

CALFED Bay-Delta Program

Levee System Integrity Program Multi-Year Program Plan (Years 6-9)

(State FY 2005-2006 to 2008-2009, Federal FYs 2006-2009)

Implementing Agencies:

Department of Water Resources

Department of Fish and Game

United States Army Corps of Engineers

The May Revision of the Governor's FY 2006 budget identifies three key activities for the CALFED Program that are to be accomplished by November 1, 2005. They are: an independent program and fiscal review; a re-focusing of the efforts of the California Bay-Delta Authority and the other CALFED state agencies; and the development of an action plan for long-term financing.

The outcome of these three activities likely will have considerable impact on how the CALFED Bay-Delta Program is implemented and financed in succeeding years. Therefore, although this Program Plan describes activities that are anticipated to occur during the next four years, the Authority is being asked to approve it based only on those activities scheduled to occur during FY 2006.



Goals and Objectives

Objective and Goals:

Levee System Integrity Program (LSIP) objective is to reduce the risk to land use and associated economic activities, water supply, infrastructure, and ecosystem from catastrophic breaching of Delta levees. Levee Program actions focus primarily on the legal Delta as defined in the Water Code ... The goal is to provide long-term protection for multiple Delta resources by maintaining and improving the integrity of the Delta levee system. In addition, the Levee Program aims to integrate ecosystem restoration and Delta conveyance actions with levee improvement activities. (CALFED Levee System Integrity Program Plan, July, 2000, page 1-5). This same goal of protecting resources and integrating ecosystem restoration applies to the Suisun Marsh levee system to the extent it is eligible for funding and included in the Levee System Integrity Program.

Currently, the Habitat Management, Preservation, and Restoration Plan for the Suisun Marsh (Suisun Marsh Plan) is under development with an estimated completion date of Fall 2006. The actions in the Suisun Marsh Plan will include components of the CALFED Ecosystem Restoration Program, Water Quality Program, and the Levee System Integrity Program to achieve a common goal of providing long-term protection of the water supply and ecosystem benefits.

Achieving this objective is being undertaken through a cooperative effort among the Department of Water Resources (DWR), the Department of Fish and Game (DFG), U.S. Army Corps of Engineers (COR), participating local reclamation districts (RD), and Suisun Resource Conservation District (SRCD).

This Program Plan is consistent with the Delta Improvements Package.

Levee System Integrity - Delta

The CALFED Record of Decision (ROD) identified five commitments for the Levee System Integrity Program:

1. Provide Base Level Protection.

Provide funding to help local reclamation districts reconstruct all Delta levees to a base level of protection (the PL 84-99 standard).

2. Implement Special Improvement Projects.

Provide funding for projects that enhance flood protection beyond base level protection on levees that have particular importance in the system. Priorities include protecting public benefits such as water quality, the ecosystem, life and personal property, agricultural production, cultural resources, recreation, and local and statewide infrastructure.

3. Implement a Levee Subsidence Control Plan.

Develop "best management practices" to control and reverse subsidence and work with local districts and landowners to implement cost-effective measures.

4. Implement a Levee Emergency Management and Response Plan.

Enhance the emergency management response capability of local, State, and Federal agencies to rapidly respond to levee emergencies.

5. Perform a Delta Levee Risk Assessment.

Quantify the risks to Delta levees, evaluate the consequences, and develop a strategy and recommendations to minimize the threat of catastrophic levee failure. Recognized major risks to Delta levees include earthquakes, floods, seepage, and subsidence.

The ROD description of the Delta Levees component contained two primary activities, Base Level Protection and Special Improvements. The relationship of these activities to the DWR's Delta Levee Subventions (Subventions) and Special Flood Control Projects (Special Projects), has been confusing.

Levee Maintenance

As defined in the finance plan, Levee Maintenance is intended to provide maintenance and structural improvement to base level protection standard only. This category corresponds well with DWR's Subventions Program. The priority for funding is to preserve and improve local flood protection benefits. This program will continue to rely on a locally-driven subventions program to distribute the State cost share. Levee Maintenance funding includes cost-shared reimbursement for full mitigation of habitat impacts resulting from levee maintenance activities.

Levee Improvement

Levee Improvements is to build levees beyond an existing level of protection. This includes levee improvements that may exceed the PL 84-99 level (base level protection standard) of protection. It is similar to the DWR's existing special projects program in that funding is based on priority areas that will provide multiple benefits such as flood protection, water quality, ecosystem restoration, water supply reliability, and transportation benefits. As with the existing special projects program, this activity provides for full mitigation of habitat impacts resulting from levee improvements and, unlike the Subventions Program, it provides for habitat enhancements for both levee maintenance and levee improvements.

Other Components

Other Components is a new category that includes the Delta Risk Management Strategy (DRMS), subsidence control, emergency response, beneficial reuse of dredged material, mitigation and net habitat enhancement, program management, oversight, and coordination.

Delta Risk Management Strategy

The Delta Risk Management Strategy (DRMS) has the objective of evaluating ongoing and future risk of levee failure; identifying the probable consequences; and identifying levee maintenance and upgrades that are necessary and economically justified to reduce controllable risk. Data gained from this critically important study will help establish the priorities for near-term and long-term actions that will reduce the risk associated with catastrophic levee failure in the Delta.

Levee System Integrity – Suisun Marsh

Levees in the Suisun Marsh were included in the ROD within the scope of the Levee System Integrity Program for purposes of considering whether levees within the Suisun Marsh may need repair or improvement to accomplish other CALFED objectives (e.g., ecosystem restoration and water quality). However, the CALFED Agencies have not made commitments to accept any responsibility or provide any assistance for maintaining the stability of the Suisun Marsh levee system through their inclusion in the Levee System Integrity Program. However, this does not preclude any existing CALFED Agency agreements and commitments for Suisun Marsh levee maintenance or improvement. .

