDY ACTIVITIES AND PHASES 9
6.1 Management Approach 9
6.2 Planning Approach 10
6.3 Initial Issues and Topics 10

7 SUMMARY 10

APPENDIX A – RELATED PROGRAMS I
Multi-Purpose Programs i
Dredging ii
Levees ii
Navigation iii
Water Quality iii
Ecosystem Restoration iii
Recreation iv
Other iv

1 Introduction and Background

The Delta estuary is the largest estuary on the West Coast. Covering more than 738,000 acres in five counties, it is a maze of tributaries, sloughs, and islands and a haven for plants and wildlife, supporting more than 750 plant and animal species, including more than 110 species listed as "species of concern." The Delta is critical to California's economy, supplying drinking water for two-thirds of Californians and irrigation water for more than 7 million acres of the most highly productive agricultural land in the world.

The Delta is also the hub of California's two largest water distribution systems – the Central Valley Project (CVP) operated by the U.S. Bureau of Reclamation (Reclamation) and the State Water Project (SWP) operated by the California Department of Water Resources (DWR). Maintaining high quality water in the Delta is critical for drinking water supplies, agricultural irrigation, and ecosystem function. More than 1,100 miles of levees protect the water conveyance functions, ecosystem, and land uses on Delta islands. The Sacramento and San Joaquin River channels also provide important shipping access to the Ports of Sacramento and Stockton.

In recent years, conflicts about levee rehabilitation, dredging, and placement of dredged sediments have been increasing. There is an ongoing need to explore alternatives and find solutions that will allow dredging of Delta channels for navigation, water conveyance, flood control, and levee maintenance, while, at the same time, protecting water quality and the ecosystem from levee work, dredging activities, and dredge material placement and reuse.

In the last several years, agencies, the public, political leaders, and the media have become increasingly concerned about the urgent need for levee rehabilitation in the Delta. One possible contributor to Delta levee rehabilitation is sediment management and reuse from dredging activities. At the same time, the Delta environment is showing signs of major stress and dysfunction, as evidenced by the rapid decline of pelagic species in recent years. Concerns about the complex and sensitive environment in the Delta necessitate stringent regulatory requirements for dredging and sediment reuse and placement in the Delta. These two apparently conflicting objectives, protection of the Delta environment and increased dredging and sediment reuse and placement, highlight the need for better coordination and management of Delta dredging and sediment management and reuse requirements.

In late 2004, local sponsors of Delta dredging projects and the U.S. Army Corps of Engineers (USACE) met to explore the feasibility of developing a long-term management strategy (LTMS) for dredging and dredged material placement or reuse in the Delta under the authority of the Pinole Shoal Management Study. The LTMS process was used successfully to develop a collaborative, coordinated approach to dredging and sediment management in San Francisco Bay.

In 2005, the USACE worked with stakeholders including other federal and state agencies to define a cooperative, collaborative, and operational approach to address the problems, challenges, and opportunities related to levee work, dredging, and placement in the Delta. This Process Framework is the result of those discussions.

This document describes the initial framework for the Delta LTMS, including the following:

- Study purpose, goals, and objectives
- Structure, participants, and roles

- Authorities and decision making
- Related programs
- Study activities and phases

This framework is intended to describe the overall purpose and structure of the process so participating agencies can confirm the purpose, participation, and resources for the Delta LTMS. As with any cooperative planning process, the framework will be refined as participation increases and implementation proceeds.

To address these concerns, the U.S. Army Corps of Engineers began working with four other federal and state agencies: U.S. Environmental Protection Agency (USEPA), the California Department of Water Resources (DWR), the Resources Agency, CALFED Bay-Delta Program (CALFED), and the California Regional Water Quality Control Board, Central Valley Region (CVWQCB). These five agencies drafted this initial Process Framework to describe a cooperative approach for developing an LTMS for Delta dredging.

2 Study Purpose

2.1 Problems, Challenges, and Opportunities

The Delta plays a critical role in a number of fronts bringing unique challenges and opportunities in establishment of a Long Term Management Strategy. These challenges and opportunities are in areas of management of sediment, ecosystem integrity, water conveyance, water quality and supply, navigation, recreation, flood control, and agriculture. The following is a brief description of these challenges and opportunities as they relate to the Delta:

Dredging – Dredging in the Delta is a critical activity for maintaining the important functions of the Delta – levee stability, flood control, navigation, ecosystem quality, water supply, and recreation. Dredging activities vary in size from small marina dredging projects to major channel deepening. There is no comprehensive planning for dredging in the Delta to determine the dredging and placement needs, potential beneficial uses of dredged material, or placement sites. In the last ten years, increasing concerns about the potential impacts of dredging on fisheries, habitat, and surface and ground water quality have resulted in greater restrictions on dredging operations and the placement or reuse of dredged material. Today, the complexity of the regulatory permit process for the Delta is viewed by dredging proponents as a major contributor to escalating project costs and lengthy study and review processes by those conducting dredging projects small and large. Delta dredging could support or harm the critical Delta features described below, including the ecosystem, levees, navigation, recreation, water quality, and water supply.

Ecosystem – The Delta ecosystem is the largest estuarine ecosystem on the west coast. It supports more than 750 plant and animal species. There are more than 110 species of fish, plants, animals, and birds in the Delta that are listed by state and federal agencies as “species of concern.” For the past ten years, state and federal resource agencies have focused hundreds of millions of dollars on ecosystem restoration projects to protect and enhance the ecosystem functions. In spite of those efforts, there are indications that much more needs to be done. For example, in the last several years, populations of pelagic fish have dropped precipitously.

Continued protection and enhancement of the Delta ecosystem and threatened and endangered species is necessary.

Levees – Delta levees are the most important infrastructure in the Delta. More than 1,100 miles of levees protect thousands of acres of homes and farmland, protect and provide important habitat, and convey fresh water supplies through the Delta for agriculture, municipal, and industrial water supplies. Approximately 410,000 people live in communities of the Delta protected by levees. The Delta levee system is at risk of chronic and catastrophic failure as a result of deferred maintenance, earthquake, or flood. The consequences of major levee failure in the Delta are potentially devastating for water quality, water supply, the ecosystem, and local property and economic activity.

Navigation – The Delta is also a transportation corridor for access to deep water ports in Stockton and Sacramento. Two federally authorized shipping channels exist in the Delta, the Sacramento Deep Water Channel and the Stockton Deep Water Channel. These channels provide access to foreign markets for Central Valley exports such as sulfur, rice and wheat, and imported goods such as cement, fertilizer, and steel. In 2004, more than 325 ships and barges transported nearly 3 million tons of goods through the ports. Without regular maintenance, the deep water channels fill with silt and debris, reducing access by ship traffic.

Recreation – Delta channels are an important recreation resource for the region. As cited in the 1998 Economic Impact of Regional Boating and Fishing in the Delta, boating and fishing recreation accounted for over $378 million in annual expenditures. The Delta boasts more than 100 marinas and waterside resorts, parks, and campgrounds, and more than 50 boat launching facilities. Protecting and enhancing the Delta fish populations and dredging to maintain marina access are high priority goals for recreation in the Delta.

Water Conveyance and Supply – The Delta provides fresh water for more than 23 million Californians and 7 million acres of the most highly productive farmland in the world. Delta channels and sloughs convey water from the major river systems to intake pumps throughout the Delta. The amount and quality of water diverted from the Delta is influenced by hydrology, water operations, and other activities in the Delta. Continued protection of the water supply system is critical for public health and the economy of California.

Water Quality – The waters of the Delta provide for several diverse, and sometimes conflicting, beneficial uses, including drinking water, habitat, irrigation, and recreation. The natural actions of an estuary, where fresh and salt water meet, pose substantial challenges in serving these beneficial uses. These challenges are made even greater by the human activities that channel, move, divert, and return water to the Delta. Protecting and enhancing water quality for all beneficial uses is critical for public health, recreation, and the sustained health of the Delta ecosystem.

2.2 Study Purpose Statement

As a result of these challenges, the five initial agencies, referred to as the Interagency Working Group (IWG) (USACE, USEPA, DWR, CALFED, and CVWQCB) have agreed to examine Delta dredging, reuse, and placement needs and explore ways to operationally improve the regulatory approval process for dredging in the Delta. The agencies seek to coordinate dredging planning and dredged material management in ways that protect and enhance the Delta environment and water quality. The agencies recognize the importance of dredging projects and

the need to explore the beneficial use of dredged material to stabilize levees, maintain and improve navigation channels, support ecosystem restoration, and maintain water supply and water quality. With these needs in mind, the agencies have drafted the following three-part project purpose statement:

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

3 Goals & Objectives

3.1 Study Goals

There are four overarching goals of the Delta LTMS. These four goals represent the benefits to be achieved from a coordinated sediment material management program and an improved dredging approval process:

- Manage sediment, including exploring the beneficial reuse of dredged material, to maintain and stabilize Delta levees that protect land-based activities and water conveyance
- Manage dredging activities and beneficial reuse to protect and enhance water quality for Delta water supply and ecosystem function
- Manage dredging activities to support and maintain Delta channel functions for navigation, flood control, water conveyance, and recreation
- Manage dredging activities and beneficial reuse to protect and enhance aquatic, wetland, and terrestrial ecosystems

3.2 Study Objectives

To achieve these goals, the Delta LTMS intends to improve coordination, planning, and approvals of Delta dredging activities and sediment management to achieve these specific objectives:

- Improve operational efficiency through the coordination and cooperation among agencies with dredging management responsibilities or regulatory authority over dredging activities
- Protect surface and groundwater quality

- Protect fish species and habitat
- Study the beneficial use of dredged material for levee stabilization or other uses
- Support ecosystem restoration activities in the Delta
- Support cost-effective dredging activities

4 Structure, Participants, and Roles

The Delta LTMS is organized to include an executive committee, management committee, interagency working group, strategy review group, science and technical work groups, and a science review panel as described in this section. In addition, public meetings are held to provide additional opportunities for input and feedback from interested parties.

4.1 Executive Committee

At the top level, an Executive Committee directs the overall program, sets policy direction, and provides oversight of the study. Subject to their approvals, the directors of each of the following agencies serve on the Executive Committee. The executive managers have the decision-making authority to represent the agency on the strategic and regulatory issues to be addressed. The agency Executive Committee generally meets annually or as necessary to establish guidance for the study and keep abreast of the progress of the Delta LTMS.

Federal Agencies

- U.S. Army Corps of Engineers, Commander, South Pacific Division
- U.S. Environmental Protection Agency, Regional Administrator, Region 9

State Agencies

- State Water Resources Control Board, Board member
- California Regional Water Quality Control Board, Central Valley Region, Chairperson
- California Department of Water Resources, Director
- Resources Agency, CALFED Bay-Delta Program, Director
- Delta Protection Commission, Chairperson

4.2 Management Committee

The Management Committee consists of the deputy-level managers for the state and federal agencies. The Management Committee oversees the work of the Interagency Working Group (IWG) and the Strategy Review Group, reviews recommendations, study plans, budget proposals, and provides recommendations to the Executive Committee. The Management Committee generally meets quarterly. Subject to their approvals, members of the Management Committee are:

- U.S. Army Corps of Engineers, District Commander, San Francisco District
- U.S. Army Corps of Engineers, District Commander, Sacramento District
- California Department of Water Resources, Deputy Director, Public Safety
- U.S. Environmental Protection Agency, Associate Director, Water Division, Region 9
- Resources Agency, CALFED Bay-Delta Program, Chief Deputy Director
- State Water Resources Control Board, Executive Director

- California Regional Water Quality Control Board, Central Valley Region, Executive Officer
- Delta Protection Commission, Executive Director
- NOAA Fisheries, Southwest Region
- U.S Fish and Wildlife Service, Pacific Region
- California Department of Fish and Game

4.3 Interagency Working Group

The Interagency Working Group (IWG) includes program-level staff at five agencies. The IWG serves as the primary program managers of the Delta LTMS process and steering committee for the Strategy Review Group. The IWG coordinates with the Management Committee, the Strategy Review Group and others with an interest in Delta activities and the LTMS process. The IWG's role is to identify study issues and questions to be addressed such as: identify technical work groups and expert resources, confirm purpose, charter, and assignments for the science review panel and technical work groups, discuss and review study work plans and scopes, discuss and review study budgets and resource needs, prepare and approve study reports, and develop management and strategic options for the Management and Executive Committees. Subject to their approvals, the members of the IWG consist of the following:

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- California Regional Water Quality Control Board, Central Valley Region
- Resources Agency, CALFED Bay-Delta Program
- California Department of Water Resources

The Management Committee may identify other participants in the IWG.

4.4 Strategy Review Group

Delta LTMS activities are informed by the Strategy Review Group. The Strategy Review Group will consist of Interagency Work Group members and other interested governmental agencies. The meetings will be open to the public with an opportunity for interested individuals to participate. The Interagency Work Group agencies will invite stakeholders, and interest groups, and individuals working in or affected by Delta dredging and beneficial use activities for navigation, levee stability, flood control, water quality, or ecosystem restoration. The Interagency Working Group coordinates meetings monthly or as needed with the Strategy Review Group to identify, review, and discuss: 1) the Delta sediment issues of concern to be addressed by the Delta LTMS and in what order, 2) lines of inquiry that the science and technical work groups (described below) will be tasked to pursue, 3) coordinated regulatory approach for Delta dredging to be approved by the Executive Committee.

Members of the Strategy Review Group may also provide public comment at the Management and Executive Committee meetings. Subject to their approvals, the Strategy Review Group may include, but is not limited to the following agencies:

State and Federal Agencies

- NOAA Fisheries, Southwest Region
- U.S. Fish & Wildlife Service, Pacific Region

- California Department of Fish & Game
- Delta Protection Commission
- State Lands Commission
- Reclamation Board

In addition, members of the public will be invited to participate in the meetings of the Strategy Review Group, including, but not limited to, the following groups:

Local/Regional Agencies

- Reclamation Districts
- Contra Costa, Sacramento, Solano, Yolo, and San Joaquin Counties
- North, Central, and South Delta Water Agencies

Stakeholders and Interest Groups

- The Ports of Sacramento and Stockton
- Bay Planning Coalition
- DeltaKeeper
- The Nature Conservancy
- The Bay Institute
- Environmental Water Caucus
- California Sportfishing Protection Alliance
- California Farm Bureau Federation
- State Water Contractors
- California Delta Chambers

4.5 Science and Technical Work Groups

The Management Committee will establish specific science and technical work groups to address Delta LTMS issues. The science and technical work groups will consist of agency staff with expertise in the relevant subject areas. Technical work groups are open to interested participants from any agency, interest group, or the public. With the direction and approval of the Management Committee, technical work groups identify study needs, develop study scopes and work plans, identify resources, and review results and conclusions. The Management Committee identifies the leader for each technical group. Some example science and technical work groups include the following:

- **Testing Protocols** – examining the appropriate procedures for testing dredged material
- **Soil and Sediment Studies** – characterizing the quality of sediments and soils in the Delta
- **Permitting Process** – identifying the regulatory approval process and opportunities for improved coordination
- **Placement and Reuse** – identifying criteria, methods, and locations for dredged material placement and reuse

These groups will be formed as determined by the Management Committee.

4.6 Science Review Panel

The Management Committee establishes a Science Review Panel made up of independent scientists. The purpose of the Science Review Panel is to provide an independent science review process for Delta LTMS studies. The Management Committee approves the leader and participants for the Science Review Panel. The Science Review Panel will evaluate existing information, identify gaps, and review results and conclusions.

4.7 Other Stakeholders/Interested Public

Other interested parties have the opportunity to learn about the Delta LTMS process and activities and to comment on them at public meetings to be held on an as needed basis, at project milestones.

5 Authorities and Decision Making

A number of state and federal agencies regulate dredging and dredged material management in the Delta. Different laws and regulations govern their roles and responsibilities, but often their purposes and goals overlap. The following summarizes the agency responsibilities for dredging, water quality, natural resources, levees, and land use. One of the early Study activities will be to document the planning, regulatory, and implementation responsibilities for Delta dredging in order to improve coordination and operational efficiency among the various Federal, State, and local agencies having jurisdictional responsibilities within the Delta. As noted in the Delta LTMS Charter, participating regulatory agencies retain their full authority to regulate dredging, reuse, and disposal activities, and nothing in the Charter or the Delta LTMS Framework shall restrict their authorities. Signatories to the Charter do not indicate their approval for any specific project that may be proposed in the future.

5.1 Dredging

The primary state and federal agencies involved in planning and permitting dredging projects are the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), California Regional Water Quality Control Board, Central Valley Region (CVWQCB) and the State Lands Commission (SLC).

5.2 Water Quality

The primary agencies with responsibility for overseeing compliance with water quality laws and regulations are the U.S. Environmental Protection Agency, the State Water Resources Control Board, and the California Regional Water Quality Control Board, Central Valley Region.

5.3 Natural Resources

Dredging and placement actions in the Delta will involve the review and approval by state and federal resource agencies, including the U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service (FWS), the National Marine Fisheries Service (NMFS), and the state Department of Fish & Game (DFG).

5.4 Levees

If the placement of dredge material involves levees in the Delta, the USACE, the Department of Water Resources, the California Reclamation Board, and the individual Reclamation Districts have responsibilities and authorities for planning, reviewing and approving levee maintenance and dredged material placement.

5.5 Land Use

The Delta Protection Commission has regional planning and coordination responsibilities in the Delta to protect and enhance agriculture, wildlife habitat, and recreation. Five counties (Contra Costa, San Joaquin, Solano, Sacramento, and Yolo), three Councils of Government, and several cities have land use planning authority in the Delta.

6 Study Activities and Phases

The Delta LTMS will generally combine two parallel approaches – a management approach and a planning approach. These activities are designed to comply with USACE guidance for Long-Term Management Strategies and Dredged Material Management Plans, while at the same time allowing flexibility to consider and incorporate planning and evaluation activities from other federal and non-federal partners. In the near-term, these activities will focus on identifying and addressing the immediate challenges associated with dredging and protecting the Delta's resources. In the long-term, these activities will improve the scientific understanding of the effects of dredging and measures to protect Delta resources and develop a Sediment Management Plan to coordinate dredging planning, dredge material placement and reuse, and the permitting process.

6.1 Management Approach

The management approach for the Delta LTMS is designed as an iterative approach to identify and address priority issues and needs related to Delta dredging and levee rehabilitation. The iterative approach proceeds through five activities. Stakeholders and the public will provide review and input during all activities.

1. **Assessment** – During the Assessment stage, the agencies will identify and prioritize dredging and dredged material management needs, opportunities and constraints, the regulatory approval process, and study and analysis needs.

2. **Research and Analysis** – During the Research and Analysis stage, the agencies will define and implement focused research and policy analysis activities to collect and evaluate information that will assist the Management Committee and the Agency Executive Committee address the priority issues and needs.

3. **Planning** – During the Planning stage, the agencies will develop and evaluate options to address the priority issues and needs related to sediment management, beneficial reuse, and regulatory process improvements.

4. **Implementation** – The Implementation stage will include the activities necessary to implement the actions identified during the planning activities.