Suisun Marsh

The ROD focused on the Delta's levees but recommended a study to determine if the Suisun Marsh should be included as a Levee System Integrity Program action. There is no documentation showing a decision to include the Suisun Marsh levee system has been made. Below are the five commitment categories tailored to the Suisun Marsh:

- **Provide Base Level Protection.**

Provide funding to participating local levee maintaining agencies to reconstruct selected Suisun Marsh levees to a suitable base level of protection, not necessarily the PL84-99 standard.
- **Implement Special Improvement Projects.**

Provide funding for projects that enhance protection beyond base level protection for key levees that protect public benefits such as water quality, life and personal property, and local and statewide infrastructure.
- **Implement a Levee Subsidence Control Plan.**

Develop "best management practices" to minimize the risk to levee integrity from land subsidence.
- **Implement a Levee Emergency Management and Response Plan.**

Enhance the emergency management response capability of local, State, and Federal agencies to rapidly respond to levee emergencies.
- **Suisun Marsh Levee Evaluation.**

The Delta Risk Management Strategy will consider the Suisun Marsh and the output of that assessment will be included in the Suisun Marsh Plan (SMP)

Full implementation of the Suisun Marsh portion of the CALFED Levee System Integrity Program awaits completion of the Suisun Marsh Charter, independent funding and authority in the Water Code or other law for the program authorization.

Targets:

Following are the ROD Elements and Stage 1¹ Actions for the Delta; actions for the Suisun Marsh will be developed during preparation of the SMP.

Delta Levee System Integrity Program and Stage 1 Actions

Element		
	Stage 1 Action	Current Plan
Base Level Protection (PL84-99) <i>Levee Maintenance</i> <i>Levee Improvements</i>	200 Additional Miles <i>None</i> <i>None</i>	Minimize Risk of Levee Failure Delta-Wide <i>Minimize Risk of Failure through levee maintenance</i> <i>Improve Flood Protection and Levee Stability.</i>
Special Improvements beyond PL84-99 <i>Levee Improvements</i>	None <i>None</i>	Improve levee stability on critical Delta islands as funding allows <i>Improve levee stability on islands providing multiple benefits</i>
Levee Subsidence Control Plan <i>Other Components - Subsidence</i>	None <i>None</i>	Continue multiple studies <i>Continue Subsidence Control Studies and Support</i>
Levee Emergency Response Plan <i>Other Components – Emergency Response</i>	Dec 2000 <i>None</i>	Plan is in place; work is continuing <i>Continue Development and Testing of Emergency Response System</i>
Delta Risk Management Strategy <i>Other Components DRMS</i>	End of Stage 1 <i>None</i>	Contract Phase 1 is complete <i>Incorporate results from Phase 1 into the Delta Risk Management Strategy</i>

The goals of the Levee System Integrity Program contained in the ROD were well founded when developed. However, the DRMS will reevaluate those goals to determine if they remain valid.

In the interim while the DRMS study is being completed, the program will continue to implement levee maintenance, levee improvement, and other components.

Levee Maintenance Targets

Levee maintenance work is necessary to attain base level protection and to preserve the existing Delta levees in their current configuration. Without maintenance, these levee structures will erode, settle, and, ultimately fail. In time, the Delta would become an inland sea. Preventing the formation of this inland sea requires regular monitoring, repair, and restoration from reclamation district staff and other cooperating agencies.

Levee maintenance has required a cooperative effort among local agencies, DWR, DFG, USACE, and regulating agencies. This approach has evolved over the 30+ years the Delta Levees Program has been in existence and has resulted in a levee system that is better able to resist the effects of high water and high winds.

¹ CALFED Stage 1 refers to the first 7 years of the CALFED Program which correspond to State Fiscal Years 2000-01 through 2006-07.

Levee Improvement Targets

Levee improvement will enlarge the existing levees and improve flood protection for the many assets in the Delta. Improvements will include the PL 84-99 standard (Base Level Protection) and may exceed this standard for islands with critical need. Improving levees to the PL84-99 standard will require slow progress over time. The soils in the Delta are weak and achieving base level protection will require many years to strengthen the foundation and increase the levee height. The necessary steps to improve the levees to the PL84-99 standard include placement of a significant volume of fill over compressible foundation soils, waiting until the foundation gains strength, then building a stabilizing berm, and, finally, increasing the crest elevation. The additional fill will stress the foundation and could result in cracking, settlement, and seepage. The work must be done carefully and the effects on levee stability must be fully analyzed. Achieving base-level protection will require careful concern for these fragile structures and must be done deliberately so as not to damage the very system we intend to preserve and strengthen. Attaining levee improvements can be safely accomplished only with careful planning and slow progress; this requires, long-term adequate and consistent funding.

Improvements beyond the PL84-99 standard, where appropriate, will follow or complement the completion of Base Levee Protection provided the program is extended and funding is available.

Program actions, using the current limited and variable funding, are targeted at preserving the progress achieved to date and minimizing the risk of levee failure rather than attaining a set quantity of miles of levee improved to the PL84-99 standard. This approach of reducing the risk of levee failure is the logical method of continuing to achieve the State's legislative intent, to preserve the Delta as it exists, while working toward the CALFED goal of achieving Base Level Protection.

If and when State and federal funding levels improve, there will be a need for the corresponding local capability to cost share to meet CALFED objectives. The ability of the local reclamation districts to share the cost of a larger program, as envisioned in the ROD, remains in question. To be consistent with the concept of beneficiary pays, the local costs should be assessed not only to levee maintaining agencies, but, also to others benefiting from the Delta's levees including the boating public, water exporters, habitat communities, and other users. Social and urban development stresses are also an ongoing issue within the Delta.

Other Components – Subsidence Control Targets

Subsidence control remains an elusive goal. Like other CALFED programs, contracting and funding constraints have stalled ongoing studies and threaten new studies or projects. However, plans are being developed to implement a large-scale demonstration project that uses the state of knowledge to slow or reverse subsidence. A set of best management practices continues to be a future objective.