5. **Evaluation and Refinement** – During the final stage, the agencies will review and evaluate the performance of the implemented actions. The evaluation results will be reported to

the Agency Executive Committee and stakeholders and used to prioritize activities for the next iteration of the management approach.

6.2 Planning Approach

In parallel with the iterative management approach to priority issues associated with Delta dredging, the Delta LTMS will proceed through five planning phases leading to a long-term Sediment Management Plan. These planning phases are consistent with federal planning guidelines.

Phase 1 – Evaluate Management Options – Establish goals, objectives, geographic scope, and operational boundaries. Forecast dredging requirements, material characteristics placement site capacities, and reuse and placement needs.

Phase 2 – Formulate LTMS Alternatives – Develop and retain all viable long-term management options that meet study goals and objectives.

Phase 3 – Alternatives Analysis – Complete a comparative assessment that weighs and balances engineering, economic, and environmental factors and benefits.

Phase 4 – LTMS Implementation – Develop and implement plan, including environmental documentation, permits, and mitigation requirements.

Phase 5 – Review and Update LTMS – Conduct periodic reevaluation of regulatory, economic, and environmental conditions and identify updates to the Delta LTMS.

6.3 Initial Issues and Topics

The following is an initial list of issues and topics planned for the Delta LTMS:

- **Regulatory Process** –Document the regulatory approval process for dredging activities and beneficial use of dredged material and identify opportunities for improved coordination.
- **Dredging Activities and Quantities** – Identify and quantify planned dredging activities for navigation, flood control, water conveyance, recreation, and other Delta functions.
- **Reuse and Placement Capacity** – Identify and quantify sediment reuse needs, sediment sources, and on-going long-term placement capacity.
- **Testing Protocols** – Identify and conduct research on evaluation of dredged material testing protocols for beneficial use of dredged sediment in the Delta.
- **Sediment Quality** – Develop and implement research on sediment quality in likely areas for dredging.
- **Emergency Procedures** – Identify existing responsibilities and procedures for response to emergency conditions in the Delta (e.g., levee failure or flooding).

7 Summary

The structure and process for the Delta Long-Term Management Strategy described in this document are designed to establish a collaborative framework to examine Delta dredging, beneficial use of dredged sediment for levee reconstruction and ecosystem restoration, and other

placement needs and explore ways to operationally improve the regulatory approval process for dredging in the Delta in ways that protect and enhance the Delta environment and water quality.

In this document, the following was detailed: 1) purpose, 2) goals and objectives, 3) structure, participants and roles of committees and working groups, 4) authorities and decision making processes, and 5) study activities and phases for the Delta LTMS process. When taken together, these framework components will enable participants to shape and implement a Delta LTMS work plan and, ultimately, a Delta sediment management plan that may include dredging projects to stabilize levees, maintain and improve navigation channels, support ecosystem restoration, and maintain water supply and water quality. The immediate next steps include development of a project management plan and work plan, as well as preparing a detailed scope of work for development of the Sediment Management Plan.

Appendix A –
Related Programs

The Bay-Delta is an interconnected system that affects and is affected by numerous projects and programs related to levees, navigation, water supply, ecosystem restoration, land development, and recreation. The following is a list of the major programs in each of these areas that will influence or relate to the Delta LTMS.

Multi-Purpose Programs

Delta Vision Process—State-led effort to encompass and integrate many ongoing but separate planning activities for the Delta and Suisan Bay/Marsh that will assess risks and prepare a contingency and emergency response plan for near-term catastrophic events. Will develop a long-term Delta Vision for sustainable management of the Delta's multiple uses, resources and ecosystem in cooperation with elected officials, government agencies, stakeholders, academia, and affected California communities.

Delta Improvement Program – As part of the CALFED Bay-Delta Program, DWR, the federal Bureau of Reclamation (USBR), and the Central Valley Project (CVP)/State Water Project (SWP) water contractors have proposed a program to improve integration of SWP/CVP operations and Delta facilities included in the CALFED Record of Decision (ROD). The program seeks to coordinate the South Delta Improvements Program (SDIP), CVP/SWP Intertie, and the Operations and Criteria Plan (OCAP) schedules, which support continuing the Environmental Water Account and define operational rules for the Banks Pumping Plant and the CVP/SWP Intertie.

South Delta Improvements Program – DWR and USBR are responsible for implementing CALFED's South Delta Improvements Program. Activities include providing for more reliable long-term export capability by the state and federal water projects, protecting local diversions, and reducing impacts on San Joaquin River salmon. Specifically, the CALFED actions in the SDIP include consideration of placement of an operable gate at the head of Old River to protect salmon, up to three operable gates in south Delta channels, dredging and extension of some agricultural diversions, and increasing diversion capability of Clifton Court Forebay.

North Delta Improvement Program – Operated as part of the CALFED Bay-Delta Improvement Projects, the purpose of the North Delta Flood Control and Ecosystem Restoration Project is to implement flood control improvements in a manner that benefits aquatic and terrestrial habitats, species, and ecological processes. The additional objectives include:

- Improve Water Supply Reliability for Conveyance
- Improve Water Quality for Conveyance
- Recommend Ecosystem Restoration and Science Actions
- Improve Levee Stability
- Improve and Enhance Recreation

Delta Protection Commission Land Use and Resource Management Plan—Adopted in November 1995 and reprinted in 2002, the DPC Land Use and Resource Management Plan

includes findings, policies, and recommendations for maintaining and improving Delta resources in eight areas: environment; utilities and infrastructure; land use; agriculture; water; recreation and access; levees; and marine patrol, boater education, and safety programs.

Dredging

National Dredging Team – The Army Corps of Engineers and the U.S. EPA are co-chairs of the National Dredging Team (NDT). The NDT was established in 1995 to support implementation of the National Dredging Policy, promote national and regional consistency on dredging issues, and provide a mechanism for issue resolution and information exchange among Federal, State, and local agencies and stakeholders. This policy calls for establishing Regional Dredging Teams and Local Planning Groups to coordinate dredging activities and permitting. The Delta LTMS could function as one or both of these groups under the National Dredging Policy.

Delta Dredging and Reuse Strategy – The Delta Dredging Reuse Strategy (June 20, 2002, Central Valley Regional Water Quality Control Board) analyzed the regulatory and technical considerations for contaminants in dredged material, particularly for the Regional Board's review of dredging projects. The technical analysis focused mainly on upland placement and beneficial use. The recommendations include identification of information gaps, recommendations for permit streamlining, and recommendations for interim screening values and test methods that may be used by Regional Board staff in future General Order Waste Placement Requirements or to assess future projects.

San Francisco Bay LTMS – Beginning in 1994, the USACE, USEPA, the SWRCB, the San Francisco Bay Regional Water Quality Control Board, the Bay Conservation and Development Commission (BCDC) and other agencies began developing a Long-term Management Strategy for dredging in the San Francisco Bay. This program provides useful guidance and experience for implementing the Delta LTMS.

Levees

CALFED Levees Program – The purpose of the CALFED Levees Program is to facilitate levee system integrity to protect water supplies needed for the environment, agriculture, and urban uses by reducing the threat of levee failure and seawater intrusion. This involves collaboration between CALFED, DWR, the Department of Fish and Game, USACE, and the Reclamation Board, and numerous local reclamation districts. The CALFED Authorization Act (108-361) provided further direction on the development and implementation of the Levee Stability and Improvement Program.

Delta Risk Management Study (DRMS) – This is a multi-year program to evaluate the ongoing and future risk of levee failure and to develop a set of alternative risk reduction plans to mitigate the consequences of levee failures. DWR has an ongoing program to reuse dredged material for Delta levee construction. Because levee construction material is in such short supply in the Delta, the primary issue for DWR associated with dredging activities is the long-term viability of this beneficial reuse program while protecting the beneficial uses of the waters of the State.

Navigation

San Francisco to Stockton Ship Channel Deepening – The San Francisco District of the Army Corps of Engineers is managing the planning process for deepening the channel from Stockton to San Francisco to accommodate larger ships of varying commodities.

Sacramento Ship Channel Deepening – Proposed improvements call for deepening the existing 300-ft- wide project from 30 to 35 ft from Sacramento River miles 12 to 20.

Water Quality

Regional Board TMDLs – The California Regional Water Quality Control Board, Central Valley Region is working on four Total Maximum Daily Load (TMDL) studies to address Delta water quality problems related to mercury, salinity, dissolved oxygen, diazinon, and chlorpyrifos. The mercury, diazinon and chlorpyrifos TMDLs are being developed. The salinity and dissolved oxygen TMDLs have been adopted by the Board and are undergoing the approval process with the State Water Resources Control Board and the Office of Administrative Law. The diazinon and chlorpyrifos TMDLs will go to the Board in June.

Stockton Dissolved Oxygen Project – A large stakeholder-driven process to find a regional solution to the seasonal dissolved oxygen depression that occurs in the San Joaquin River. Low dissolved oxygen levels can be harmful to resident aquatic life and can delay the fall salmon migration in the river. The organizational structure for the project includes several oversight committees and diverse stakeholders, including the regional water board, local governments and agencies, and state and federal agencies.

Bay-Delta Basin Plan Update – The State Water Resources Control Board has adopted a Triennial Review staff report with a commitment to review baseline monitoring, aquatic life protection, chloride objectives, flow objectives, export limits and electrical conductivity objectives, among others, over the next decade. The California Regional Water Quality Control Board, Central Valley Region also has a Water Quality Control Plan for the Sacramento River and San Joaquin River Basins with objectives for salt and other constituents in the Delta.

State Water Resources Control Board Sediment Management Program – The State Board is managing a program to characterize and manage Delta sediments to improve water quality.

Ecosystem Restoration

CALFED Ecosystem Restoration Program – One of CALFED's program elements, the Ecosystem Restoration Program is designed to protect and restore aquatic, upland and riparian habitats, fish populations and other native species in the Delta.

CA Aquatic Invasive Species Management Plan—Document that lays out a process by which agencies would coordinate to implement control programs for aquatic invasive species. Draft plan was released in August 2006 by Dr. Karen McDowell of the San Francisco Estuary Project.

Bay-Delta Conservation Plan— Applicant-driven effort to provide for the conservation and management of aquatic species and regulatory assurances related to water supply reliability and water quality.

Local Entity HCP Programs— Local Habitat Conservation Plans (HCPs) are mater plans with the key purpose of balancing the need to conserve habitat for wildlife while accommodating growth for an expanding population. An example is the San Joaquin County Multi-Species

Habitat Conservation and Open Space Plan (SJMSCP), which has been in existence since 2001 covering 97 species with San Joaquin County.

Land Use

County and City General Plans – A city or county's basic planning document. It provides the blueprint for development throughout the community by addressing all aspects of development, including housing, traffic, natural resources, open space, safety, land uses, and public facilities.

DPC Appeal Authority—Any person who is aggrieved by any action taken by a local government or other local agency in implementing the Delta Protection Commission's Land Use and Resource Management Plan for the Primary Zone of the Delta may file an appeal with the Commission.

Recreation

Delta Trail – State Senator Tom Torlakson has proposed a five-county trail network through the Delta that would stretch from the Bay Area to the heart of the Great Central Valley. The trail planning would be coordinated with levee improvement activities.

State Parks Central Valley Vision— California State Parks effort that began in 2003 analyzing gaps in park and recreational lands and services, specifically in the Central Valley. In 2005 State Parks held over three dozen meetings and with significant public input identified short-term actions to pursue over the next five years.

Other

Irrigated Lands Program – In July 2003, the California Regional Water Quality Control Board, Central Valley Region adopted a resolution which sets forth two Conditional Waivers of Waste Discharge Requirements (WDRs) for discharges of waste to surface water from irrigated lands. One Irrigated Lands Conditional Waiver is for Coalition Groups, the other is for individual Dischargers. The California Regional Water Quality Control Board, Central Valley Region also developed Monitoring and Reporting Program Plans for Coalition Groups, and Individual Dischargers. The Regional Board is in the process of adopting a new waiver.

Long Term Management Strategy for Dredged Material in the Delta

(Delta LTMS)

CHARTER

COPY

Long Term Management Strategy for Dredged Material in the Delta
(Delta LTMS)

CHARTER

VISION

The Long Term Management Strategy is designed to improve operational efficiency and coordination of the collective and individual agency decision making responsibilities resulting in approved dredging and dredged material management actions in the Delta. Approved dredging and dredged material management actions will take place in a manner that protects and enhances Delta water quality, identifies appropriate opportunities for the beneficial reuse of Delta sediments for levee rehabilitation and ecosystem restoration, and establishes safe disposal for materials that cannot be reused.

GOALS

The Delta LTMS will facilitate development of long-term management approach for the Delta sediments based on science, enhanced communication and coordination among the stakeholders, and resolution of issues surrounding Delta dredging and beneficial use of sediments. The agency and stakeholder meetings will serve as a forum for developing a Delta Long Term Management Strategy for Delta sediments to be detailed in a Sediment Management Plan (SMP), and for promoting its implementation when adopted.

The goals of the Delta LTMS, to be finalized in the SMP, are to manage dredging and sediment management activities, including the following:

- Maintain and stabilize Delta levees that protect land-based activities and water conveyance
- Protect and enhance water quality for Delta water supply and ecosystem function
- Support and maintain Delta channel functions for navigation, flood control, water conveyance, and recreation
- Protect and enhance aquatic, wetland, and terrestrial ecosystems

OPERATING PRINCIPLES

The participating agencies of the Delta LTMS will operate under the Delta LTMS Process Framework, as last revised on November 1, 2006.

The participating agencies will work towards the timely completion and implementation of the Delta LTMS and Sediment Management Plan.

The participating agencies will continue to seek the participation of other agencies and stakeholders to the Delta LTMS Charter and Process Framework.

The agenda and issues to be addressed will be determined by the Delta LTMS agencies in consultation with other agencies and stakeholders.

The Delta LTMS will provide for peer review of technical studies through the Science Review Panel.

Information will be sought from stakeholders to help identify and clarify specific issues as well as provide factual data on the issues.

It is anticipated that the Delta LTMS will serve as a Regional Dredging Team under the National Dredging Policy.

Participating regulatory agencies shall retain their full authority to regulate dredging, reuse, and disposal activities, and nothing in this Charter or the Delta LTMS Framework shall restrict their authorities. Signatories do not indicate their approval for any specific project that may be proposed in the future.

MEMBERSHIP

The Delta LTMS is organized to include an executive committee, management committee, interagency working group, strategy review group, and science and technical groups as described in this section. In addition, public meetings will be held to provide additional opportunities for input and feedback from interested persons.

Executive Committee
At the top level, an Executive Committee directs the overall program, sets direction, and provides oversight of the study. Subject to their approvals, the directors of each of the following agencies serve on the Executive Committee. The executive managers have the decision-making authority to represent the agency on strategic and regulatory issues to be addressed, to the extent consistent with applicable laws, statutes, and regulations. The agency Executive Committee generally meets annually or as necessary to establish guidance for the study and keep abreast of the progress of the Delta LTMS.

Federal Agencies

- U.S. Army Corps of Engineers, Commander, South Pacific Division
- U.S. Environmental Protection Agency, Regional Administrator, Region 9

State Agencies

- State Water Resources Control Board, Board member

- California Regional Water Quality Control Board, Central Valley Region, Chairperson
- California Department of Water Resources, Director
- Resources Agency, CALFED Bay-Delta Program, Director
- Delta Protection Commission, Chairperson

Management Committee
The Management Committee consists of the deputy-level managers for the state and federal agencies. The Management Committee oversees the work of the Interagency Working Group (IWG) and the Strategy Review Group, reviews strategic recommendations, study plans, budget proposals, and provides recommendations to the Executive Committee. The Management Committee generally meets quarterly. Subject to their agency approvals, members of the Management Committee include:

- U.S. Army Corps of Engineers, District Commander, San Francisco District
- U.S. Army Corps of Engineers, District Commander, Sacramento District
- California Department of Water Resources, Deputy Director, Public Safety
- U.S. Environmental Protection Agency, Associate Director, Water Division, Region 9
- Resources Agency, CALFED Bay-Delta Program, Chief Deputy Director
- State Water Resources Control Board, Executive Director
- California Regional Water Quality Control Board, Central Valley Region, Executive Officer
- Delta Protection Commission, Executive Director
- NOAA Fisheries, Southwest Region
- U.S Fish and Wildlife Service, Pacific Region
- California Department of Fish and Game

Interagency Working Group
The Interagency Working Group (IWG) includes program-level staff at five agencies. The IWG serves as the primary program managers of the Delta LTMS process and steering committee for the Strategy Review Group. The IWG coordinates with the Management Committee, the Strategy Review Group and others with an interest in Delta activities and the LTMS process. The IWG's role is to identify study issues and questions to be addressed such as: identify technical work groups and expert resources, confirm purpose, charter, and assignments for the science advisory teams and technical review groups, discuss and review study work plans and scopes, discuss and review study budgets and resource needs, prepare and approve study reports, and develop management and policy options for the Management and Executive Committees. Subject to their approvals, the members of the IWG consist of the following:

- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- California Regional Water Quality Control Board, Central Valley Region
- Resources Agency, CALFED Bay-Delta Program

- California Department of Water Resources

The Management Committee may identify other participants in the IWG.

Strategy Review Group
Delta LTMS activities are informed by the Strategy Review Group. The Strategy Review Group will consist of Interagency Work Group members and other interested governmental agencies. The meetings will be open to the public with an opportunity for interested individuals and organizations to participate. The Interagency Working Group agencies will invite stakeholders, interest groups, and individuals working in or affected by Delta dredging and beneficial use activities for navigation, levee stability, flood control, water quality, or ecosystem restoration. The Interagency Working Group coordinates meetings monthly or as needed with the Strategy Review Group to identify, review, and discuss: 1) the Delta sediment issues of concern to be addressed by the Delta LTMS and in what order, 2) lines of inquiry that the science and technical work groups will be tasked to pursue, 3) coordinated regulatory approach for Delta dredging to be approved by the Executive Committee.

Members of the Strategy Review Group may also provide public comment at the Management and Executive Committee meetings. Subject to their approvals, the Strategy Review Group may include, but is not limited, to the following agencies:

State and Federal Agencies

- NOAA Fisheries, Southwest Region
- U.S. Fish & Wildlife Service, Pacific Region
- California Department of Fish & Game
- Delta Protection Commission
- State Lands Commission
- Reclamation Board

Local/Regional Agencies

- Reclamation Districts
- Contra Costa, Sacramento, Solano, Yolo, and San Joaquin Counties
- North, Central, and South Delta Water Agencies
- The Ports of Sacramento and Stockton

In addition, members of the public will be invited to participate in the meetings of the Strategy Review Group, including, but not limited to, the following groups:

Stakeholders and Interest Groups

- Bay Planning Coalition
- DeltaKeeper
- The Nature Conservancy
- The Bay Institute
- Environmental Water Caucus
- California Sportfishing Protection Alliance
- California Farm Bureau Federation

COPY

- State Water Contractors
- California Delta Chambers

Science and Technical Groups
A Science Review Panel of independent scientists will be formed as determined by the Management Committee. The Management Committee may also establish science and technical work groups of agency staff, the meetings of which will be open to the public

AGREEMENT

Participants in the Delta Long Term Management Strategy agree to participate in the study activities and will operate under this Charter. The undersigned recognize that public agency signatories to this Charter have specific statutory and regulatory authority and responsibilities, and that actions of these public agencies must be consistent with applicable procedural and substantive requirements. Nothing in this Charter or the Delta LTMS Framework is intended to, or shall have the effect of, constraining or limiting any public entity in carrying out its statutory responsibilities to regulate dredging, reuse, and disposal activities. Nothing in this Charter constitutes an admission by any party as to the proper interpretation of any provision of law or policy, nor is anything in this Charter intended to, nor shall it have the effect of, waiving or limiting any public entity's rights and remedies under any applicable law.