Other Components – Emergency Response Targets

The emergency response plan was tested and proved during the response to the Upper Jones Tract Levee failure which occurred on June 3, 2004. The emergency response system worked well; however, we continue developing emergency plans to refine and improve the overall response capability. Emergency Response/ Preparedness is an ongoing activity that will continue in order for it to remain effective.

DWR staff is working with local agencies and Delta counties to assure all agencies have SEMS compatible emergency response plans, to more fully develop the Delta-wide asset management system, and to provide additional emergency response supplies.

Federal funds have been requested under the Hazard Mitigation Grants Program to address Delta levee investigation issues. The requested funding is to support electro-magnetic anomaly survey of the levees in the Delta to look for zones of high seepage, voids, or artifacts buried in the levee. We are hopeful funding will be available for use in summer 2005.

Other Components – Levee Risk Assessment

A Levee risk assessment study was initiated to quantify the risk to Delta export facilities resulting from multiple seismic-induced failure of Delta levees, and to develop a strategy for reducing and managing these risks. The study has produced significant work products including an improved hydraulic model of the Delta, an evaluation of the emergency response system, and a definition of typical breach configurations. Early results of this study have shown there is a need to examine current policies for preserving and improving the levees in the Delta and Suisun Marsh and that initial study has been expanded and modified to become the DRMS.

The DRMS will explore many facets of the existing Delta infrastructure and ecosystem including risk factors, hydrodynamics, beneficial uses, state economics and risk reduction strategies. The outcome of the DRMS will be current information for involved agencies, leading to better policy to guide the use of program funds intended to attain reductions in the risk of levee failure. The DRMS study is commencing with phase 2 of the levee risk assessment and will analyze the effects of multiple levee failures on through-Delta-conveyance and water quality.

Other Components – Net Habitat Enhancement

Statute requires that program expenditures are consistent with a net long-term habitat improvement program and have a net benefit for aquatic species in the Delta. The CALFED Levee System Integrity Program does ensure that this requirement is met for all projects under the Subventions and Special Projects Programs. The levee program has a demonstrated ability to achieve ecosystem benefits, thus assures net habitat enhancement, by working cooperatively with local reclamation districts to minimize environmental impacts, mitigate all unavoidable impacts, and construct enhancements that directly improve habitat for target species at specific sites throughout the Delta.

Other Components – Public Outreach

The Levee System Integrity Program conducts regular public outreach through monthly meetings of the Delta Levees and Habitat Advisory Committee and the California Bay-Delta Public Advisory Committee, Levees and Habitat Subcommittee and through participation in occasional workshops throughout the year. These meetings and workshops provide opportunities for public input to program priorities, schedules, and actions. These are effective forums for public input to the CALFED process and provide both stakeholders and the public at large an opportunity to affect program outcomes. The Delta Levees and Habitat Advisory Committee and the California Bay-Delta Public Advisory Committee, Levees and Habitat Subcommittee are effectively coordinating the Levee System Integrity Program Element with other CALFED Programs. .

Accomplishments

Provide Base Level Protection – Levee Maintenance

During Fiscal Year 2004-05 the program worked cooperatively with levee maintaining agencies in the Delta to preserve more than 600 miles of eligible project and non-project levees in the Sacramento – San Joaquin Delta. Maintenance includes routine annual maintenance, fish and wildlife expenses, emergency response, repairs to restore the levee crest, slope protection, levee patrolling, repair of slips and scarps, and the associated engineering and construction costs. Any unavoidable impacts to habitat were fully mitigated.

Provide Base Level Protection – Levee Improvement

Through cooperative effort among local, state, and federal interests the program has improved more than 43 levee miles for stability and overtopping. Improvements include raising selected sections of levee crest to new levels, up to the PL 84-99 standard. Significant projects were undertaken on Sherman, Bradford, and Jersey Islands and at Webb Tract. Continuing consolidation of the foundation will reduce the crest elevation of these levees over time and additional work will be required before the levee sections will stabilize at the upgraded standard. Additional work of note was performed within the Subventions Program on McDonald and Quimby Islands. All work completed with program funds was fully mitigated, resulting in no net loss of habitat

Special Improvement Projects – Levee Improvement

Special improvement projects are projects which will raise the levee crest above the PL 84-99 standard. This is to be completed only on islands with broad statewide significance. The Department of Water Resources has completed no projects of this nature and is currently giving a high priority to funding projects that raise deficient levees on critical islands to more modest standards. The existing backlog of deficient levee sections has taken all available funding.

Other Components – Net Habitat Enhancement

The cooperative efforts obtained in the LSI Program have resulted in the creation of approximately 33 acres of riparian and wetland habitat along with 16,000 linear feet of Shaded Riverine Aquatic habitat in the Delta. Islands where this habitat enhancement has occurred include Decker, Twitchell, Webb Tract, and McCormack Williamson Tract. The Program has significant other habitat enhancements planned for Miens Landing, Dutch Slough, and Sherman Island.

All Other Components - Subsidence Control Plan

Subsidence is the phenomenon that causes the Delta land surface to sink and the islands to become holes in the water surrounded by earthen levees that keep the rivers from flooding in. Subsidence and the methods leading to its reversal have been studied for several years on Twitchell Island under grants from the CALFED Levee System Integrity Program. These studies have shown that it is possible to stop subsidence by shallow flooding and that it is possible to begin reversing its effects by growing aquatic plants. Additional studies in-progress show promise for further increases in land surface elevation through dispersing silts and soils over the fallen aquatic plants.

While these methods may hold some promise for the future, there is a continuing loss of 35,000 cubic

yards of peat soils daily resulting from business as usual, including pumping the islands to keep them dry for beneficial uses. There are ongoing studies that continue to evaluate subsidence reversal techniques. However, the Department of Water Resources recognizes the ongoing problem of subsidence and will establish a leadership role in its control and reversal on islands and in areas they own.