The undersigned recognize that certain departments, boards, and commissions (Adjudicative Entities) have adjudicative responsibilities with respect to contested regulatory matters that are brought before them. (See California Gov. Code §§ 11400, et seq.) Such adjudicative responsibilities include the requirement that the Adjudicative Entity and its members avoid bias, prejudice, or interest in the adjudicative matters before them, e.g., they cannot decide the outcome of a matter before completion of any required hearing or equivalent proceeding.

Some such Adjudicative Entities exist within the undersigned agencies. This Charter does not in any way require or commit an Adjudicative Entity to participate in proposing a project that will come before it for approval, nor does this Charter require or imply that an Adjudicative Entity will approve a project that requires an adjudicative proceeding. Under this Charter, the role of Adjudicative Entities in connection with matters that may require an adjudicative decision is limited to promptly and diligently processing any applications, petitions, or other requests for approval. Nothing in this Charter commits an Adjudicative Entity to an approval or disapproval of any project subject to the authority of the Adjudicative Entity, nor to a term or condition in any approval of a project by the Adjudicative Entity.

Legal Consistency
All provisions of this Charter are intended and shall be interpreted to be consistent with all applicable provisions of State and Federal law.

The parties recognize that this Charter is not a contract. This Charter does not delegate to any agency, or the collective group of agencies, the authority to: (1) control another agency's final decision on a project; (2) modify or halt an agency's project; or (3) compromise an agency's discretion to pursue projects according to their individual agency legal authority. This Charter facilitates cooperation and advice among the agencies; it shall not be interpreted to form a partnership, joint venture, or contract that requires federal agencies to analyze state projects and programs under the National Environmental Policy Act.

Contingent on Appropriation of Funds and Future Actions
The expenditure or advance of any money or the performance of any obligation of the United States under this Charter shall be contingent upon appropriation or allotment of funds in accordance with 31 USC 1341(Anti-Deficiency Act). No liability shall accrue to the United States for failure to perform any obligation under this Charter in the event that funds are not appropriated or allotted.

Activities and obligations, if any, under this charter pertaining to entities of the State of California are also subject to the availability of appropriated funds and to the independent decision-making authority of such entities. No liability shall accrue to such entities, or to the State of California, for failure to perform any action under this Charter in the event that funds are not appropriated or if any such entity declines to participate in any activity. Each participating agency's participation under this Charter is and shall remain voluntary.

This Charter shall be effective upon the date of signature of all participating agencies listed on page 7. This Charter may be signed in counterparts.

COPY

Signed by:

12 FEB 07

General John R. McMahon
Commander, South Pacific Division
U.S. Army Corps of Engineers

Date

22 FEB 07

Wayne Nastri
Regional Administrator, Region 9
U.S. Environmental Protection Agency

Date

14 Feb 07

Lester Snow
Director
California Department of Water Resources

Date

2/28/07

Tam M. Doduc
Chairperson
State Water Resources Control Board

Date

13 Feb 07

Karl E. Longley
Chairperson
California Regional Water Quality Control Board, Central Valley Region

Date

2/14/07

Joe Grindstaff
Director
CALFED Bay-Delta Program (Resources Agency)

Date

2/22/07

Mike Reagan
Commissioner
Delta Protection Commission

Date

APPENDIX B

LEVEES OF FEDERAL CONCERN

Engineers: 122 levees at risk of failing Date?

By BEVERLEY LUMPKIN, Associated Press Writer

WASHINGTON – One hundred twenty-two levees from Maryland to California are at risk of failing, according to a list released Thursday by the Army Corps of Engineers.

There could be danger to people who live in communities near some of the levees as well as a chance that they will have to pay more for insurance, said Butch Kinerney of the **Federal Emergency Management Agency**'s national flood insurance program.

The list was released in response to Freedom of Information Act requests filed by news organizations, including The Associated Press.

If the Corps of Engineers determines a levee to be at risk of failing, homeowners in the area could be required to purchase flood insurance, though exceptions can be made.

Communities near the levees have been notified that they have received an "unacceptable maintenance inspection rating." That means a levee has one or more problems, which can include movement of floodwalls, faulty culverts, animal burrows, erosion or tree growth, according to a statement released by the Corps.

California, with 37 suspect levees, and Washington state, with 19, led the list.

FEMA's Kinerney said he was concerned that the levees present not only a chance of higher insurance costs but a danger to those living nearby. FEMA maps flood plains and helps determine the flood risks that communities face.

Kinerney said people living near the levees should have an evacuation plan, a family emergency plan, and a disaster supply kit, along with flood insurance.

The Corps has been warning communities they need to take care of routine levee maintenance, said Larry Larson, director of the Association of State Floodplain Managers. Larson said he was glad the Corps was putting out the word on the levees.

"The feds are saying, 'Wait a minute, we haven't been doing our job,'" Larson said. "'We better get on top of this. Your people are at risk. You need to get something done.'"

The Corps historically has constructed the levees and has turned most of them over to local communities for operations and maintenance. Some communities may not have kept up with needed repairs, while others may merely lack the documentation, Kinerney said.

As the Corps decertifies the adequacy of a particular levee, it also notifies FEMA, which can take away the credit communities get on their flood insurance rate for having a levee.

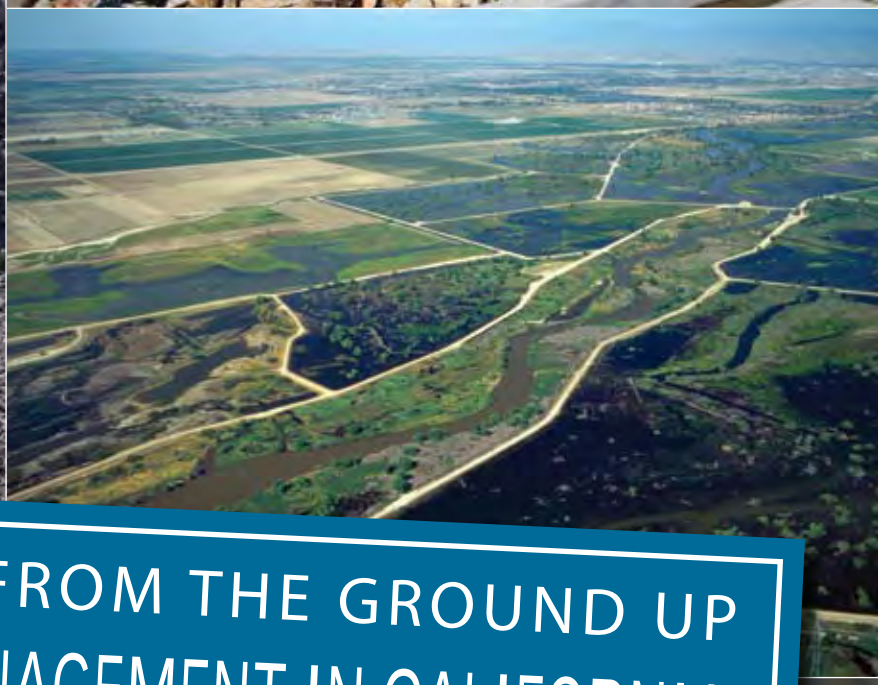
Kinerney added that if residents of the communities at risk were to purchase flood insurance now, before the community's designation changes, they can still pay the cheaper rate.

The Corps can give communities 12 months to make corrections — sometimes it's just a matter of "filling gopher holes," Kinerney said.

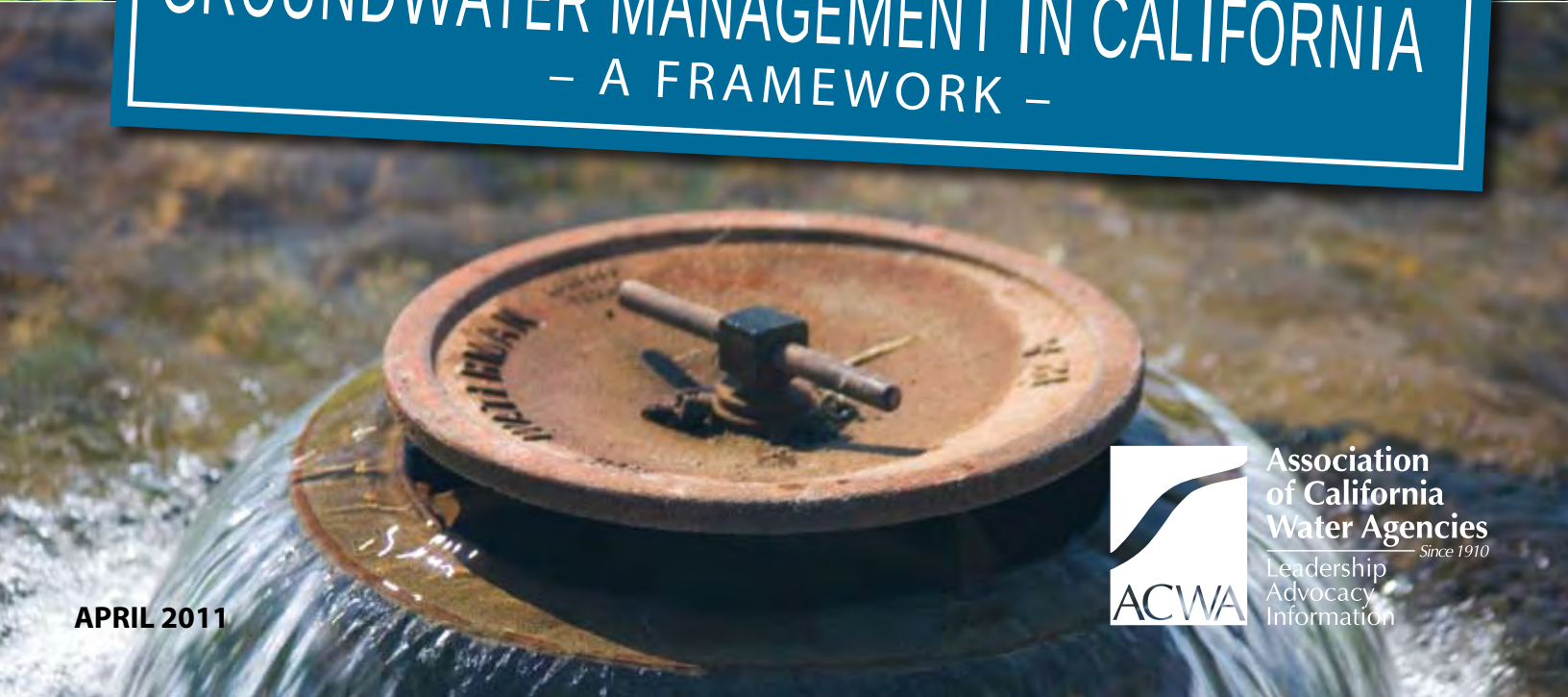
Also, FEMA can issue for up to 24 months a provisional accreditation if a community requests it, giving it up to two years to correct the problems or contest the finding that the levee is not sound. During that period, residents are not required to purchase flood insurance.

The list: http://www.hq.usace.army.mil/cepa/releases/leveelist.pdf

Attachment C-8
Sustainability from the Ground Up: Groundwater Management in California



SUSTAINABILITY FROM THE GROUND UP
GROUNDWATER MANAGEMENT IN CALIFORNIA
– A FRAMEWORK –



APRIL 2011

Association of California Water Agencies
Since 1910
ACWA
Leadership
Advocacy
Information

Acknowledgements

Principal writers
Danielle Blacet, ACWA Senior Regulatory Advocate
Tim Parker, Parker Groundwater
David Aladjem, Downey Brand LLP

Core Review Group
Greg Zlotnick, Chair, ACWA Groundwater Committee*, San Luis & Delta-Mendota Water Authority
John Rossi, Vice Chair, ACWA Groundwater Committee, Western Municipal Water District
Dave Orth, Kings River Conservation District
Kirby Brill, Mojave Water Agency
John Woodling, Sacramento Groundwater Authority
Jill Duerig, Zone 7 Water Agency
Thad Bettner, Glenn-Colusa Irrigation District
Timothy Quinn, ACWA Executive Director

Regions Review Group
Region 1: Jay Jasperse, Sonoma County Water Agency
Region 2: Thad Bettner, Glenn-Colusa Irrigation District
Region 3: Bob Dean, Calaveras County Water District
Region 4: Robert Roscoe, Sacramento Suburban Water District*
Region 5: Derrik Williams, HydroMetrics WRI (Soquel Creek Water District)
Region 6: Chris Kapheim, Alta Irrigation District*
Region 7: Paul Hendrix, Tulare Irrigation District*
Region 8: Dee Zinke, Metropolitan Water District
Region 9: Ken Manning, Chino Basin Watermaster
Region 10: Mike Markus, Orange County Water District

Editorial Assistance and Production
Jennifer Persike, ACWA Director of Strategic Coordination and Public Affairs
Lisa Lien-Mager, ACWA Communications Supervisor
Katherine Causland, ACWA Graphic Designer

** Member of ACWA's Board of Directors*

Association of California Water Agencies
Since 1910
ACWA
Leadership
Advocacy
Information

910 K Street, Suite 100 • Sacramento, CA 95814 • (916) 441-4545 • www.acwa.com
© 2011 Association of California Water Agencies. All rights reserved.

Foreword

In 2009, California lawmakers passed historic legislation that marked an important step toward improving the state's water supply reliability and restoring the Sacramento-San Joaquin Delta ecosystem. A critical challenge to achieving the goals of the legislative package is providing more effective management of groundwater resources at a time when California's reliance on its groundwater basins is growing due to a variety of short- and long-term factors.

The Association of California Water Agencies (ACWA) developed this Framework to describe current groundwater management efforts and identify proactive steps to advance sustainable groundwater management as part of the state's overall water management portfolio. ACWA believes the challenge of providing sustainable groundwater management must be met by local and regional agencies and not by centralized state regulation. Locally controlled groundwater management is effective because it is best able to respond to the particular circumstances of, and significant differences in, groundwater basins throughout the state. Local expertise and direct reliance on the resource ensures immediate response to problems and trends, and provides the strongest basis for collaborative regional approaches.

But as this Framework emphasizes, the job is far from done. While there are numerous case studies in successful management, efforts must be expanded in many parts of the state to achieve sustainable outcomes.

ACWA members are not daunted by the challenge. The actions and policy recommendations outlined in this document reflect the on-the-ground experience of experts involved in managing groundwater in every region of California and in a variety of geographic and hydrologic settings. Implementing these actions will help empower local agencies to strengthen their management efforts and contribute to the state's overall need for sustainable groundwater management, today and into the future.

To be successful, sustainable groundwater management must be accomplished in the context of a comprehensive solution that includes conveyance improvements in the Delta, investments in additional surface storage and groundwater storage to meet the co-equal goals, and massive investments in local water resources development.

ACWA members are prepared to step up to the challenge of providing sustainable groundwater management. We stand ready to work with policy makers and water managers to carry out actions and initiatives to promote more effective local groundwater management as part of a comprehensive solution.

Paul Kelley
ACWA President

Greg Zlotnick
ACWA Groundwater
Committee Chair

Timothy Quinn
ACWA Executive Director

Contents

Overview 5

Defining Sustainability 7

Groundwater Management Today 8

Water Supply Infrastructure: Key to Meeting Needs 10

Conjunctive Use: A Critical Part of Sustainable Management 10

The Current Regulatory Landscape 13

Basic Legal Principles Set Foundation 13

Recognizing Interplay Between Surface Water and Groundwater 14

Challenges to Sustainable Groundwater Management 15

Declining Sacramento-San Joaquin Delta 15

Periodic, Inevitable Droughts 15

Changing Climate 15

Unmanaged Overdraft and Subsidence 16

Protracted Drought on the Colorado River 16

Aging System and Maintenance Backlog 16

Groundwater Quality Degradation 17

Limited Data Collection, Interpretation and Use 17

Small System Vulnerability 18

Fragmented Regulations 18

Mounting Environmental Requirements 18

Land Use Decisions and Population Growth 18

Existing Local Management Strategies 19

Basic Management Mechanisms 19

Case Studies in Effective Local Groundwater Management 22

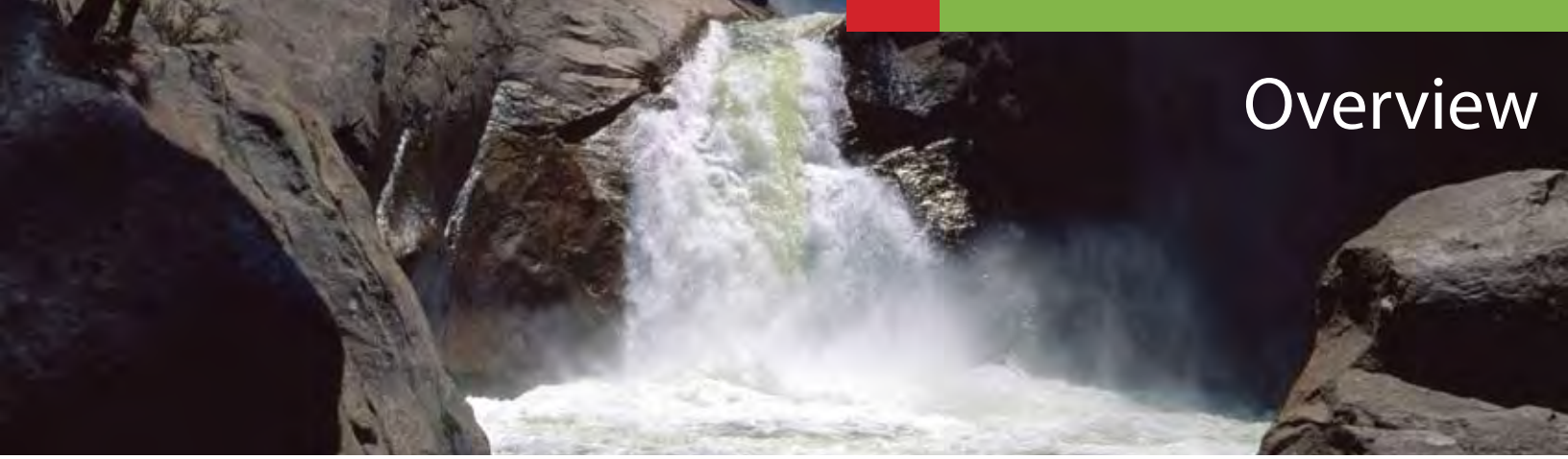
Advancing Sustainable Groundwater Management 25

Recommendations 29

ACWA Policy Principles on Groundwater Management 32

ACWA Groundwater Committe 33

2011 ACWA Board Of Directors 34



Overview

Groundwater has long been an integral part of California's water supply. Today, it has an even more critical role to play as the state grapples with significant water supply challenges.

California's water management system is arguably among the most complex and innovative in the world. Massive amounts of water are captured, stored and delivered through a combination of man-made and natural features to serve urban, agricultural and environmental needs.

Groundwater was widespread and abundant at the beginning of the 20th century. Its extensive availability contributed to large-scale agricultural and urban growth, which in turn steadily increased demand for and dependence on the resource. Effective management quickly became critical to protecting the future availability and quality of California's groundwater supplies. While many strategies have been implemented over the years to address groundwater management challenges, some are falling short today and require modernization.

Though California does not have a formal state-administered system of regulating and permitting groundwater use, it does have a long history of managing groundwater resources through locally controlled programs developed and refined over the past century.

Many of these programs have been very effective in addressing the state's most difficult groundwater management problems over the years. However, the array of challenges on the horizon will demand even more of local agencies and require a greater commitment to ensuring that local decisions and management contribute to statewide water policy goals.

The current state of California's groundwater should not be considered in isolation since it is largely reflective of broader water management concerns in the state. It has become increasingly clear in recent years that California's aging water supply and management infrastructure can no longer reliably meet the economic and environmental needs of the state. This is readily apparent in the Sacramento-San Joaquin Delta and elsewhere where challenges associated with population growth, drought, climate change, unmanaged groundwater overdraft and environmental concerns await resolution. The growing uncertainty of surface water supplies due to these and other factors has triggered greater reliance on groundwater as a principal or supplemental supply for urban, agricultural and environmental uses (e.g. wildlife refuges). It has also focused attention on groundwater basins as a potential storage solution.

The shift toward greater reliance on groundwater has magnified long-term risks to the quality and quantity of water available from California's groundwater basins. While Californians have relied on groundwater resources to varying degrees over the years, ACWA strongly believes today's growing dependence – intensified by both cyclical and long-term factors – will continue to stress California's groundwater basins unless proactive steps are taken at the local and regional level.

The California Legislature took an important step toward addressing the state's water challenges with passage of comprehensive water legislation in 2009. In addition to an $11.14 billion water bond now targeted for the November 2012 ballot and policy bills addressing Delta governance, water conservation, and water diversion and use, the package included new requirements for groundwater elevation monitoring to help track seasonal and long-term trends in groundwater basins.

ACWA developed this Framework to complement that legislation and advance the dialog on sustainable groundwater management. Produced by a task force of local groundwater managers from throughout the state, the Framework has four main purposes:

1. To define "sustainability" in terms that promote effective groundwater basin management;
2. To describe the current state of groundwater management in California, including an increasing number of successful local and regional management and conjunctive use programs, to provide an accurate and comprehensive foundation on which the public, policy makers and other stakeholders may make informed decisions;
3. To articulate groundwater management practices to address current and future challenges in California groundwater management; and
4. To identify specific policy development needs and recommend ways to enhance accountability, transparency, and the efficacy of sustainable groundwater management in California and its appropriate integration as a critical part of California's overall water management planning portfolio.

As evidenced by effective local and regional programs highlighted in this Framework, (see map, page 22), existing mechanisms for managing groundwater basins are providing an excellent foundation for sustainable management now and into the future. These examples, along with many other programs throughout the state, have generated impressive results and should be utilized as models for other agencies to help achieve the goal of sustainable groundwater management in California.

Locally controlled groundwater management is effective because local and regional entities are the most knowledgeable about their local basins and tend to be the first to notice changes or problems. They are also best suited to address issues unique to their region, including the implementation of proactive plans and actions to meet current and future groundwater needs.

Groundwater management plans developed under AB 3030, SB 1938 and the Integrated Regional Water Management Planning Act offer prime opportunities to enhance effective management and incorporate strategies that can help address the potential consequences of a large-scale shift to groundwater, whether cyclical or permanent. Doing so will also improve coordination and collaboration with state agencies as elevation data is collected pursuant to the new requirements of SBX7 6, enacted as part of the 2009 comprehensive legislative water package.

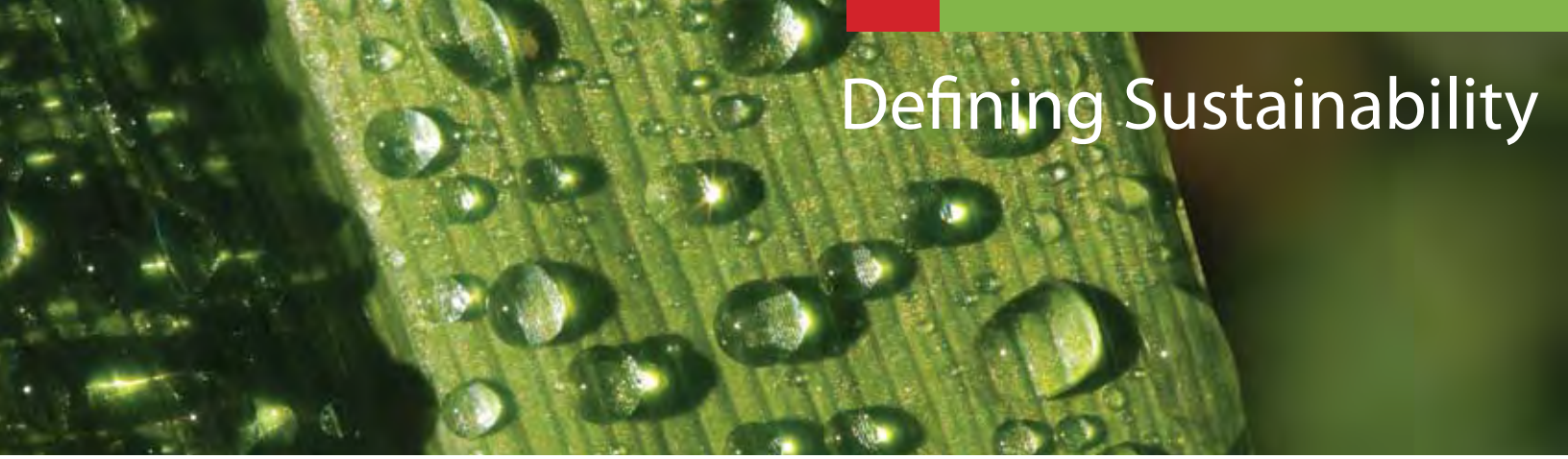
ACWA believes the state Legislature should encourage and support local management policies that appropriately reflect California's geographic and hydrologic diversity rather than institute a state-administered centralized control structure for regulating or permitting the use of groundwater. Statewide permitting and regulation would undermine the effectiveness of existing and planned local investments and would be counterproductive because it would not account for the significant differences in California groundwater basins throughout the state.

The Legislature should focus instead on incentivizing the development and implementation of the best practices outlined in this Framework. Recommendations for doing so are outlined beginning on page 29.

Ultimately, for sustainable groundwater management to succeed, California must invest in improvements to its water storage and conveyance infrastructure to optimize both surface and groundwater supplies. Such investments are critical if conjunctive use and groundwater banking are to realize their full potential as effective strategies to meet California's future demands, both economic and environmental. These investments must complement an ongoing commitment to expanded water use efficiency and water reuse.

ACWA believes that with the actions and policy modifications recommended in this Framework, local agencies can provide sustainable groundwater management, to the benefit of California, without the addition of new layers of state bureaucracy or regulation.

In addition to this Framework, ACWA has adopted Groundwater Management Policy Principles to provide further guidance and recommendations for sustainable management of the state's groundwater resources. The principles can be found on page 32. The Framework and the principles together provide a solid foundation for achieving groundwater management goals in California, and an effective basis for collaboration among the water and environmental communities, agriculture, business and labor leaders, and state and local governments.



Defining Sustainability

Sustainability has emerged as an important principle in natural resources management in recent years. ACWA has adopted policy principles that identify environmental and economic sustainability as co-equal priorities for water management in California.

In the context of groundwater, ACWA defines sustainability as actively managing the resource at the local level in a way that satisfies the needs of both the environment and the economy while ensuring the continued health of the basin. Given the importance of groundwater to California's water supply, sustainable management of the state's groundwater resources is essential to ensuring a reliable water supply and a healthy environment – both today and for generations of Californians to come.

The United States Geological Survey characterizes groundwater sustainability as the "development and use of groundwater in a manner that can be maintained for an indefinite time without causing unacceptable environmental, economic, or social consequences."[1]

Inherent in that definition as applied is the long-term protection and maintenance of both groundwater quantity and quality. As evidenced by effective local and regional programs throughout the state, managing groundwater basins to achieve sustainability has many benefits, including:

- More reliable surface and groundwater resources
- Increased opportunities for conjunctive use and recharge projects
- Environmental health / stability
- Drought mitigation
- Water quality improvements
- More effective land use planning and management
- Reduced energy costs associated with pumping

On the other hand, the lack of effective groundwater management contributes no such benefits and has led to the further decline of groundwater resources in certain areas of California. Unacceptable consequences include depletion of existing groundwater supplies, land subsidence, water quality degradation and environmental damage.

1 Alley, W.M., Reilly, T.E., and Franke, O.L. (1999). *Sustainability of Ground-Water Resources:* U.S. Geological Survey Circular 1186.

Groundwater Management Today

In California, groundwater management generally refers to a locally developed and controlled program that integrates groundwater protection, recharge, extraction and monitoring to achieve the long-term sustainability of the resource. Since groundwater basins vary greatly around the state, local control and supervision allow for the most effective and careful management of the resource. One size does not fit all when it comes to groundwater management.

California is known for its diverse ecosystems, topography and geology and for its highly variable water resources. With more than 38 million people and a land area of 100 million acres, California is the most populous state and the third-largest geographically in the country. It is also the most productive agricultural state, producing over half the fruits, nuts and vegetables in the nation.

In 2000, an average water year, California cities and suburbs used about 8.9 million acre-feet (MAF) of water. California agriculture irrigated 9.6 million acres of cropland (includes multi-cropping) using roughly 34 MAF of applied water. Dedicated environmental uses of water, including in-stream flows, wild and scenic flows, required Delta outflow, and managed wetlands, exceeded 39 MAF.[2]

In an average year (based on 1998-2005 data), groundwater resources supply about 35 percent of California's urban, agricultural and managed wetlands water demands (about 15 million acre-feet per year).[3] In dry years, this percentage increases to 40 percent or higher statewide and as high as 60 percent or more in some regions. Nearly half of California's drinking water supply comes from groundwater.

In addition to contributing essential water supplies, the state's groundwater basins provide significant water storage capacity. This storage capability is important in and of itself, but when used in conjunction with surface water storage it can go a long way toward meeting local and regional needs for greater flexibility, increased water supply reliability and improved water quality. This potential is limited, however, by current regulatory and infrastructure constraints on groundwater recharge and extractions. Optimizing large-scale conjunctive use programs will require investments in both surface and groundwater storage.

2 California Department of Water Resources. *California Water Plan Update 2009:* v1c4, pp 4-12, 4-21.
3 California Department of Water Resources. *California Water Plan Update 2009:* v2c8, p 8-10.

APPLIED WATER VS. CONSUMPTIVE USE

According to the California Department of Water Resources, applied water is the amount of water from any source needed to meet the demand for beneficial use by the user. It includes consumptive use, reuse, and outflows. Consumptive use is a quantity of applied water that is not available for immediate or economical reuse. It includes water that evaporates, transpires, or is incorporated into products, plant tissue, or animal tissue. Consumptively used water is removed from available supplies without return to a water resource system (uses such as manufacturing, agriculture, landscaping, food preparation, and in the case of Colorado River water, water that is not returned to the river.)*

*DWR California Water Plan Update 2005 http://www.waterplan.water.ca.gov/docs/cwpu2005/vol2/v2glossary.pdf

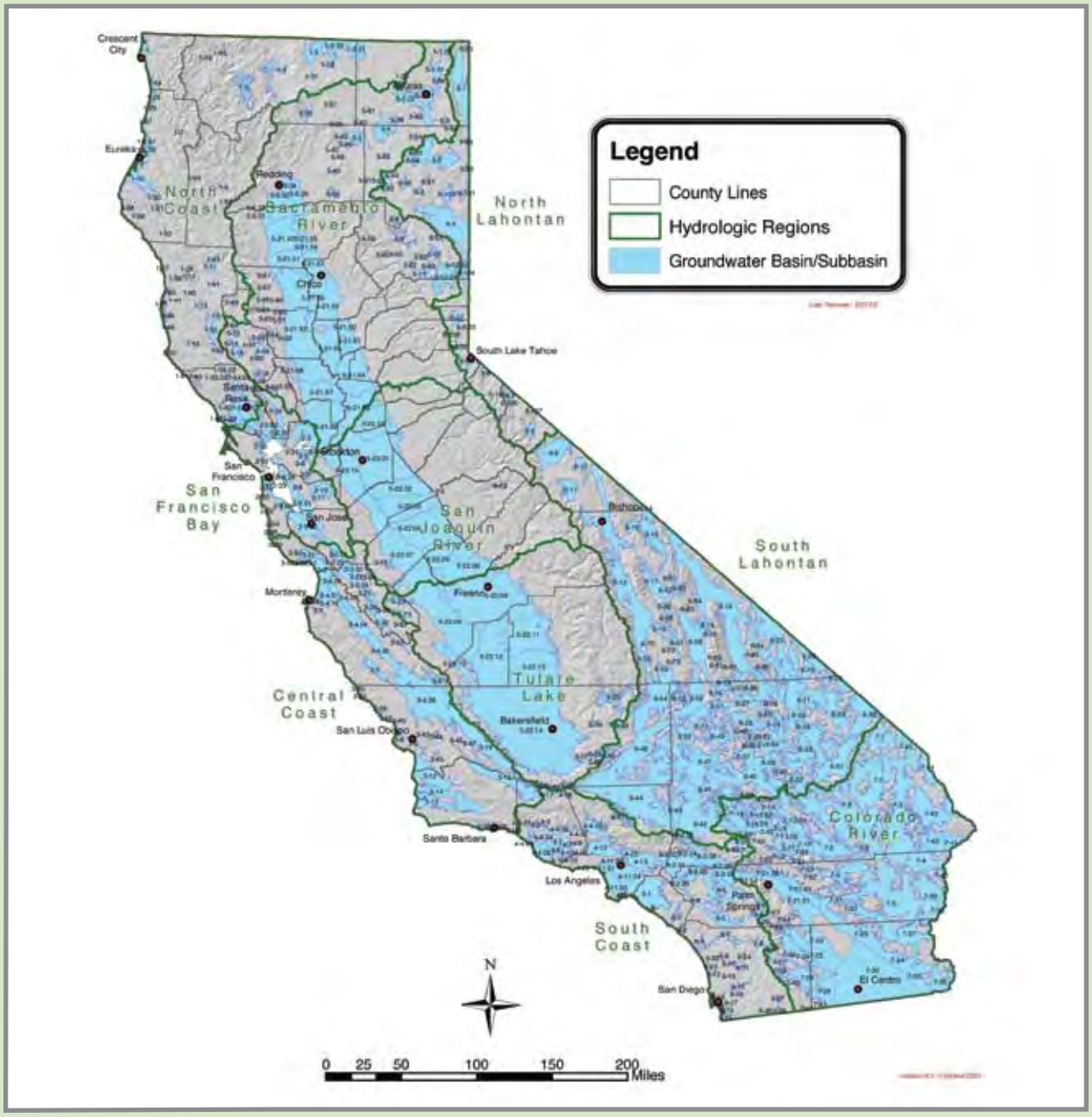
WHERE DOES GROUNDWATER COME FROM?

Much of the water from snowmelt and rain that flows into surface water formations (e.g. creeks, streams, rivers, ponds) percolates into the ground and becomes groundwater. Groundwater can be thousands of years old, but most of the groundwater typically used in California today is extracted a few years to a few decades after its original percolation.

Groundwater is found in two main types of geologic settings in California. The vast majority of groundwater in the state is stored in alluvial basins, which are composed of sediments such as gravel, sand, silt or clay and cover nearly 40 percent of the geographic area of the state. Alluvial basins account for all 515 basins and sub-basins identified in DWR's Bulletin 118. (http://www.water.ca.gov/pubs/groundwater/bulletin_118)

However, groundwater is also stored and extracted from fractured bedrock or sandstone. About 20 percent of the state's municipal supply wells are located in this type of formation, with prime examples found in the Sierra Nevada and the Coast Ranges.

Groundwater Basins in California



Water Supply Infrastructure: Key to Meeting Needs

Precipitation in California varies widely—from place to place, from season to season, and from year to year. Wet years can bring the threat of floods, while dry years can reduce available water supplies and require the temporary drawdown of stored water. This unpredictable hydrology affects not only the amount of surface water available in a given year but also the amount of groundwater available for extraction and use.

The state's water storage and delivery infrastructure was designed to address that unpredictability, protecting communities from floods and capturing winter precipitation and spring snowmelt for strategic delivery in the drier summer and fall months. The system also contributes to effective groundwater management by providing surface water to augment local supply sources and alleviate pressure on groundwater basins.

California's two largest water delivery systems are the State Water Project (SWP) and the federal Central Valley Project (CVP). The SWP, operated by the California Department of Water Resources, delivers water to 25 million Californians and 755,000 acres of irrigated farmland. The CVP, operated by the United States Bureau of Reclamation, provides water for more than 3 million acres of farmland and drinking water to nearly 2 million consumers.

All told, California has nearly 200 surface storage reservoirs with a capacity of 10,000 acre-feet or more, for a combined storage capacity of more than 41 MAF. In addition, there are many other reservoirs smaller than 10,000 acre-feet that are used to manage water for a wide range of uses.

Given the state's highly variable hydrology, surface and groundwater storage facilities are critical to supplying cities, farms, businesses and the environment with adequate water year-round. They are particularly effective when used in concert with each other to make maximum use of water when it's available and store it for use in dry times.

Conjunctive Use: A Critical Part of Sustainable Management

Conjunctive use or management refers to the coordinated and planned use of both surface water and groundwater resources to maximize the availability and reliability of water supplies in a region to meet various management objectives. Since surface water and groundwater resources can differ significantly in their availability, quality, cost and other characteristics, managing both resources together, rather than in isolation from each other, allows water managers to use the advantages of each for maximum benefit.

WHAT IS GROUNDWATER BANKING?

Groundwater banking is a water management tool designed to increase water supply reliability. By using dewatered aquifer space to store water during wet years (when there is abundant rainfall and surplus water available), water can be pumped and used during dry years (when there is little rainfall and no surplus water).