Larger scale subsidence control and subsidence reversal demonstration projects will provide real opportunities to determine suitable best management practices to minimize the loss of organic soils and reverse the subsidence trend. Commencing in 2005 selected plots of Department-owned land will be taken out of production and shallow-flooded to stop organic soil loss. As techniques for subsidence reversal show promise, they will be applied and evaluated for commercial application in an attempt to determine the best set of land management practices that will keep the Delta productive and stop the ongoing subsidence.

The Department of Water Resources continued working with the USGS on a demonstration project on Twitchell Island to determine relationships between biomass accumulation, sediment deposition, and water management and to delineate priority areas on the island for subsidence control.

All Other Components - Emergency Management and Response Plan

The Department of Water Resources implemented emergency response activities for the flooding of Upper and Lower Jones Tract. The breach was successfully closed, wave wash protection installed to protect the interior of the levee, and pump out was effected through activation of the emergency response plan developed within the Delta Levees Program. The Department participated in additional emergency actions which occurred on Twitchell Island, Van Sickle Island, Bradford Island, and on Simmons-Wheeler Island in the Suisun Marsh. Program staff continues to work with local levee maintaining agencies to provide funds and technical support for emergency measures necessary to prevent overtopping, erosion, and flooding of Delta and some Suisun Marsh islands.

All Other Components - Delta Levee Risk Assessment

The Levee Risk Assessment (LRA) Contract for Seismic Risk Management Analysis has completed the Phase I tasks. These include assembling a Levee Risk Assessment Team of qualified professionals; developing the analytical approach for the study; identifying the Delta systems and assets, defining the seismic hazard and consequences of system failure; and defining the scope of a formal quantitative risk assessment. The results of the study have highlighted additional risk potential from the current configuration of levees in the Delta and indicate a need to better understand the origin of the risk, identify consequences, and provide insight to cost effective means of reducing or controlling that risk. Phase II of the contract will be awarded in the fall of 2005 and the work will be incorporated into the Delta Risk Management Strategy.

Tasks finished, behind, or on schedule – Levee Maintenance and Levee Improvement

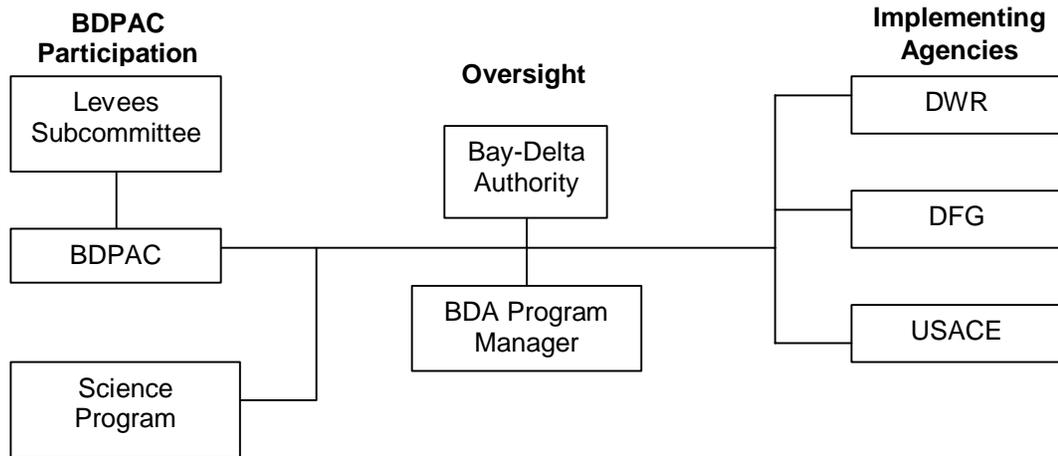
The Stage 1 goals for Levee System Integrity are included in the table on page 2. Each of the actions, except beneficial reuse, is significantly behind schedule. Though contracting difficulties can account for some of the delay in certain elements, it is the absence of adequate, sustained matching funds from the State and federal government sources that is the primary cause for this program's delay.

The current progress toward achieving Base Level Protection is falling behind because the available funding is used for maintenance, in an effort to preserve the levees for future enlargement. Over the past 5 years the local agencies have been spending their funds that were available for levee improvements to pay the pro-rata charge and cost share on maintenance.

Where the program has obtained significant levee improvements, many of the levee improvements were obtained in great extent through local monies. When taken in the aggregate, Levee System Integrity has provided only about 50% of the cost of achieving the maintenance and improvements to the levee system, not the 75% indicated in many CALFED documents. By supporting local districts at the 50% rate, rather than at the 75% rate, the program is less able to achieve the goals stated in the ROD.

<u>Element</u>	<u>Status</u>
Base Level Protection -----	Significantly behind schedule
Special Improvement -----	Not Started
Subsidence Control Plan -----	Behind Schedule
Emergency Response -----	On Schedule
Delta Risk Assessment -----	Behind Schedule

Program Structure



Agency	Roles and Responsibilities
California Bay-Delta Authority	<ul style="list-style-type: none"> • Oversight
Department of Water Resources	<ul style="list-style-type: none"> • Program management • Subventions • Special projects • Subsidence • Emergency response • Beneficial reuse • Risk assessment • Suisun Marsh
U.S. Army Corps of Engineers	<ul style="list-style-type: none"> • Program management • Base Level Protection and Special improvements • Emergency response • Beneficial reuse
Department of Fish and Game	<ul style="list-style-type: none"> • Program management • Subventions environmental review • Special projects environmental review • Preserving/Improving net Delta habitat
Reclamation Districts	<ul style="list-style-type: none"> • Planning • Levee Maintenance • Levee Improvements • Habitat Mitigation • Emergency Response

Major Activities

Major activities include Levee Maintenance, Levee Improvement and Other Components. These activities are all carried out through a cooperative effort among participating agencies, using local funds and additional funds provided by the state and federal governments through the program. It is these additional program funds that provide the means for accomplishing the major levee work, conducting the studies, paying for development of emergency response functions, and other program attributes. The funding for the Levee System Integrity Program should be consistent, at a level that provides incremental improvement; however, it has varied significantly over the years of Stage 1. The ROD provided a theoretical budget and corresponding targets that would allow the program to achieve base level protection for 200 additional miles of Delta levee and accomplish other goals. The historic funding received within the program is approximately 30% of the ROD targets. This funding level has preserved the Delta, but denied it the improvements promised in the ROD. The uncertainty in program funding has required that some goals be revised downwards and schedules be extended.

Currently, CALFED is working on a 10-year finance plan. The draft plan shows state funding is being reduced or eliminated at a time when it is unlikely that federal funding would be increased. This plan to reduce the existing state participation will result in ongoing risk of levee failure and reduction in the amount of work completed for levee maintenance and levee improvement. It will also mean loss of experienced program staff from DWR and DFG that have well established working relationships and a successful history. The loss of state funding does, however, provide an opportunity for the Corps of Engineers or other federal agency to assume a greater leadership role in the Delta and bring new criteria and procedures with which to accomplish CALFED goals.

In Year 6 (State fiscal year 2005-06) the program will continue to implement the program according to well established priorities.

Levee Maintenance

The Subventions Program will provide funding for maintenance activities to preserve the existing levees, protect individual islands, and provide a base upon which to build when funding is increased. The Special Projects Program funding will be used to make improvements to critical levee stability, and to fund the "Other Components" portion of the CALFED LSIP. This funding assures habitat enhancements, implementation of beneficial reuse, and improvements to the emergency response as opportunities arise and to the extent allowed by available funding.

Levee Improvements

Though some improvements are obtained with local funding only, program funding for levee improvements above the PL84-99 standard will wait until the critical levee needs are resolved.

Other Components

State operations funding will allow researchers to continue the ongoing study of subsidence and economical methods to reverse it.

Funds redirected from local assistance will be used to conduct the Delta Risk Management Strategy² that will increase our understanding of the risks to levee structures present in the Delta and provide insight on how best to manage that risk.

Staff from DWR and DFG will continue making improvements in supplies, planning, coordination effort and other means to make improvements to the emergency response system.

Current year funding available for Beneficial Reuse is from the Special Projects Program budget and is limited to participation in a Delta Long-Term Management Strategy for beneficial reuse of dredged material and other activities that are economically justified.

Special Projects funding will continue to be used to provide net habitat improvement benefits as available funding allows.

Staff from DWR and DFG will begin a comprehensive assessment of the Suisun Marsh levee system as a component of the SMP using funding provided by the involved departments.

Provide Base Level Protection – Levee Maintenance

The CALFED Program element of Base Level Protection is implemented incrementally with significant planning, coordination, contracting, scientific investigation, and cost sharing with local agencies. The Subventions Program works closely with these agencies and other local interests to provide regular levee inspections by qualified private engineering firms, timely repairs, re-establishment of crest elevation lost to consolidation, and incremental enhancements to stability that will, over time, result in attaining the CALFED goals, provided that there is adequate, consistent, and timely funding.

Local support is strong for the Subventions Program as evidenced by the historic cost sharing of 50% and not less than 25%.

Schedule: This is an annually recurring program and will continue for the duration of available funding to support the work.

Subventions Program – Continue to provide financial assistance to local agencies for preservation and rehabilitation of non-project Delta levees and project levees within the primary zone consistent with no net habitat loss and long-term net habitat improvement. Achievement of Base Level Protection is possible over time with sufficient program funding.

Schedule: The ROD schedule is significantly delayed by funding shortfalls, limitations on local cost share funding, shortage of materials, and other problems. The program is preserving options for the future by continuing the maintenance and incremental improvement of the existing levees to the level allowed by available funding.

² The CALFED Levees and Habitat Subcommittee disagrees with this decision to use local assistance to pay for the Delta Risk Management Strategy.

Suisun Marsh Levee Maintenance – Work with interested parties to define funding needs and work within CALFED to obtain baseline allocations that will begin to provide financial assistance to local agencies for preservation and rehabilitation of Suisun Marsh levees consistent with no net habitat loss and long-term habitat improvement. Achievement of Base Level Protection is possible over time with sufficient program funding.

Schedule: Ongoing

Implement Special Improvement Projects – Levee Improvements

USACE Studies: HR-2828 promises a total of \$90 Million for support of Levee System Integrity. The U.S. Army Corps of Engineers will complete a preliminary study on use of the funds once sufficient funding is allocated to the Sacramento District for staff work associated with the study. It is due to congress 120 days after an allocation is provided and will establish the types of work intended to be accomplished with funding when it is provided by later legislation.

Schedule: Ongoing

Other Components - Implement a Levee Subsidence Control Plan

Subsidence reversal has been studied for several years on Twitchell Island under the CALFED Levee System Integrity Program. Studies have shown that it is possible to reverse subsidence by shallow flooding. However, problems associated with taking land out of agriculture, poor quality of the resulting young “peat soil”, and production of Tri Halo Methane (THMs) precursors (carcinogenic substances) require additional study before recommending a specific subsidence reversal plan. This study of peat growth continues with support from the program for maintenance of the ponds.

An additional study on dispersing silts and soils on fallen aquatic plants continues to be stalled due to contracting difficulties. The DWR is working to restore these contracts and continue this study.

Ultimately, subsidence reversal best management practices must reflect the outstanding scientific investigations that lead to the best implement able practices that can be applied directly adjacent to levees as fully coordinated with the outcome of the risk assessment study and cost sharing with local agencies.

Schedule: DWR is working to extend the contracts for subsidence reversal. Studies are ongoing to determine methods of subsidence reversal that are compatible with existing Delta activities. Current methods for subsidence reversal preclude much of the agriculture in the Delta and create water quality problems with THMs.

Suisun Marsh Levee Subsidence Control – Work with interested parties to obtain funding for pilot projects in the Suisun Marsh such as tidal wetlands restoration, muted-tidal, or alternative seasonal diked wetlands management strategies to assess subsidence reversal. Also continue economically justified reuse of dredge material in the Suisun Marsh.