Groundwater banking is accomplished two ways: through in-lieu and direct recharge. In-lieu recharge is storing water by utilizing surface water "in-lieu" of pumping groundwater, thereby storing an equal amount in the groundwater basin. Direct recharge is storing water by allowing it to percolate directly to storage in the groundwater basin.*

*Definition courtesy of Semitropic Water Storage District

CONJUNCTIVE MANAGEMENT OF LOCAL AND IMPORTED WATER SUPPLIES: THE KEY TO A SUSTAINABLE SILICON VALLEY

Graphic courtesy of Santa Clara Valley Water District

The Santa Clara Valley Water District has a long record of conjunctive water management. Established in the late 1920s to address groundwater overdraft and subsidence, the district constructed seven dams by 1935 to impound surface water for recharge into percolation facilities. As the graphic illustrates, the post-war boom brought increased demands for water and the return of unsustainable declines in groundwater elevation. Surface reservoir capacity was quadrupled by constructing four additional reservoirs in the 1950s. In 1965, the district began importing surface water from the State Water Project. Groundwater levels began to recover and the rate of subsidence slowed significantly. The rise of Silicon Valley brought increased demands again, and the district added Central Valley Project deliveries to its supply portfolio in the late 1980s. By the mid-1990s groundwater elevations had returned to levels seen at the turn of the 20th century.

Conjunctive use has been practiced for decades in California. In general, conjunctive use programs take advantage of available groundwater storage capacity to "bank" or store surface water through natural and / or artificial recharge for later extraction and use. In many areas, there is tremendous potential to enhance local supplies even further by utilizing storm flows and recycled water with appropriate safeguards to augment groundwater recharge.

Well-planned conjunctive use programs not only enhance local and regional water supply reliability, but can also provide other benefits such as enhanced flood management, improved environmental water management, reduced reliance on the Delta to meet future water supply needs, and water quality improvements.

Conjunctive use projects require investments in surface storage, conveyance systems, recharge and extraction facilities, and management of groundwater basins. Conveyance systems may include lined and / or unlined canals, pipelines, and streams. Recharge options include direct spreading and infiltration in artificial ponds, injection via wells, and induced natural recharge in natural systems. In the strategy known as in-lieu recharge, surface water can be provided to users who normally use groundwater to allow supplies to stay in groundwater basins.

Groundwater may be extracted later for direct use, for pumping back to conveyance systems, or for surface water exchange.

KEY WATER PROJECTS IN CALIFORNIA

<<<

WHAT ARE SOME OF THE SOURCES FOR CONJUNCTIVE USE PROJECTS?

Imported water – Water that is transferred across hydrologic region boundaries from one agency to another. Many parts of the state receive imported water from the State Water Project and Central Valley Project.

Local surface water – Direct deliveries of water from stream flows, as well as water supplies from local storage facilities.

Recycled water – Municipal, industrial, or agricultural wastewater that is treated to produce water that can be reused.

Reclaimed water – Treated water where the inflow water supply is polluted, contaminated, or otherwise tainted.

Desalinated water – Water that has been treated to remove salt for beneficial use. Source water can be brackish (low salinity) or seawater.

Stormwater (runoff) – Water that collects during a precipitation event and may carry pollutants to water courses, causing degradation.*

*For more information, please see Bulletin 160 Water Plan Update 2009 Glossary (http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v4c01ag_cwp2009.pdf)

The Current Regulatory Landscape

California is often criticized for being one of the only Western states without a formal state-administered system of regulating and permitting groundwater use. But while it is true there is no *centralized* system to regulate the use of groundwater, California has developed and refined an effective system of locally controlled groundwater management over the past century.

As noted by the California Legislative Analyst's Office[4], the current system has been successful in addressing the state's most difficult groundwater management problems over the years. The growing list of challenges on the horizon, however, will demand more of local agencies and require a greater commitment to ensuring that local decisions and management contribute to achieving statewide water policy goals.

To that end, ACWA is confident that, with certain modifications recommended in this Framework, local agencies can provide sustainable groundwater management for the benefit of California without the addition of new layers of state bureaucracy or regulation.

Basic Legal Principles Set Foundation

As a general rule, landowners in California are entitled to pump and use a reasonable amount of groundwater from a basin underlying their land. Under the doctrine known as "correlative rights," landowners overlying a common source of groundwater are limited to using a reasonable share, typically based on the amount of overlying land owned by each and the physical condition of the basin. When there is insufficient water to meet the demands of overlying landowners, those users are expected to reduce their demands correlatively to bring their groundwater extractions within the safe yield of the basin and prevent overdraft.

Entities other than overlying users, such as cities, may be entitled to "appropriate" water from the basin for use as a municipal supply when water surplus to the needs of overlying users is available. Unless otherwise prescribed, appropriators must curtail their use when there is no surplus.

As the above paragraphs suggest, the interrelated concepts of "safe yield," "surplus" and "overdraft" are central elements in the legal landscape addressing California groundwater. As defined by the California Supreme Court in the landmark *Los Angeles v. San Fernando* case in 1975, "safe yield" refers to "the maximum quantity of water which can be withdrawn annually from a groundwater supply under a given set of conditions without causing an undesirable result." The phrase "undesirable result" is understood to refer to "a gradual lowering of the groundwater levels resulting eventually in depletion of the supply." "Surplus" refers to "the amount of water in a groundwater basin in excess of safe yield." *City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d at 278.

The *San Fernando* court also clarified that an overdraft occurs only when extractions exceed safe yield plus "temporary surplus," the latter term defined as the amount of water that can be pumped from a basin to provide storage space for surface water that would otherwise be lost during wet years if it could not be stored in the basin. *Id.* at 279.

4 California Legislative Analyst's Office. 2010. *Liquid Assets: Improving Management of the State's Groundwater Resources.* (http://www.lao.ca.gov/laoapp/PubDetails.aspx?id=2242)

Recognizing Interplay Between Surface Water and Groundwater

Though surface water and groundwater are often interconnected from a hydrologic perspective, they are generally managed and regulated through separate legal regimes in California. The Legislative Analyst's Office and others have called for California's groundwater law to be "modernized" to better reflect the well-established physical connection between groundwater and surface water in many areas.

That recommendation fails to consider, however, that California has a long and reasonably well-developed history of successfully integrating the use of surface water and groundwater, despite the existence of two different legal regimes. Though this "dual system" may not always appear neat and orderly, case law is sufficiently well-developed to suggest that California courts are fully aware of the interplay between surface water and groundwater in specific instances and have crafted legal doctrines to address those hydrologic realities.

A LOOK AT LEGAL CASES OVER THE YEARS

Under California law, water is characterized as being surface water or groundwater. Groundwater is further classified as either a subterranean stream or as percolating groundwater. Surface water and groundwater classified as a subterranean stream are subject to the permitting authority of the State Water Resources Control Board, while groundwater classified as percolating groundwater is not subject to that authority.

In areas where there is a hydrologic connection between groundwater and surface water resources, a number of early cases established the legal rules for interconnected surface water and groundwater systems. These rules form the foundation of groundwater management today.

Potential Interference by Groundwater Pumpers with Surface Water Rights

Case Information	Result
City of Los Angeles v. Hunter (1909) 156 Cal. 603, 607; *McClintock v. Hudson* (1903) 141 Cal. 275, 278; *Los Angeles v. Pomeroy* (1899) 124 Cal. 597, 624.	Found that a user of percolating groundwater may diminish flows in a surface stream only if the groundwater is put to reasonable use on lands overlying the groundwater basin.
Hudson v. Dailey (1909) 156 Cal. 617, 624-627.	Virtually ignores the distinction between riparian rights to surface water and correlative rights to groundwater in finding a right to extract groundwater for use on overlying lands despite impacts on downstream riparians and downgradient overlying pumpers.
Barton Land & Water Co. v. Crafton Water Co. (1915) 171 Cal. 89, 94-95.	Owner of lands overlying a subterranean stream cannot extract water from that stream so as to have an adverse impact on surface water diverters.

Potential Interference by Surface Water Diverters with Groundwater Rights

Case Information	Result
Miller v. Bay Cities Water Co. (1910) 157 Cal. 256, 276-279 (overruled on other grounds in *City of Lodi v. East Bay Municipal District* (1936) 7 Cal.2d 316, 338-339).	California Supreme Court decision that articulated a broad standard protecting the owner of percolating groundwater from surface appropriations of water on non-riparian lands
United States v. Fallbrook Pub. Util. Dist. (S.D. Cal. 1958) 165 F.Supp. 806, 847 (citing *McClintock,* 141 Cal. at 281; *Hudson,* 156 Cal. at 628).	Federal district court decision that found riparian and overlying rights are treated as extracting water from one common source and so have joint rights to reasonable shares of the resource.

Challenges to Sustainable Groundwater Management

To advance sustainable groundwater management, it is essential to understand the growing list of challenges related to California's groundwater basins.

Addressing these challenges will require comprehensive efforts by local agencies individually and within regional partnerships to develop and implement sustainable groundwater management practices. This brief overview describes a number of factors confounding the management of California's groundwater resources.

Declining Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta is the hub of California's two main water delivery systems – the State Water Project and the federal Central Valley Project. Court-ordered restrictions to protect species have significantly reduced deliveries from these projects in recent years. This reduction in surface water supplies has hampered conjunctive use projects in some parts of the state and highlighted the need for more sustainable groundwater management as urban, agricultural and environmental users have turned to local groundwater resources as a substitute for increasingly unreliable SWP and CVP deliveries.

Periodic, Inevitable Droughts

The southwestern United States, including California, is prone to periodic droughts. Most recently, three consecutive dry years from 2006-2009 resulted in some of the driest conditions in decades and reduced water storage in key reservoirs to record lows. Regulatory restrictions on SWP and CVP deliveries magnified the impacts of this natural drought.

Prolonged drought has multiple effects on groundwater resources and management. The lack of available surface water can place additional demands on groundwater basins. Less surface water also means less water available for groundwater recharge. If groundwater levels drop as a result of increased demand or reduced recharge, there are additional energy costs to pump groundwater and greater potential for overdraft conditions. Further, the strategic value of conjunctive use projects that rely on surface water reliability can be undermined.

Changing Climate

Climate change will exacerbate the existing water management challenges facing California, including those affecting groundwater resources. Possible consequences include more frequent drought periods, reduced snowpack in the Sierra Nevada, increased flooding intensity as well as impacts to the operation of the state's surface storage facilities.[5] Higher temperatures, particularly in inland areas, could lead to increased demands on water supplies for urban, agricultural and environmental uses.

Changes in rainfall patterns could also result in faster local runoff and reduced natural groundwater recharge. Collectively, these impacts could result in less reliable water supplies and an overall increase in the demand for groundwater supplies.

5 ACWA Policy Principles on Climate Change. March 2010.

"HIGHER HIGHS, LOWER LOWS"

Based upon historical data and modeling, DWR projects that the Sierra snowpack will decline by 25 percent to 40 percent from its historic average by 2050. Climate change is also anticipated to bring warmer storms that result in less snowfall at lower elevations, reducing the total snowpack.* These storm events will, however, increase peak flows and affect the length of the recharge and recovery cycle of reservoirs that is critical to effective conjunctive use projects.

* California Department of Water Resources. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water.* October 2008.

Unmanaged Overdraft and Subsidence

Overdraft is defined as the condition of a groundwater basin when the amount of water withdrawn by pumping over the long term exceeds the amount of water that recharges the basin, either through natural or artificial methods. A basin in overdraft tends to not fully recover, even in wet years. While the occasional extraction of groundwater in amounts greater than annual recharge can be part of an effective groundwater management plan, unmanaged or excessive extractions can result in land subsidence, water quality degradation, and environmental impacts.

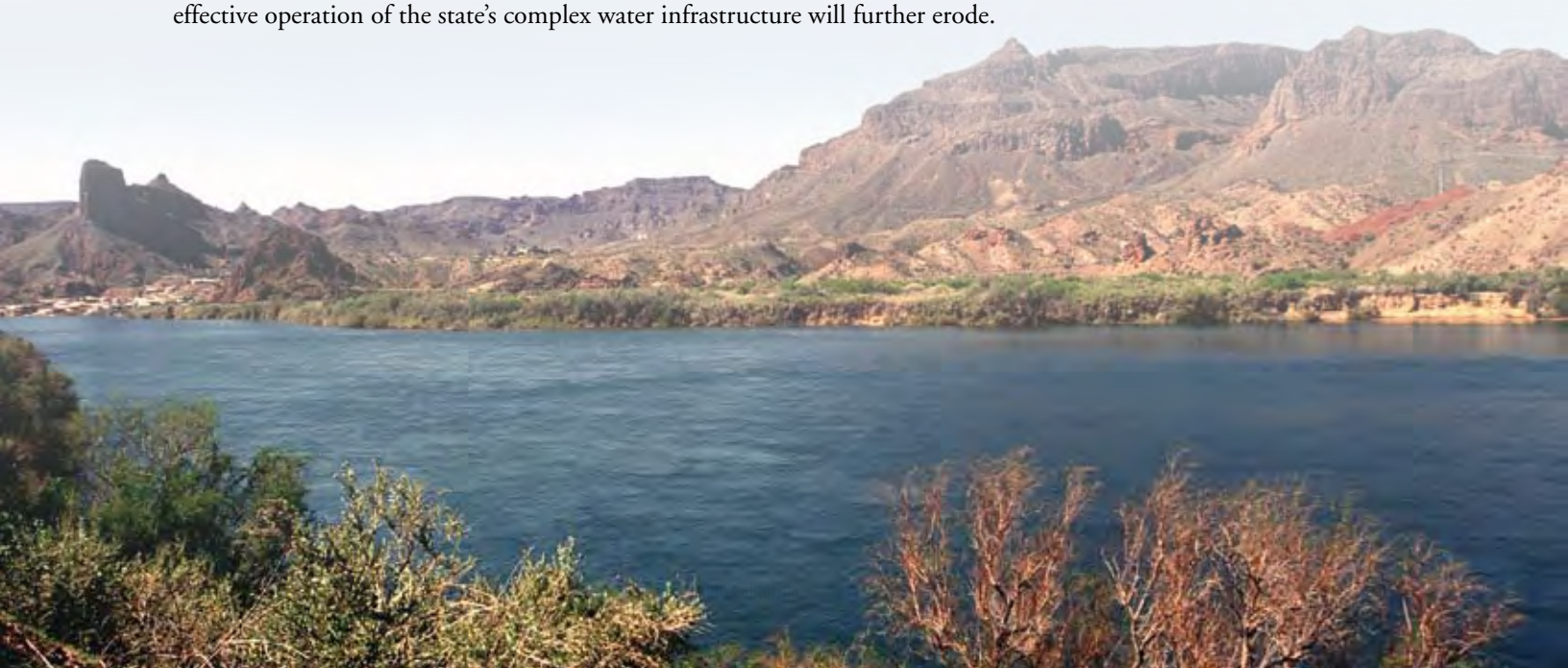
Protracted Drought on the Colorado River

The Colorado River is a key source of water for seven states and Mexico, providing water for some 30 million people to drink and meet household needs, irrigate crops and urban landscapes, operate businesses and replenish groundwater basins. California's annual allocation is 4.4 MAF for irrigation and domestic uses. The Colorado River Basin is in the midst of a multi-year drought that has reduced reservoir storage to record-low levels. These conditions are affecting the reliability of Colorado River supplies for conjunctive use projects and other beneficial uses throughout Southern California. Climate change is expected to further diminish the reliability of deliveries to California.

Aging System and Maintenance Backlog

California has not made significant investments in its backbone water storage and delivery systems, the SWP and CVP, in more than 40 years. In addition, several key components of the projects as originally planned were never built. Constructed when the state's population was just 18 million, the projects are struggling to meet the needs of 38 million Californians today. They also lack the flexibility to meet 21st century demands for both ecosystem health and water supply reliability. These aging facilities also suffer from a backlog of maintenance and repair needs arising from budget and contracting constraints.

Further complicating the effective maintenance of the state's water infrastructure is the growing number of issues related to an aging workforce. It is becoming increasingly difficult to secure professionals for policy and technical positions (such as engineers and water treatment operators), particularly those with extensive experience in California's water industry. As those individuals with expertise begin to retire en masse or find employment elsewhere, effective operation of the state's complex water infrastructure will further erode.



As a result of the increasing physical and workforce limitations, contractual and historic water delivery expectations are not being met and the existing facilities have neither the capacity nor flexibility to adapt to the approaching challenges presented by climate change. The deterioration of the delivery capabilities and reliability of this surface water infrastructure has resulted in, and will continue to contribute to, reductions in the amount of supply available for effective recharge and increasing demands for already-stressed groundwater resources.

At the local and regional level, efforts to maintain and upgrade facilities can be constrained by factors such as Propositions 218, which limits the ability of local agencies to raise rates and fees for a variety of projects and purposes. In addition, the practice of restricting bond funds solely for new construction and not for retrofitting and major maintenance needs can undermine past investments by allowing the foundation upon which they rely to crumble.

Groundwater Quality Degradation

Groundwater quality degradation has become a significant challenge for agencies that manage groundwater. Though groundwater quality can be affected by many factors, some of the most significant threats include chemical contaminants, both naturally occurring and man-made, salinity (including seawater intrusion), landfills and other hazardous waste sites. When groundwater quality is compromised, it may become unsafe for consumption or other uses and it can, without remediation, render the basin unfit for conjunctive use and artificial recharge projects.

Efforts to remediate groundwater contamination can be complicated by a number of issues. Under current law, local agencies that wish to initiate a remediation effort can face numerous disincentives that can hinder or even prevent a proactive approach. Difficulties related to liability, water quality standards, anti-degradation versus non-degradation concerns, assignment of costs and other factors are impediments to clean-up efforts.

Limited Data Collection, Interpretation and Use

In many areas, the lack of a comprehensive approach to systematically managing data on California's groundwater resources is a considerable challenge to sustainable groundwater development. Due to inadequate funding, a comprehensive assessment of groundwater level trends in California's groundwater basins has not been conducted since 1980. While some data is collected through ongoing efforts such as the Groundwater Level and Quality Monitoring Program (DWR), the Groundwater Ambient Monitoring and Assessment (GAMA) Program (administered by the U.S. Geological Survey under contract to the State Water Resources Control Board), and the U.S. Geological Survey Groundwater Information Program, these initiatives are weakened by their limited geographic scope. DWR and the

HOW DOES LAND SUBSIDENCE OCCUR?

Land subsidence is the gradual settling or sudden sinking of the Earth's surface due to changes that take place underground. This movement of earth can be the result of many factors, including groundwater extraction. In some types of groundwater basins, water that is pumped to the surface is drawn from spaces between sand and gravel. In addition, layers of clay can contain large amounts of water, and water pressure in the surrounding aquifer keeps the clay particles slightly apart from each other. When the water pressure in such a basin drops due to extensive pumping, the clay particles are pushed together by the weight of the overlying sediments, which is no longer in equilibrium with the (now lower) water pressure. As clay particles are pressed together for lack of water pressure, water drains out of the clay and the clay layers become compressed (thinner).

The effect of thinner clay layers is seen as a lowering of the land surface – sometimes as much as 20 or 30 feet over the course of a few decades. The lowering of land surface elevation from this process is permanent. Effective groundwater management utilizes the storage capabilities of groundwater basins while preventing significant subsidence from occurring. More information can be found at http://www.water.ca.gov/groundwater/well_info_and_other/land_subsidence.cfm, http://geochange.er.usgs.gov/sw/changes/anthropogenic/subside/.