Schedule: Ongoing

Reuse of Dredge Material – The continued reuse of dredge material to increase levee stability and for habitat enhancement has become more restrictive due to increasingly-rigorous water quality standards. Again this year the Central Valley Regional Water Quality Control Board has made a finding that increase costs and limits the reuse of dredged material for levee stability or habitat improvements. Costs for acquiring and reusing dredged material exceed the cost of purchasing commercial borrow for Levee System Integrity Program projects. Continuation of this portion of the program is being reevaluated to determine if it is cost effective for the program.

Schedule: This element is on schedule achieving approximately 60% of the ROD commitment. The program remains committed to use available dredged material to strengthen levees wherever it is allowed and proves to be cost effective

Other Components -Implement a Levee Emergency Management and Response Plan

The program's involvement with the local levee maintaining agencies and the 6 counties with Delta jurisdiction proved valuable during the recent failure of the Upper Jones Tract levee on June 3, 2004. The supplies of flood fight materials purchased by the Levee System Integrity Program were utilized along with a version of the Delta Area Command. The emergency response organization was staffed, at various times, by the local agency and their engineer in cooperation with more than 40 federal, state, and local governmental agencies. Notable help was provided by Governor Arnold Schwarzenegger and President Bush. In addition, several private contractors, the American Red Cross, and other non-government participants were involved.

CALFED's Levee System Integrity Program will continue our leadership role and work to fully develop this SEMS-compatible flood fight capability with the cooperation of the local agencies and the State OES.

The program's implementing agencies continue to work independently and with Delta reclamation districts to develop a model for mutual cooperation and conduct of future flood fights in compliance with SEMS. Though the distribution of the sample emergency response plan was significantly delayed by action at Upper Jones Tract, Twitchell Island, and Van Sickle Island, we remain committed to working on sample emergency response plans for dissemination to the 62 reclamation districts to foster the development of a coordinated Delta-wide response.

The first few hours of any flood fight are critical to saving the structure and what it protects from inundation. In the interest of having supplies on hand when needed, the program will renew its plan for 2006 to locate up to ten truck and helicopter-transportable flood-fight boxes, complete with basic supplies, throughout the Delta, pending adequate funding and contracting authority.

Schedule: Emergency management and response are ongoing functions that are refined, practiced and improved on an annual cycle. The program remains committed to continue these activities for the duration of available funding.

Delta-wide Asset Management System – Continue work on formal agreements for establishing mutual aid during flood fights between six Delta counties and the state Office of Emergency Services.

Schedule: The plan is largely in place; work will continue to maintain relationships, preserve effective communications, and exercise the Delta-wide asset management system.

Standardized Emergency Management System (SEMS) - Organize teams and conduct exercises with various reclamation districts, Delta Area Command, Flood Operations Center, Department of Forestry and Fire Prevention, and Civilian California Conservation Corps to encourage continuing enhancement of specific SEMS-compatible emergency response plans.

Schedule: Teams are organized; training continues and must be ongoing.

Pre-positioned Assets – Acquire and distribute 10 flood fight boxes and materials, including 100,000 sandbags, plastic sheeting, wood stakes, and hand tools to key areas.

Schedule: Completion Summer 2006

Suisun Marsh Levee Emergency Management and Response Plan – Work with interested agencies to enhance local coordination and support existing activities. Continue development of this Suisun Marsh Levee Emergency Management and Response Plan..

Schedule: Emergency management and response are ongoing functions that are refined, practiced and improved on an annual cycle. The program remains committed to continue these activities for the duration of available funding

Other Components - Perform a Delta Risk Management Strategy

The Delta Risk Assessment contract was awarded in 2003 and Phase 1 work has been completed. Preliminary results of this study have shown the state to be at significantly elevated risk from specific multiple failure scenarios. To better understand the nature and magnitude of this risk the original study has been revised into the Delta Risk Management Strategy. This new contract will be awarded in 2005. It will incorporate the results of Phase 1 of the Delta Risk Assessment and expand to provide comprehensive understanding of Delta hydrodynamics, risks associated with seismicity, emergency response capabilities, operational constraints, and other aspects associated with catastrophic levee failure. The results of this study will be use to form the basis of multiple agency support for specific actions in the Delta to reduce the controllable risk from levee failure. It will quantify resulting consequences, and articulate a strategy to manage the risk. The scope of this contract will consider the Suisun Marsh levees to determine the consequences of failure. Agencies involved with the Suisun Marsh will use information from this study to develop recommendations for the disposition of Marsh levees, and assess strategies to minimize the threat.