CONJUNCTIVE USE OPERATIONS AND "OVERDRAFT"

An increasingly common practice in California is to operate a groundwater basin in conjunction with available surface water supplies on a local or regional level. The practice involves exercising the basin, a process that causes the groundwater level to go up and down with wet and dry annual and periodic cycles. During the wet season and during wetter years, surface water is relied on more and the groundwater basin is recharged with surplus surface water, from local and / or imported sources, resulting in groundwater level increases. Such recharge occurs through direct means via spreading basins or in-lieu via surface deliveries that otherwise offset groundwater pumping. During dry years, when less surface water is available, groundwater is relied on more, drawing the groundwater levels down.

In the event of a periodic drought lasting several years, when less surface water is available and groundwater is used more extensively to meet demands, groundwater level trends can sometimes decline quite dramatically without any notable recovery for a longer period of time. The groundwater level trend in a conjunctively managed basin over a period of several years during a drought may appear as long-term overdraft; however, some would refer to this as "managed overdraft" as the downward trend will be offset by recovery cycles in wetter periods utilizing the direct or in-lieu groundwater recharge methods.

SWRCB do not adequately coordinate their statewide monitoring efforts. This lack of comprehensive data management will continue to hinder the ability of local and regional agencies to optimize the use of California's groundwater resources.

Small System Vulnerability

Small community water systems, including many that serve disadvantaged populations, can face unique management challenges not shared by their larger counterparts. Such systems that are dependent on groundwater and / or private wells are especially vulnerable to drought and the effects of climate change because they are typically located in isolated areas with few opportunities for interconnections with other systems, water transfers, or emergency relief. This can also make it more challenging to develop successful conjunctive use programs or implement costly water quality treatment technologies.

Fragmented Regulations

California has a multifaceted and complex regulatory structure. Numerous agencies have jurisdiction over various aspects of groundwater recharge and banking projects, particularly those involving underground storage supplements (USS) and aquifer storage and recovery (ASR). Regulations governing these projects tend to be fragmented, duplicative or unnecessarily complicated. Often-conflicting regulatory requirements affecting the same basin or water supply can also slow or even stall progress on critical projects.

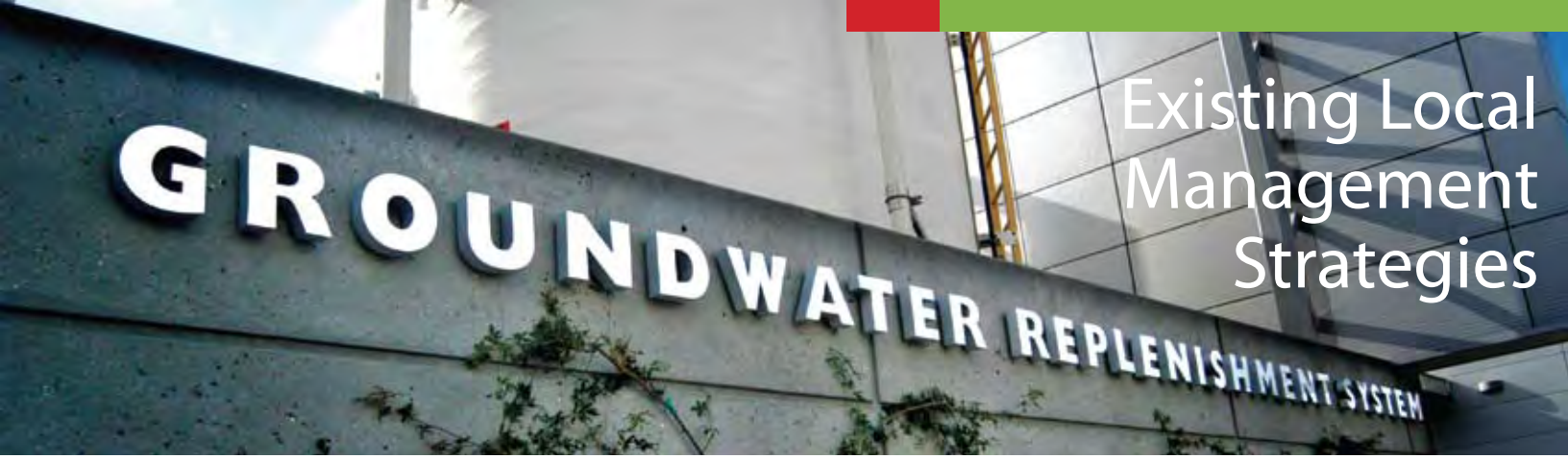
Mounting Environmental Requirements

In addition to a complicated regulatory landscape, local water agencies must adhere to an array of environmental statutes as they plan, develop and operate projects. The California Environmental Quality Act (CEQA), for example, adds numerous layers and requirements that can be a hurdle to moving projects forward. Depending on how they are implemented, the state and federal Endangered Species Acts can also affect development and operation of projects, sometimes at great cost to water supplies. Loss of surface water supplies as a result of environmental regulations can result in greater short-term reliance on groundwater, often with long-term ramifications.

Land Use Decisions and Population Growth

Population growth and commercial development continue to put pressure on resources throughout California. As competition increases for a limited amount of developable land, the need to retain adequate groundwater recharge capability is often overlooked in decisions affecting land use. Activities such as paving and development change the absorption capacity of land, thereby reducing opportunities for natural recharge. In some watershed areas, forestry practices affect in-stream recharge by contributing to siltation, which blocks the absorption capability of creek and river bottoms.

Land use policies and regulations that fail to consider and protect natural and artificial recharge and extraction capabilities create long-term challenges for successful sustainable groundwater management, including permanent reductions in permeable acreage, water quality degradation and land subsidence. Such policies can also exacerbate problems associated with management of stormwater runoff.



Existing Local Management Strategies

California relies on a variety of mechanisms to promote the local control and management of groundwater resources. Since the earliest efforts to manage California's groundwater, the effectiveness and complexity of these strategies has continued to evolve with changing urban and environmental needs and conditions.

As previously noted, every groundwater basin in California presents unique physical and hydrogeological characteristics. In addition, each basin has unique beneficial uses dependent upon water quality, water rights, number and breadth of stakeholders, institutional type and complexity, and other features.[6]

Locally-controlled groundwater management is effective because local and regional entities are the most knowledgeable about their local basins and tend to be the first to notice changes or problems. They are also best suited to address issues unique to their region, including the implementation of proactive plans and actions to meet current and future groundwater needs.

Since local stakeholders and management agencies receive the direct benefits of sustainable management, they are more inclined to support investments in local infrastructure and water quality projects, which in turn leads to more consistent implementation of improvements. Local agencies are also in the best position to identify and assess the consequences of over-reliance on groundwater resources and to evaluate options for improved management. While a certain degree of coordination with the state is important, particularly with regard to data management and funding, one-size-fits-all mandates and uniform statewide protocols tend to be counterproductive because they do not recognize the significant differences in California groundwater basins.

Basic Management Mechanisms

As noted in the Department of Water Resources' California Groundwater Bulletin 118[7], there are three basic mechanisms available for managing groundwater resources in California. These mechanisms include: 1) management by local agencies under authority granted by state statute; 2) coordinated agreements and ordinances; and 3) court adjudications.

Local and regional agencies employ a variety of successful management strategies under these mechanisms, reflecting the diversity of the state's groundwater basins and the diverse beneficial uses of water from those basins. Examples can be found on pages 22 and 23. Financial support and incentives at the state and local levels have also contributed to the success of local and regional groundwater management plans. State policy makers can play a key role in promoting these efforts by providing consistent support and assistance through legislation and funding. Propositions 204, 13, 50 and 84 are examples of this constructive support.

Local Management under Authority Granted by State Statute

Many local water agencies are authorized by statute to institute and conduct some form of groundwater management. Agencies formed under the Water Replenishment District Act and the Water Conservation District Act, for example, are authorized to carry out groundwater replenishment programs and assess fees to pay for groundwater management programs.

6 California Department of Water Resources. *California's Groundwater, Bulletin 118 - Update 2003.* (http://www.water.ca.gov/groundwater/bulletin118/bulletin118update2003.cfm)

7 California Department of Water Resources. *California's Groundwater, Bulletin 118 - Update 2003: Ch. 2.* (http://www.water.ca.gov/pubs/groundwater/bulletin_118/california%27s_groundwater__bulletin_118_-_update_2003_/bulletin118-chapter2.pdf)

FINANCIAL SUPPORT FOR LOCAL GROUNDWATER MANAGEMENT

The California Legislature and voters have approved several propositions that included funding for groundwater quality remediation or local and regional management. The following are the most recent and largest allocations:

The Safe, Clean, Reliable Water Supply Act of 1996 (Proposition 204)

This measure authorized the state to sell $995 million in general obligation bonds for the purposes of restoration and improvement of the Bay-Delta; wastewater treatment, water supply and conservation; and local flood control and prevention. Funds were included in Proposition 204 for a water conservation and groundwater recharge loan program ($30 million) and local water supply development and environmental mitigation ($25 million).

The Safe Drinking Water, Clean Water, Watershed Protection and Flood Protection Act of 2000 (Proposition 13)

Proposition 13 was a $1.97 billion general obligation bond with $230 million earmarked for groundwater programs. The act authorized $200 million for grants for feasibility studies, project design, and construction of conjunctive use facilities (Water Code, § 79170 et seq.) and $30 million in loans for local agency acquisition and construction of groundwater recharge facilities and feasibility study grants for projects potentially eligible for the loan program (Water Code, § 79161 et seq.).

Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50)

California voters approved the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50; Water Code, § 79500 et seq.), which provided for more than $3.4 billion in funding, subject to appropriation by the Legislature, for a number of land protection, water quality and water management activities. Proposition 50 provided $500 million for integrated regional water management, water management projects that will protect communities from drought, protect and improve water quality, and reduce dependence on imported water supplies.

The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84)

Proposition 84 authorized $5.488 billion in general obligation bonds to fund safe drinking water, water quality and supply, flood control, waterway and natural resource protection, water pollution and contamination control, state and local park improvements, public access to natural resources, and water conservation efforts. Within Proposition 84 is $60 million for projects that prevent or reduce groundwater contamination, and $1 billion for integrated regional water management (IRWM) planning and implementation.

*Note: The 2009 legislative package included an $11.14 billion water bond (set for the November 2012 ballot) with additional funding for groundwater activities. See page 28 for more on the package.

Currently, 13 local agencies throughout California have specific authority under special legislation to limit or regulate groundwater extraction.

AB 3030 Plans

The Groundwater Management Planning Act, commonly known as AB 3030, greatly expanded the number of local agencies with authority and responsibility over groundwater resources. The act, which became effective in January 1993, was aimed at encouraging more effective local management as an alternative to establishing a state-administered groundwater management structure. AB 3030 was developed by ACWA and its Groundwater Committee, partially in response to the U.S. Environmental Protection Agency's Comprehensive State Ground Water Protection Program (CSGWPP), which promoted comprehensive groundwater quality management on the state level with EPA providing proposed oversight and coordinated funding.

After the passage of AB 3030, many water agencies developed voluntary "3030" plans and significantly increased their involvement in groundwater management. As of 2003, more than 200 agencies have adopted an AB 3030 groundwater management plan.[8] This legislation was a big step forward in formalizing and supporting the local management of groundwater in California. Some plans prepared under its provisions, however, have suffered from little or no implementation, while others have focused primarily on limiting exports of groundwater to other regions, rather than incorporating all elements of a comprehensive management program.

8 California Department of Water Resources. *California's Groundwater, Bulletin 118 - Update 2003: Ch. 2.* (http://www.water.ca.gov/pubs/groundwater/bulletin_118/california%27s_groundwater__bulletin_118_-_update_2003_/bulletin118-chapter2.pdf)

SB 1938 Groundwater Management Programs

In 2002, the Legislature passed SB 1938. This statute provides additional direction and technical guidance to local agencies for developing groundwater management plans and requires the inclusion of basin management objectives relative to groundwater quantity and quality, subsidence and monitoring programs. SB 1938 also requires agencies to have a groundwater management plan that meets certain requirements in order to be eligible for any state grant or loan programs for groundwater projects.

Building upon the positive elements of AB 3030, SB 1938's passage strengthened the effectiveness of groundwater management plans in California. Many agencies have supplemented their existing plans by incorporating the bill's new provisions or are developing entirely new SB 1938 plans to not only sustain the resource but also to ensure eligibility for state grants or loans.

AB 3030 and SB 1938 plans have provided the basis for action and progress. Under the Local Groundwater Assistance Program (AB 303), DWR awarded nearly $28 million in grants between 2000 and 2005 to local agencies to conduct 128 projects involving groundwater management plans or related activities.[9]

DWR also distributed $205 million in funds from Proposition 13 to groundwater recharge and storage feasibility studies, pilot projects and construction projects between 2000 and 2004, with the total value of those efforts (when combined with leveraged local dollars) totaling over $1 billion. Primary benefits from these activities were enhanced groundwater management and improved water supply reliability, but there have been other benefits as well, including improved drinking water quality, groundwater protection, reduced wastewater discharges, dedicated environmental water and improved habitat / wetlands restoration. It is estimated that these projects provide an additional 300,000 acre-feet per year to local California water supplies.[10]

More recent water bond measures have also included funding to support local groundwater management programs. When distributed, that funding will assist local management entities to ensure further progress in the implementation of their plans.

Groundwater management plans developed under AB 3030 and SB 1938 are among the most effective and widely used management techniques in California. As noted, more than 200 plans have been implemented throughout the state. Entities implementing this type of management are also best prepared to work with state agencies as elevation data is collected pursuant to the new requirements of SBX7 6, enacted as part of the 2009 comprehensive legislative package on water. The comprehensive structure of AB 3030 and SB 1938 plans provides a vehicle to simultaneously provide effective management now and into the future while remaining focused on local hydrologic and economic conditions.

Integrated Regional Water Management Plans (IRWMPs)

Proposition 50's passage in 2002 provided additional grants and matching funding for local projects consistent with the new integrated regional water management plan (IRWMP) initiative. IRWMPs require various local entities to

9 California Department of Water Resources. *Local Groundwater Assistance Program Five-Year Report, 2000-2005.* (http://www.water.ca.gov/groundwater/docs/AB303_Finalized_050206.pdf)

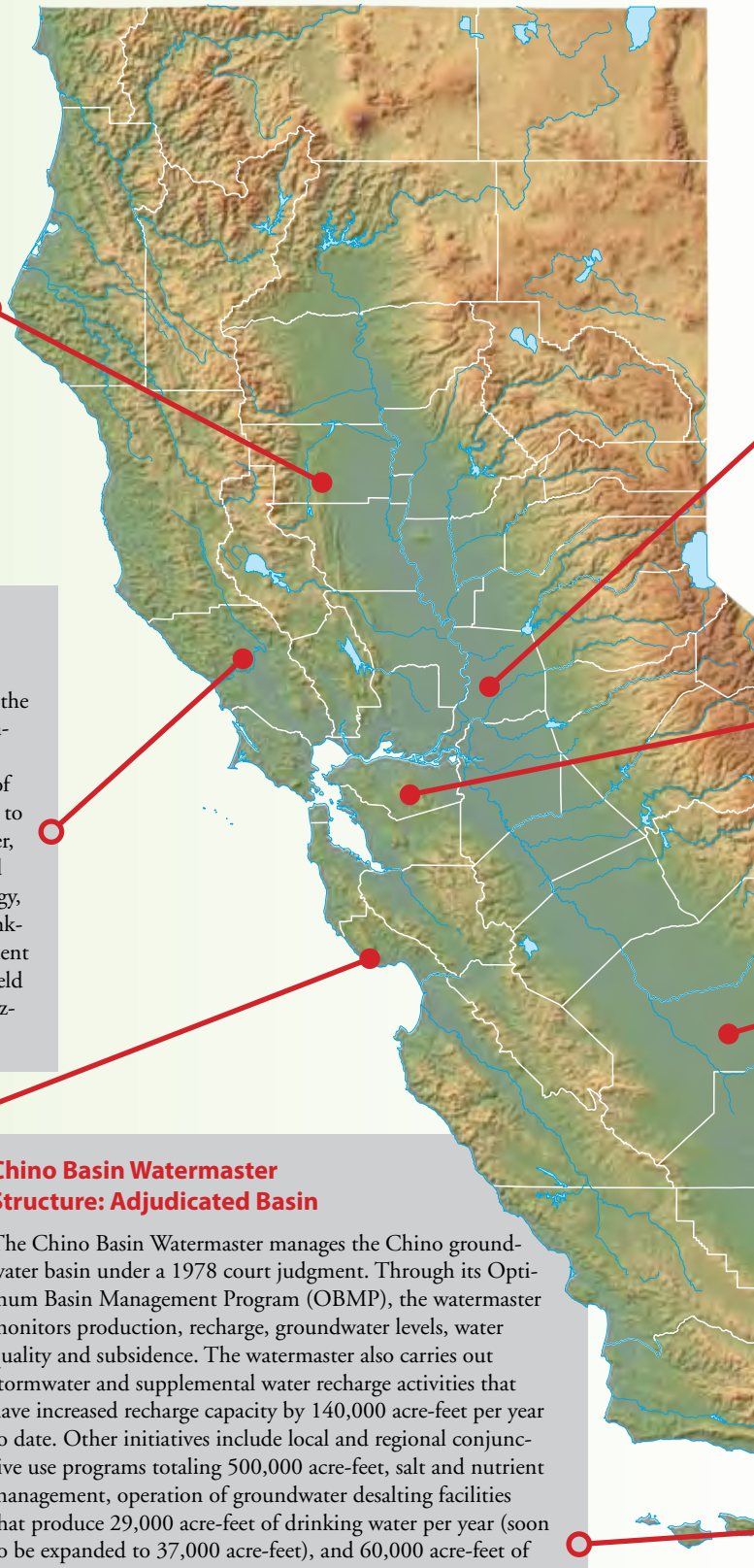
10 California Department of Water Resources. *2000-2004 Proposition 13 Groundwater Grants and Loans Program Summary.* (http://www.grantsloans.water.ca.gov/docs/prop13/Prop_13_Final_Report.pdf)

COMMON CHARACTERISTICS OF SUCCESSFUL GROUNDWATER MANAGEMENT

Elinor Ostrom, who recently won the Nobel Prize in Economics for her work on local governments' management of natural resources, identified a number of characteristics shared by successful efforts to manage groundwater resources. These characteristics include: (i) clearly defined boundaries, both in area and in participants; (ii) rules that are tailored to the local circumstances; (iii) local governance; (iv) active monitoring for compliance with adopted rules; (v) graduated sanctions for violations of those rules; (vi) conflict resolution mechanism within the institution; and (vii) support for local institutions by external governments.*

* Ostrom, Elinor (1990). *Governing the Commons: The Evolution of Institutions for Collective Action.* Cambridge University Press. ISBN 0-521-40599-8.