Schedule: Ongoing

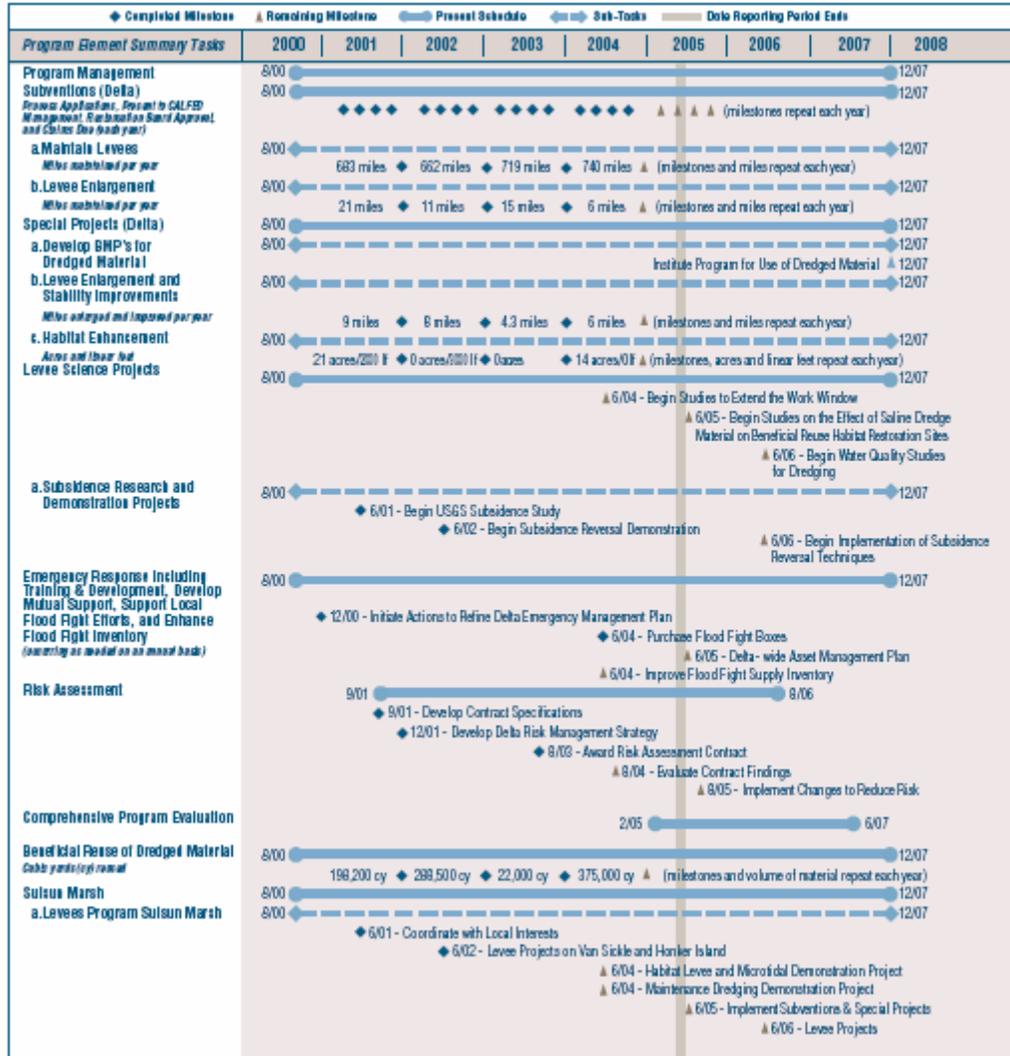
Special Improvement Projects- Levee Improvements

Habitat Improvement: The California Bay-Delta Levee System Integrity Program provides significant improvements to Delta habitat. The program has restored a portion of Decker Island to tidal marsh, it has active projects on Bradford, Medford, Sherman, and Jersey Islands within the Delta and on Miens Landing in the Suisun Marsh. Planning is ongoing for habitat improvement projects on McCormack Island and at Grizzly Island. The Levee System Integrity Program projects work with local agencies to achieve habitat enhancements at favorable prices.

Schedule: Ongoing

Schedule

LEVEES



Integrating Science, Environmental Justice, and Tribal Relations

Science:

Studies and research: Subsidence processes and reversal analyses are ongoing in the program and will continue, as funding allows.

Analysis of existing data: Data gathered from past ecosystem enhancements is used to revise current designs and improve on overall performance.

Science Communication: Staff Environmental Scientists and engineers from the program have participated in CALFED science presentations, meetings with stakeholders, and other groups to expand the knowledge base of interrelationships existing in the Delta and Suisun Marsh.

Monitoring (including for Performance Measures): Monitoring has been conducted outside the program and results of others efforts used to adjust current designs.

Peer review: Independent technical review of proposals and products (including articles, reports, recommendations, studies, or other products)

Use of Science Boards and technical experts: Program and project level review of ongoing and proposed actions; identification of knowledge gaps and information needs to help set program priorities. Can include work by science consultants.

Cross-program science coordination: Delta Levees Staff have taken the lead on several ERP Science grants, including Flooded Islands, and Subsidence Reversal projects. We are cooperating with others to complete LiDAR surveys of the entire Delta.

Estimated funding for science portion of this activity: Approximately \$6 million of program funds will be used to pay costs associated with the Comprehensive Program Evaluation. Additional funding is provided on an annual basis for subsidence studies, developing GIS data, and completing habitat enhancement projects. Future funding for these efforts is highly dependant upon receipt of State funding.

Levee System Integrity

Major program activities, Years 6-9	Studies and research	Analysis of existing data	Science Communication	Monitoring	Peer review	Use of Science Boards and technical experts	Cross-program coordination (note which program)	Estimated funding for science portion of this activity
Habitat Development : Decker Island Phase I	X		X	X				\$45,000
Habitat Development : Decker Island Phase II	X	X	X	X		X	X	\$60,000
Habitat Development: Twitchell Island Setback Levee				X			X	\$9,500
Habitat Development : Sherman Island Parcel 11							X	\$29,000
Habitat Development : Bradford Island, Parcel 19			X	X			X	\$35,000
Habitat Development : Sherman Island Setback Levee	X	X	X	X	X	X	X	
Subsidence Reversal Program	X			X				
Habitat Development: Dutch Slough								
Levee Maintenance		X		X				\$100,000/yr
Levee Enlargement		X		X		X		Not Determined
Data Collection	X	X				X		\$50,000
Conceptual Alternative Designs and Feasibility Report	X	X	X			X		\$285,000
Environmental Impact Analysis	X	X				X	X	\$300,000
Adaptive Management	X	X	X	X	X	X	X	Not Determined
Habitat Development		X	X	X	X	X		Not Determined
Delta Risk Management Strategy								
Remote Sensing Techniques – Magnetic Anomaly								
Emergency Preparedness and Response								

Habitat Development: Decker Island Phase 1. Beginning with 15 acres, this project is the first of two phases that ultimately re-establishes and enhances approximately 34 acres of both wetland and upland habitats on DFG-owned land to contribute to achieving the habitat enhancement requirements of the Levee System Integrity Program; located on the Sacramento River at Horseshoe Bend; combines habitat development with levee rehabilitation on nearby Islands; DFG biologists conducting fish utilization study under permit; staff presents project information at conferences and workshops; DFG evaluation of channel bed configuration over time to guide future restoration or enhancement efforts; success criteria applied to monitoring of habitat development; maintenance and monitoring of plant success and control of invasive plant species.