Case Studies in Effective Local Groundwater Man



Glenn County Groundwater Management Plan
Structure: Groundwater Ordinance

Utilizing a mission and goals statement and a memorandum of understanding (MOU) among local stakeholders, the Glenn County Board of Supervisors adopted a groundwater ordinance in 2000. The ordinance builds on earlier work by a water advisory committee and identifies basin management objectives in key areas to help overcome challenges associated with defining safe yield and overdraft in the Sacramento Valley. Instead of a "one-size-fits-all" approach, the ordinance calls for management objectives to be set for minimum groundwater levels, minimum water quality and maximum subsidence for each of 17 sub-areas in the basin. The creation of the advisory committee, adoption of the ordinance and the subsequent adoption of a Four County MOU in 2006 have led to increased coordination and improved water resources understanding at the county and regional level. An Integrated Regional Water Management Planning process is also under way. (www.glenncountywater.org/management_plan.aspx)

Sonoma Valley Groundwater Management Program
Structure: AB 3030 / SB 1938 Plan

With a primary goal of sustaining groundwater resources for future generations, the Sonoma Valley Groundwater Management Program centers on an SB 1938-compliant plan adopted in 2007. The program includes four main management strategies: conservation, recycled water use to offset groundwater pumping, use of stormwater to recharge groundwater, and banking of winter Russian River water to recharge the basin. Cooperative efforts have helped to bring stakeholders together, while information gathered from the expansion of a voluntary groundwater-level monitoring program has led to increased understanding of the basin hydrogeology, improved public awareness, and better planning. Initiation of a groundwater banking feasibility study, a flood control / groundwater recharge study, and development of a guidebook for homeowners to better manage stormwater are expected to yield broader benefits such as reducing localized groundwater depressions and minimizing or eliminating seawater intrusion. (www.scwa.ca.gov)

Soquel-Aptos Area Groundwater Management Plan
Structure: AB 3030 / SB 1938 Plan

Soquel Creek Water District, Central Water District, the City of Santa Cruz Water Department and the County of Santa Cruz are working cooperatively to manage resources and prevent seawater intrusion. The program centers on activities to limit water demand, maintain groundwater extractions within sustainable quantities, and closely monitor changes in all or part of four groundwater basins. Efforts include aggressive conservation, conjunctive use, and development of a seawater desalination project that will provide water for in-lieu recharge. Cooperative groundwater management has slowed the decline of coastal water levels by collectively reducing demand and reducing pumping toward sustainable levels. Opportunities for interagency projects are identified through regular communications and a collaborative approach. Projects that could not have been undertaken by any one agency are being jointly funded through cost-sharing agreements and / or Integrated Regional Water Management grant funding. (www.soquelcreekwater.org/content/groundwater-management-plan)

Chino Basin Watermaster
Structure: Adjudicated Basin

The Chino Basin Watermaster manages the Chino groundwater basin under a 1978 court judgment. Through its Optimum Basin Management Program (OBMP), the watermaster monitors production, recharge, groundwater levels, water quality and subsidence. The watermaster also carries out stormwater and supplemental water recharge activities that have increased recharge capacity by 140,000 acre-feet per year to date. Other initiatives include local and regional conjunctive use programs totaling 500,000 acre-feet, salt and nutrient management, operation of groundwater desalting facilities that produce 29,000 acre-feet of drinking water per year (soon to be expanded to 37,000 acre-feet), and 60,000 acre-feet of recycled water reuse. The OBMP has enhanced the sustainable yield of the basin, improved water supply reliability as well as water quality, reduced subsidence, and expanded the direct use and recharge of recycled water. It has also reduced demand for imported water from the State Water Project and the Colorado River. (www.cbwm.org)

nagement in California

Sacramento Groundwater Authority
Structure: Joint Powers Authority

SGA draws its authority from a 1998 agreement between the cities of Sacramento, Citrus Heights, Folsom, and the County of Sacramento to utilize their common police powers to protect the basin. Through its SB1938-compliant groundwater management plan and a comprehensive update completed in 2008, SGA has developed a dedicated monitoring well network, a regional groundwater model, a comprehensive groundwater database, and a biennial basin management report to assess the basin's health. Prior to SGA's formation, much of the basin suffered from decades of continually declining groundwater levels. Collaboration through SGA has improved the basin to the point that banked water could be transferred to state and federal programs during recent drought conditions. SGA's efforts also have led to the accelerated cleanup of regional contaminant plumes. The region is now poised to further expand banking and exchange operations, while ensuring a sustainable basin. (www.sgah2o.org)

Zone 7 Water Agency
Structure: AB 3030 Plan

Zone 7 Water Agency has actively managed the Livermore Valley Groundwater Basin for more than 40 years for municipal water supply. It began importing State Water Project water into the watershed in 1962 to reduce groundwater extractions that had left the basin in overdraft. Soon after, the district began artificially recharging the basin by using local "losing" streams to convey and percolate imported water. It continues to manage the basin conjunctively through a comprehensive Groundwater Management Plan that incorporates salinity management to offset the addition of salts from imported and recycled water. Plans are being developed to augment the district's artificial recharge capacity by adding nine aggregate quarry pits that will be used as water storage and aquifer recharge basins. Through its efforts, Zone 7 has curbed groundwater pumping and replenished basin aquifers to levels that can be managed sustainably. (www.zone7water.com)

Upper Kings Basin Integrated Regional Water Management Authority
Structure: Integrated Regional Water Management Plan

Local water agencies in the Kings Groundwater Basin have created a coalition of water districts, private water companies, cities, counties, environmental interests, and other stakeholders to deal with the most pressing local water issues—groundwater depletion, supply reliability and quality. The Upper Kings Basin Integrated Regional Water Management Authority was formed in 2009 to create a sustainable supply of the Kings Basin's finite surface and groundwater resources through balanced regional planning. The IRWMP features an array of projects, including groundwater banking facilities to capture available surface water to enhance local groundwater levels and water quality. A second-phase plan includes surface water exchanges and a groundwater treatment plant to serve disadvantaged communities currently using water of lesser quality. Regional planning and projects will improve supply reliability in dry years and mitigate the Kings Basin's groundwater overdraft. (www.krcd.org/water/ukbirwma)

Orange County Water District
Structure: Special District Act

OCWD was the first agency in California to adopt a groundwater management plan. Originally adopted in 1989, the plan was updated most recently in 2009. In addition to operating one of the most advanced groundwater recharge and monitoring systems in the nation, OCWD manages the largest constructed wetlands in Southern California to naturally filter and clean Santa Ana River flows before entering the recharge area. The district has an active groundwater conjunctive use storage agreement with Metropolitan Water District of Southern California and has constructed the largest planned indirect potable reuse project in the world, the Groundwater Replenishment System, which provides 72,000 acre-feet per year of highly purified water for an expanded seawater barrier and recharge to the aquifer. Successful management of the basin has helped reduce the region's reliance on imported water from Northern California and the Colorado River. (www.ocwd.com)

work collaboratively within a region to develop common water resources management goals and objectives through a transparent process including public involvement. These standards include a list of water management strategies and objectives, including surface and groundwater management, water quality protection and improvement, recycled water and desalination (where appropriate).

The intent of the IRWMP program is to encourage integrated regional strategies for management of water resources and to provide funding, through competitive grants, for projects that protect communities from drought and other extreme weather events, ensure sustainable water uses and environmental stewardship, protect and improve water quality, and improve local water security by reducing dependence on imported water.

Similar to the AB 3030 and SB 1938 processes, local and regional stakeholders have collaborated to develop common water resources management goals and objectives. Multiple plans have emerged since 2002, bolstered by over $1 billion in funding from Propositions 50, 84 and 1E for those agencies with groundwater management plans and / or an urban water management plan. It is anticipated the comprehensive approach outlined through the IRWMP process will continue to play a vital role in sustaining California's overall water supply, particularly if the considerable financial support for the program is maintained in the future.

Coordinated Agreements and Ordinances

Some agencies have entered into coordinated agreements over the years in which multiple water purveyors commit to participate in mutually beneficial management activities, including the analysis of a jointly used basin and the development of joint capital projects and joint operational policies. Enforcement of the agreement and the collection of any fees or levies may be jointly shared among the parties.

In addition, groundwater ordinances have been adopted by some cities and counties. These ordinances may include controls intended to limit or prohibit exports of groundwater to protect the area's groundwater basins. The more general intent is to better coordinate management of water supply and land development. Local governments implementing this type of groundwater management utilize their police power, land use authority and general plan provisions to regulate the use of groundwater in their jurisdiction. These governmental entities are often faced with unique, internal management issues, such as planning department goals that must be coordinated with water or public works department goals and objectives. These ordinances have been most successful when coordinated with an AB 3030 / SB 1938 groundwater management plan.

Other voluntary management strategies are less common, but they can also be successful when implemented proactively and in cooperation with other local and regional stakeholders. Coordinated agreements such as the Sacramento Area Water Forum (including the Sacramento Groundwater Authority) have produced positive results in some regions.

Adjudication

Adjudication is a management method for groundwater basins that have typically exhibited a condition of sustained overdraft for a period of at least five consecutive years. Adjudication is the product of a judicial process involving parties in a groundwater basin to determine the nature and quantity of each producer's share of the basin's safe yield. The process includes the appointment of a watermaster to oversee the court judgment that specifies how much each of the parties to the decision can extract from the basin. There are 22 settled court adjudications of groundwater basins in California, mostly in Southern California.[11] The first basin-wide adjudication of groundwater rights in California was in the Raymond Basin in Los Angeles County in 1949 (*Pasadena v. Alhambra*)[12]and the majority of adjudications were initiated or completed prior to the passage of AB 3030 in 1992.

Adjudicated groundwater basins in California can help to provide certainty by defining and quantifying specific rights for individual producers in the basin. However, application of this strategy indicates significant challenges exist in the affected basin, and parties entering into adjudication should understand the process is time consuming, expensive and complex for the involved parties.

11 California Department of Water Resources. Groundwater Information Center – Court Adjudications. 2011. (http://www.water.ca.gov/groundwater/gwmanagement/court_adjudications.cfm)

12 California Department of Water Resources. *California's Groundwater, Bulletin 118 - Update 2003: Ch. 2.* (http://www.water.ca.gov/pubs/groundwater/bulletin_118/california%27s_groundwater__bulletin_118_-_update_2003_/bulletin118-chapter2.pdf)

Advancing Sustainable Groundwater Management

It is increasingly clear that California's reliance on groundwater is growing. Local groundwater management plans must reflect that reality and incorporate strategies that consider the potential consequences of a large-scale shift to groundwater, whether cyclical or permanent.

The components of AB 3030 and SB 1938, along with the Integrated Regional Water Management Plan approach, provide an excellent foundation for this type of management and their use should be encouraged and incentivized. Engaging stakeholders in the process is a key way to promote broad participation in the development of such plans. As experience shows, cooperation and participation by a wide spectrum of stakeholders — including surface water users — can be extremely beneficial to the development and implementation of sustainable groundwater management programs.

The ideal groundwater management plan addresses the resource on a local level, provides for operational flexibility, and satisfies the needs of both the environment and the economy while ensuring the continued health of the basin.

The following management objectives reflect best practices that will maximize the effectiveness and sustainability of local groundwater management plans.

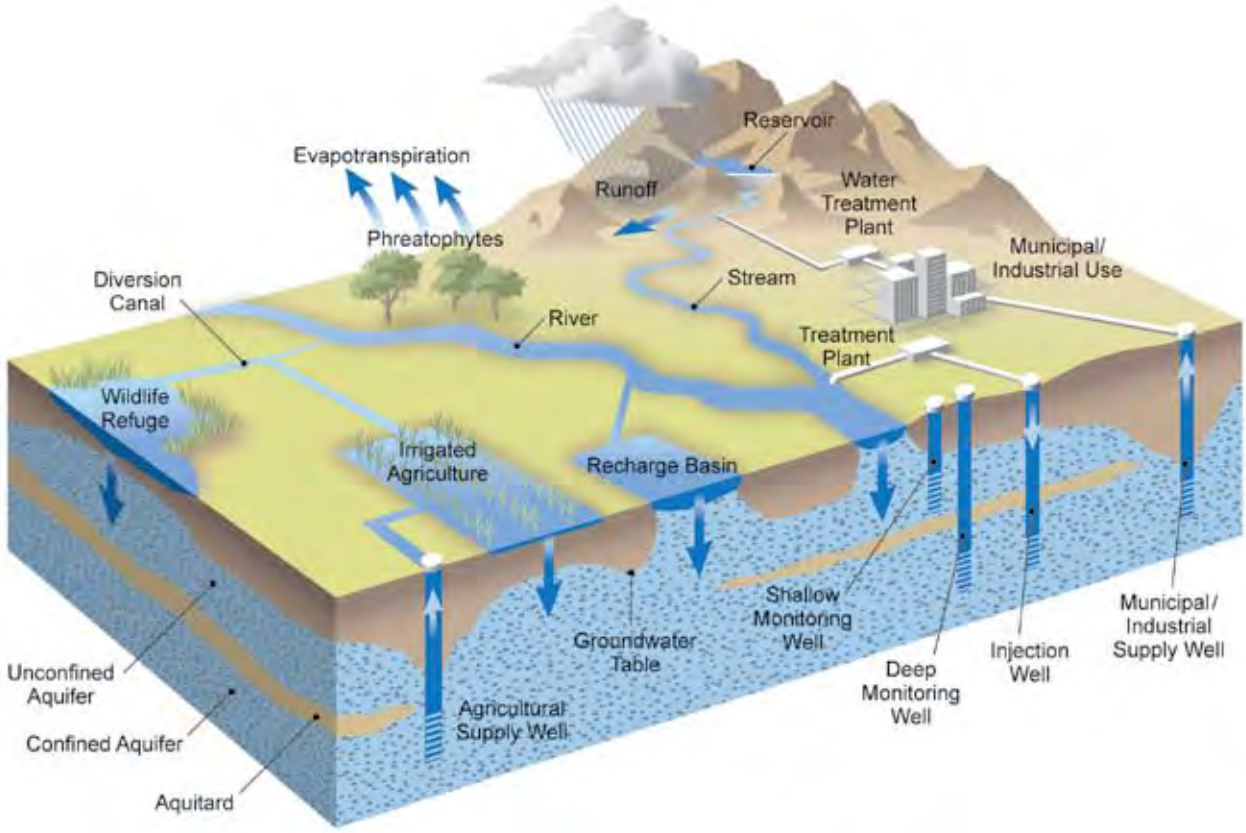
Optimize conjunctive management of surface and groundwater resources. California must invest in surface storage and conveyance improvements as part of a comprehensive plan to restore the Delta ecosystem, ensure a reliable statewide water supply and help recover, improve and sustain the state's economy. Because surface water and groundwater resources are most effective when used in concert with each other, significant investments in surface water storage and conveyance facilities are critical to the success of conjunctive use projects and sustainable groundwater management throughout California.

One of the most effective methods to do this is to ensure that grant programs and regulatory policies reflect the critical link between local and regional groundwater management programs and investments in new storage and conveyance infrastructure. This link is integral to maximizing California's overall water management flexibility.

Groundwater management agencies must also prepare for the effects of future surface water shortages and develop strategies to augment natural and artificial recharge. These strategies should include the increased use of alternative water sources such as stormwater, recycled and desalinated water, as well as additional conservation / water use efficiency efforts, to expand the portfolio of options for groundwater recharge.

Integrate conservation and water use efficiency. Many of the challenges facing groundwater management agencies are driven by the general availability of water for beneficial uses. A continued and intensified commitment to conservation and water use efficiency is critical to addressing these issues. In the context of California water management, water use efficiency means "using water more efficiently to reduce water demand for a given set of beneficial uses."

As with groundwater management efforts, water conservation and water use efficiency programs will only be successful if local water agencies are responsible for their design and implementation. Local water agencies are accountable to their customers for making locally cost-effective decisions that will provide reliable water supplies while balancing other factors, consistent with applicable regulatory requirements. Water conservation and water use efficiency programs are indispensable tools in any agency's portfolio as it develops a sustainable water management plan.



Conceptual model of a typical water management system. Courtesy of the Department of Water Resources.

Undertake comprehensive data collection and analysis. While large amounts of groundwater information are currently being collected and used by multiple local, regional, state and federal agencies and organizations, there are data gaps that can prevent the optimal beneficial use of a groundwater basin. These gaps may also affect relationships among agencies and limit opportunities for regional efforts to sustainably manage a basin's resources. Filling data gaps, ensuring adequate and sustained local groundwater monitoring and making periodic evaluations of the data are the most effective ways to gauge the long-term management risks to groundwater basins (both from a quality and quantity perspective) resulting from increased reliance on groundwater resources. Such fundamental data gathering and assessment are prerequisites to successful, sustainable groundwater management.

Sustainable groundwater management has the best chance of being achieved and maintained if a proper and frequent assessment of the state's groundwater resources is completed, including groundwater level trends, average quantities of groundwater available, and unused storage capacity. Efforts should also focus on groundwater quality data, the effects of current and future contamination and management options for better protecting basins over the long term. This assessment of the groundwater basins' level trends, availability, capacity and quality should be completed and reported by DWR and the appropriate federal agencies (e.g. USGS, NASA), working cooperatively with local groundwater management agencies and optimizing local agency data, evaluations and reports. ACWA was encouraged by the inclusion of a provision requiring such a document in the SBX7 6 legislation and has been working with DWR to develop appropriate, effective and efficient protocols for engaging with local groundwater management agencies.

Most of the groundwater served in California is well managed by local agencies utilizing the appropriate scale of monitoring, data evaluation and reporting through a well-designed groundwater management program. Those areas without, but in need of, active groundwater management programs should be identified, and local agencies should be engaged to implement strategies to move toward sustainability. However, at this time there is limited large-scale groundwater data and information available to systematically assess and accurately describe the status of groundwater basins throughout the state. In addition to developing such information, it is important that representative groundwater level and quality information already collected be made transparent and accessible to interested stakeholders, including adjacent local groundwater managers.

Local and regional entities should share appropriate information and collaborate with other pertinent agencies and the state in developing and implementing sustainable groundwater management programs. Additional efforts may be required to engage individual landowners on a case-by-case basis because sustainable local management of groundwater resources requires accountability, stewardship and transparency by all users. This data collection and transparency of information will not only provide a means for communication and education about the resource, but ultimately will help provide protection to all groundwater users, ensuring a high quality, reliable water supply in each basin. Appropriate local monitoring, measurement and reporting of groundwater basin activity are the only ways to assess whether groundwater basin objectives are being achieved.

Consider the implications of land use decisions. Land use policies that maximize conjunctive use projects and minimize subsidence and groundwater contamination often conflict with common practices of agricultural and urban development throughout California. The constant pressure of residential and commercial development can result in the loss of critical acreage that could be utilized to recharge groundwater basins or ensure storage for areas with unreliable surface supplies. Ironically, areas developed in a way that prevents adequate recharge have the potential to suffer subsidence and a loss of the infrastructure built over the basin. IRWMPs can be an important tool in minimizing such impacts, but it is necessary to collaborate with the developer community to ensure effective communication and reduce potential conflict.

Local agencies should be proactive in identifying and including in a sustainable groundwater management plan the most appropriate areas to serve as dedicated recharge or conjunctive use locations. In addition, land use practices to protect indirect recharge should be promoted to land use jurisdictions for their consideration and implementation, through ordinance where necessary. One example of an indirect approach to conjunctive use is promoting low-impact development (LID), a strategy increasingly used to improve the effectiveness of groundwater recharge and extraction options by minimizing the loss of recharge areas and requiring certain construction practices that increase or maintain the absorption capability of lands overlying groundwater basins. Such efforts, when developed and implemented in coordination with other actions such as enhanced water use efficiency and / or water recycling, present an important opportunity for coordination with local governments and collaboration with stakeholders.

Make public communication and education a priority. Many local and regional groundwater management agencies continue to improve and implement plans that effectively maintain or enhance the health of their basins and provide the foundation for future sustainable management activities. Efforts to educate the public (including policy makers, other local agencies and regulators) about groundwater and successful management approaches can be significantly improved and should be a higher priority for agencies already implementing or working to craft a sustainable groundwater management plan. Information should be made available in a variety of formats and regular workshops should be designed to appeal to all audiences.

WHAT IS LOW-IMPACT DEVELOPMENT?

Low-impact development (LID) is a sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional stormwater management, which collects and conveys stormwater runoff through storm drains, pipes, or other conveyances to a centralized stormwater facility, LID takes a different approach by using site design and stormwater management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall.*

* State Water Resources Control Board. *Low Impact Development – Sustainable Storm Water Management*. 2011. (http://www.swrcb.ca.gov/water_issues/programs/low_impact_development/index.shtml)

THE 2009 LEGISLATIVE WATER PACKAGE

The comprehensive water package enacted in November 2009 marked a new era for California water. At its core, the new law formalized the co-equal goals of water supply reliability and ecosystem health as state water management policy. The package includes four policy bills and an $11.14 billion water bond measure now targeted to go before California voters on the November 2012 ballot. The policy bills address the Delta ecosystem and its governance, statewide conservation policies applicable to urban, industrial and agricultural water suppliers, development of updated in-stream flow criteria, and groundwater elevation monitoring requirements in every basin and sub-basin in California.

While all of the bills include policies or actions that will directly or indirectly impact groundwater resources, the groundwater monitoring bill, SBX7 6, requires the most of groundwater managers and users. This legislation requires groundwater elevation monitoring for all basins and sub-basins by January 1, 2012 to demonstrate seasonal and long-term elevation trends in groundwater basins. The monitoring provisions are designed to help better manage the resource during both normal water years and drought conditions.

Under the legislation, a local agency or other eligible organization in each basin or sub-basin interested in assuming responsibility for monitoring and reporting groundwater elevations for its respective area was to notify DWR by January 1, 2011. If no entity volunteers for a particular area, DWR will assume the responsibility for monitoring and the affected county and entities will become ineligible for state grants or loans.

This legislation supports local groundwater management by appropriately looking to local and regional agencies as the authorities for monitoring groundwater elevations. ACWA has been an active partner with DWR as the monitoring program protocols have been developed. The state's commitment to supporting the local management approach will help ensure effective implementation.

In addition to the groundwater provisions in SBX7 6, accomplishing the goals included in the Delta package will be a critical part of securing a healthy Delta ecosystem and improvements in water supply reliability for the entire state. It will allow for a more reliable surface supply for users who may otherwise shift to groundwater to satisfy part or all of their water needs.

Implementing activities to reach conservation targets outlined in SBX7 7 will also be important as local agencies seek to reduce long-term stress on groundwater resources, particularly during periods when access to surface water supplies is reduced or eliminated.

While this historic package of water legislation includes much that will contribute to improved water management in California, it alone will not lead to sustainable groundwater management. Though it reflects recognition that the state is facing a multi-faceted water crisis and provides policy and financial support for many projects, much work remains to be done to ensure groundwater resources can be sustained through active management on a local or regional scale.

Recommendations

Throughout this Framework ACWA has described key elements of groundwater management and the growing number of challenges facing local water managers today. Examples of successful, locally coordinated approaches to groundwater management have been provided to highlight best practices that may enhance the effectiveness of management plans. Plans such as these should be developed and expanded at the local or regional level, understanding that sometimes there is a need to engage beyond an individual agency's jurisdictional boundaries.

ACWA firmly believes the state Legislature should encourage and support local management policies that appropriately reflect California's geographic and hydrologic diversity rather than institute a state-administered centralized control structure for regulating or permitting the use of groundwater. Statewide permitting and regulation would undermine the effectiveness of existing and planned local investments and would be counterproductive. The Legislature should focus instead on incentivizing the development and implementation of the best practices outlined in this Framework.

In addition, ACWA stands ready to collaborate in the development of appropriate regulatory and policy-related actions and initiatives that will further promote more effective and comprehensive local groundwater management. To that end, we make the following management and policy recommendations to help ensure the sustainability of California's groundwater resources.

ACWA Groundwater Framework Recommendations

Local Agency Level

1. Excluding small or undeveloped basins, groundwater basins in California that are identified in DWR Bulletin 118 should be operated by local agencies and / or stakeholders consistent with a locally developed groundwater management plan that achieves sustainability with the level of management appropriate for the basin. Groundwater management agencies within any basin where extractions are a significant percentage of the groundwater budget should develop formal groundwater management plans with stated policies and practices. The development of these plans should be open and transparent to allow public engagement in the process and should specifically address all factors related to groundwater management including, but not limited to, conjunctive use where appropriate.

2. Consistent with their respective groundwater management plans and state law, groundwater management agencies should be encouraged to collect and disseminate comprehensive groundwater information to demonstrate short- and long-term sustainability of the basin. Agencies should actively provide that information to DWR and make it accessible to the public.

3. Agencies that do not have an SB 1938 groundwater management plan (or functional equivalent), where applicable, should be ineligible for water-related state grants and loans. Financial support and incentives should be made available to agencies that lack sufficient resources but are committed to developing a groundwater management plan.

State and Regional Agencies

1. DWR should improve the functionality of existing online access portals such as IWRIS and the Water Data Library for groundwater information that utilizes the data collected from local agencies to provide improved public access. Representative information should also be transparent and accessible statewide through other avenues, including the California Water Plan (Bulletin 160) and any updates to Bulletin 118.
2. Where an SB 1938 groundwater management plan (or the functional equivalent) exists, state agencies should develop procedures, where applicable, to issue necessary permits for groundwater projects within 60 days of the certification of the CEQA document by the lead agency. This is especially critical for groundwater replenishment projects.
3. A multi-agency team led by DWR should be created and charged with developing an approach to both coordinate review and facilitate implementation of new local and regional groundwater recharge, groundwater banking and conjunctive use projects. Interagency coordinated review and facilitation of groundwater projects is required to ensure that these sustainable resource management opportunities are implemented efficiently once approved by a local agency as part of its groundwater management plan.
4. The Natural Resources Agency and Cal/EPA should work together to develop incentives for local agencies to implement small-scale groundwater replenishment projects, consistent with the applicable local groundwater management plan.
5. Regional Water Quality Control Boards should encourage and facilitate the process for capable local agencies responsible for groundwater management to proactively remediate contaminated groundwater basins when the local agency determines such remediation will contribute to more sustainable groundwater management.
6. The California Department of Public Health should develop draft criteria for SB 918 (2010), which directs the California Department of Public Health to develop criteria for using recycled water to supplement water storage, no later than December 31, 2011.
7. California agencies must develop a new methodology for encouraging, promoting and supporting infrastructure investments, particularly those that would improve water supply reliability at the local level and those that can work in conjunction with the state's backbone water delivery systems.

Legislative / Legal

1. The state of California should designate the use of surface water for groundwater recharge as a "beneficial use." The designation should apply even when there is no plan for future extraction of the water, as long as it is consistent with an SB 1938 groundwater management plan (or the functional equivalent).
2. California law should be clarified to state that once surface water is recharged as part of a conjunctive use project consistent with an SB 1938 groundwater management plan (or the functional equivalent), such water becomes "groundwater" outside the scope of State Water Resources Control Board jurisdiction.
3. The state of California should provide appropriate protection from liability for any agency responsible for groundwater management that undertakes the cleanup of a contaminated groundwater basin in order to use that basin, including as part of a conjunctive use program.
4. Voting requirements should be reduced to 55 percent for approval of local funding initiatives targeted at investments in new or existing water management infrastructure.
5. California anti-degradation policy, as it is currently interpreted with respect to groundwater recharge projects, should allow local agencies to optimize their groundwater resources, providing that maximum benefit to the public is maintained. Any changes should be made in coordination with groundwater management plans, recognizing the variety of different circumstances throughout the state.
6. County general plans should be required to incorporate land use elements that contribute to and promote effective implementation of an SB 1938 groundwater management plan (or the functional equivalent), as determined in consultation with local agencies responsible for groundwater management.

7. The state of California should ensure that "in-lieu" recharge is protected as part of a conjunctive use program. Put otherwise, a conjunctive use project need not require the direct recharge of surface water or the actual extraction of groundwater if near-term demands can be shifted from one source to the other, thereby accomplishing the goal of the conjunctive use project in both wet and dry years.

Collaborative Actions

1. In order to implement large-scale conjunctive use projects in the Central Valley and elsewhere, the Legislature and federal government should invest in surface water storage and improved Delta conveyance, provide financial support for local and regional infrastructure projects, and modify operations and regulatory policies to optimize conjunctive use opportunities.
2. The state, working with appropriate local entities, should address groundwater-related drinking water quality issues in small or disadvantaged communities by providing technical assistance to identify the best approach to protecting public health.
3. In implementing applicable state laws and developing ordinances, local governments should carefully consider the implications of policies and regulations that affect land use in the areas that overlie basins and advocate projects in collaboration with the developer community that maximize opportunities for recharge and conjunctive use.
4. Sustainable groundwater management may be improved through the use of quantitative groundwater models; state and federal agencies should provide financial support to assist local agencies in constructing such models where appropriate.
5. Protecting groundwater quality should be considered as important as the development of sustainable groundwater supplies. Using the best available science, regulatory and policy efforts to identify long-term solutions for the remediation of contamination issues should be supported on a local, regional and statewide scale, such as the salt and nutrient management plans identified in the State Water Resources Control Board Recycled Water Policy.

ACWA Policy Principles on Groundwater Management

"Groundwater – Invisible No More"

Groundwater is an invaluable resource for California and a critical asset in the state's comprehensive water management portfolio. Groundwater management should be implemented throughout California, and should be done so consistent with the following policy principles adopted by ACWA's Board of Directors.

1. Groundwater resources are best managed by local jurisdictions to effectively and efficiently manage water quality and supplies for beneficial uses. ACWA encourages and supports regional groundwater management strategies such as Integrated Regional Water Management Plans (IRWMP) and other regional partnerships.
2. Local management of groundwater resources requires accountability, stewardship and transparency; and appropriate local monitoring, measurement and reporting of groundwater basin activity to assure groundwater basin objectives are being achieved.
3. ACWA opposes state interference with existing legal rights to groundwater and believes that a state-administered water rights system for groundwater would undermine effective groundwater management and local investments.
4. California's groundwater resources are unique and diverse in physical characteristics, beneficial uses, water rights, legal and institutional governance and management structures, stakeholders and other features. One-size-fits-all state mandates are ineffective and counterproductive.
5. ACWA supports expansion of conjunctive management of surface water and groundwater supplies that contributes to the protection, reliability and sustainability of local, regional and statewide water supplies for water users and the environment. Such an expansion requires increased groundwater and surface storage, the re-operation of surface reservoirs as appropriate, and improved Delta conveyance.
6. Groundwater quality management is integral to optimizing California's groundwater resources. It must be science-based and include improved data management, basin assessments, monitoring, reporting, protection and, where appropriate, remediation.
7. ACWA supports the use of potable, desalinated, recycled and storm waters for groundwater recharge, with appropriate water quality safeguards that protect beneficial uses.
8. Land use policies and regulations that identify, preserve and protect natural and artificial recharge and extraction capabilities are essential for sustainable groundwater management. Land use policies must consider and analyze impacts and potential impacts to groundwater quality.
9. ACWA supports statewide and regional regulatory consistency that acknowledges the diversity of groundwater resources to facilitate the achievement of local and statewide groundwater storage and basin utilization goals.
10. Groundwater management strategies must anticipate and adapt to the effects of climate change.
11. Optimal groundwater management throughout California will require significant federal, state, regional, local and private investment in infrastructure and related facilities. ACWA further supports increased funding for groundwater research, monitoring, and other management programs.
12. ACWA encourages other statewide associations, regional entities and groundwater-related organizations to educate and advocate for expanded and more effective groundwater management throughout California, and will help coordinate such activities.

ACWA Groundwater Committee

Greg Zlotnick, Chair	San Luis & Delta-Mendota Water Authority
John V. Rossi, Vice-Chair	Western MWD
Behzad Ahmadi	Santa Clara Valley WD
David R.E. Aladjem	Western MWD
Lewis Bair	Reclamation Dist. #108
George M. Barber, P.E.	Paradise ID
Greg Bartow	San Francisco PUC
Thaddeus Bettner	Glenn-Colusa ID
Wilmar (Will) L. Boschman	Semitropic WSD
Kirby Brill	Mojave Water Agency
Thomas S. Bunn, III	Crescenta Valley WD
Michelle Casterline	Kern County WA
Grace Chan	Metro WD of Southern California
John Christopher	Rincon del Diablo MWD
Thomas Coleman	Orchard Dale WD
Richard Corneille	San Bernardino Valley WCD
Greg Cross	City of San Diego Public Utilities
Robert T. Dean	Calaveras County WD
Paul E. Dorey	Vista ID
Jill Duerig	Zone 7 Water Agency
Craig Elitharp	Rancho California WD
Hicham Eltal	Merced ID
Glenn Farrel	Friant Water Authority
Sandy Figuers	Zone 7 Water Agency
Daniel E. Griset	Metro WD of Southern California
Karna Harrigfeld	Stockton East WD
Tom Haslebacher	Kern County WA
Donald G. Hauser	Calleguas MWD
Clemens Heldmaier	Montara Water & Sanitary District
J. Paul Hendrix	Tulare ID
Rick Hoelzel	Kings River CD
Rick Iger	GEI Consultants Inc., Bookman-Edmonston
Jay Jasperse	Sonoma County WA
Barbara Judd	Santa Clara Valley WD
Chris M. Kapheim	Alta ID
Sanford (Sandy) B. Kozlen	Carmichael WD
Charles (Chuck) A. Krieger	Desert WA
Robert A. Krieger	Desert WA
David Luker	Desert WA
Michael R. Markus, P.E.	Orange County WD
Brian Martin	Placer County Water Agency

ACWA Groundwater Committee

Melody A. McDonald	San Bernardino Valley WCD
Craig Miller	Inland Empire Utilities Agency
L. Mark Mulkay	Kern Delta WD
Debbie Neev	Laguna Beach CWD
David Orth	Kings River CD
Richard Ottolini	Rancho California WD
Jim Patrick	Rain Bird Corporation
Lynne Plambeck	Newhall CWD
Iris Priestaf	San Benito County WD
Bob Ptacek	Montara Water & Sanitary District
Max Rasouli	Riverside Public Utilities
Douglas J. Reinhart	Irvine Ranch WD
Robert Roscoe	Sacramento Suburban WD
Randy Schoellerman	San Gabriel Basin WQA
Dean Sherrill	Rio Alto WD
Richard Smith	Helix WD
Phyllis Stanin	San Benito County WD
Max Stevenson	Yolo County FC & WCD
Rob Swartz	Regional Water Authority
John Thornton	Municipal Water District of Orange Cnty
Michael Tognolini	East Bay MUD
Mike Wehner	Orange County WD
Daniel Wendell	Marina Coast WD
Dean Wiberg	Foothill MWD
Carol Williams	Main San Gabriel Basin Watermaster
Derrik Williams	Soquel Creek WD
Richard S. Williamson, P.E., R.L.S.	Borrego WD
Robert V. Winchester	Browns Valley ID
Ron Withrow	Princeton-Codora-Glenn ID
John Woodling	Sacramento Groundwater Authority
Glen Wright	City of Santa Rosa - Utilities Dept.
John C. Yeakley	Bear Valley CSD
Tony Zampiello	Main San Gabriel Basin Watermaster

2011 ACWA Board Of Directors

Paul Kelley, ACWA	ACWA President
Randy Record, Eastern MWD	ACWA Vice President
Glen D. Peterson, Las Virgenes MWD	Immediate Active Affiliated Past President
Paul Helliker, Marin Municipal Water District	Region 1 Chair
Aldaron Laird, Humboldt Bay MWD	Region 1 Vice Chair
Eric Larrabee, Western Canal WD	Region 2 Chair
Sandy Willard Denn, Glenn-Colusa ID	Region 2 Vice Chair
Ron Nelson, Nevada Irrigation District	Region 3 Chair
Bob Dean, Calaveras County Water District	Region 3 Vice Chair
Robert Nees, Turlock Irrigation District	Region 4 Chair
Robert Roscoe, Sacramento Suburban WD	Region 4 Vice Chair
David Hodgin, Scotts Valley Water District	Region 5 Chair
Katy Foulkes, East Bay MUD	Region 5 Vice Chair
Chris Kapheim, Alta Irrigation District	Region 6 Chair
William Diedrich, San Luis WD	Region 6 Vice Chair
Adrienne (Jo) Ann Mathews, Kern County WA	Region 7 Chair
J. Paul Hendrix, Tulare ID	Region 7 Vice Chair
Robert J. Gomperz, Foothill MWD	Region 8 Chair
Gail Pringle, Calleguas MWD	Region 8 Vice Chair
Ben Wicke, Elsinore Valley MWD	Region 9 Chair
Steve Robbins, Coachella Valley WD	Region 9 Vice Chair
Peer Swan, Irvine Ranch Water District	Region 10 Chair
Keith Lewinger, Fallbrook PUD	Region 10 Vice Chair
Gary Arant, Valley Center MWD	Communications Committee Chair
Martha Davis, Inland Empire Utilities Agency	Energy Committee Chair
John Coleman, East Bay MUD	Federal Affairs Committee Chair
Joe Parker, Placer County WA	Finance Committee Chair
Greg Zlotnick, San Luis & Delta-Mendota WA	Groundwater Committee Chair
Rick Gilmore, Byron-Bethany ID	Insurance & Personnel Committee Chair
Scott Shapiro, Reclamation District #2068	Legal Affairs Committee Chair
Shauna Lorance, San Juan WD	Local Government Committee Chair
Paul Bartkiewicz, Yuba County WA	State Legislative Committee Chair
Mark Weston, Helix WD	Water Management Committee Chair
Pankaj Parekh, Los Angeles DWP	Water Quality Committee Chair
Thomas A. Cuquet, South Sutter WD	ACWA / JPIA

COUNCIL OF PAST PRESIDENTS

James H. Blake
Bette Boatmun
Randy Fiorini
E.G. “Jerry” Gladbach
Gene C. Harris
John E. Kidd
Glen D. Peterson

ACWA is a statewide non-profit association whose 450 public agency members are responsible for about 90% of the water deliveries in California.

MISSION.

ACWA's mission is to assist its members in promoting the development, management and reasonable beneficial use of good quality water at the lowest practical cost in an environmentally balanced manner.