Habitat Development: Decker Island Phase 2. Continues re-establishing and enhancing approximately 34 acres of both wetland and upland habitats to contribute to achieving habitat enhancement requirements of the Levee System Integrity Program on an additional 15 acres of the DFG property. DFG biologists conducting fish utilization study under permit; staff presented project information at Delta Levee Workshop; DFG evaluation of channel bed configuration to guide additional restoration or enhancement efforts; success criteria applied to monitoring of habitat development; maintenance and monitoring of plant success and the control of invasive plant species; committee of scientists reviewed conceptual models for project; USGS proposed grant to study aquatic weeds and fish (not granted funds in the last PSP).

Habitat Development: Twitchell Island Setback Levee. This levee widening and habitat creating project is a 3,000 foot long setback, where the levee was widened by 100 feet, the original levee planted with a variety of riparian forest, scrub shrub, and herbaceous species, and a channel created behind this levee; monitor results of program efforts to develop and evaluate performance measures; DWR and DFG scientists continue to review progress in years 5-10 after initial planting.

Habitat Development: Sherman Island Parcel 11. A habitat mitigation project to restore fourteen (14) acres of historic wetland and upland habitat types; monitoring to achieve long-term sustainability with specific habitat goals; success criteria applied to monitoring of habitat development.

Habitat Development: Bradford Island Parcel 19. A habitat mitigation project to develop 49 acres of wetland and upland habitats on the interior of Bradford Island; approved by the Delta Protection Commission; proposed experimental design to develop historic dune scrub habitat; specified success criteria applied to monitoring habitat goals and development.

Habitat Development: Sherman Island Setback Levee. Project combines levee rehabilitation and contributes to Levee System Integrity Program habitat enhancement with approximately 4,000 linear feet of upland and intertidal habitats; designed to benefit various native and sensitive species; long-term monitoring to ensure successful habitat development.

Subsidence Reversal Program. Determination of the interrelationship of biomass accumulation and sediment deposition and estimate the time to build up land surface elevations to tidal range using different methodologies; analyses of the effect of subsidence reversal techniques on water quality.

Habitat Development :Dutch Slough. A tidal wetland restoration project on 1,166 acres of ranch land in the western Delta. Project goals: 1) provide shoreline access, educational and recreational opportunities; 2) benefit native species by re-establishing natural ecological processes and habitats; 3) and contribute to scientific understanding of ecological restoration by implementing the project under an adaptive management framework. Project partners include the California Coastal Commission, the Natural Heritage Institute, the California Bay-Delta Authority, and the City of Oakley. Following are ongoing project activities:

Levee Maintenance: Conduct routine inspection activities on waterside and landside of existing levees by local Reclamation District 2137 to identify potential risk issues and implement necessary maintenance activities (i.e., vegetation, rodent, and erosion control).

Levee Enlargement: Search for availability of suitable fill, including dredge reuse, to design, construct, and monitor “wildlife friendly” levees on portions of the restoration site to enhance the landside habitat element.

Conceptual Alternative Designs: Complete the evaluation of a set of alternative restoration design concepts and the associated feasibility report to select a preferred design that will be used for the environmental document and construction plans.

Data Collection: Conduct and complete studies to fill identified data gaps needed for the environmental review and engineering analyses.

Environmental Impact Analysis: Prepare a CEQA/NEPA EIR/EIS and conduct associated meetings. Activities will include scoping documents, notice of preparation, administrative draft and final EIR/EIS as well as a mitigation and monitoring report and environmental permitting activities and consultations (via ASIP).

Habitat Development: Based on selection of the preferred design of habitat types and elevations, start on site-construction of earth-moving activities (cut & fill), including levees, dendritic channels, infrastructure, and planting prior to breach-opening.

Adaptive Management: Develop a comprehensive adaptive management plan. Monitor results of program efforts to develop and evaluate performance measures and conduct applicable maintenance activities consistent with the goals of the project and the adaptive management plan.

Proposed strategy for developing a “science-based” approach to Levee System Integrity Program actions

Continue Subsidence studies and subsidence reversal studies on Twitchell Island.

Offer “science questions” relevant to levee system integrity to researchers.

Seek independent peer reviews from the California Bay-Delta Authority Science Program and stakeholders

Continue the Levee Risk Analysis contract, Phase II and the Delta Risk Management Strategy.

Test engineering techniques for use in monitoring Delta Levees including electro-magnetic anomaly detection and electrical conductivity monitoring.

Science Questions

The current list of science questions was generated by the Delta Levees and Habitat Advisory Committee and arose from ongoing issues associated with levee maintenance and improvement activities. The Levee Program staff and the Bay Delta Public Advisory Committee (BDPAC) Levee Subcommittee will reconsider the original questions and develop a revised list in coordination with the California Bay Delta Science Program.

1. How effective are the existing work windows?

2. What is the definition of shallow water habitat?

3. How should the effectiveness of restoration efforts on riparian, wetland, and aquatic habitat be monitored and evaluated?

4. Are all the waters of the legal Delta critical habitat for the Delta Smelt?

5. What are the chances of success of net habitat enhancement projects in different locations?

6. Under what conditions is it appropriate to use rock placement to improve fish and wildlife habitat?

7. How can dredged materials be incorporated into levee and habitat projects in a manner that complies with RWQCB requirements?

Environmental Justice:

By preserving and enhancing levee stability, the Levee System Integrity Program is promoting the fair and equitable treatment of people of all races, cultures, and incomes living and working in the Delta. The levees protect the homes and jobs of all communities equally. Through its environmental enhancements the Levee Program also improves opportunities for subsistence hunting and fishing.

Through its basic function the Levee System Integrity Program incorporates environmental justice.

Tribal Relations:

There currently are no federally recognized tribes in the Delta region. However, if a federally recognized tribe is identified in the future, the Levee Program will, with assistance from CBDA's tribal coordinator through tribal briefings and the govt-to-govt consultation process.

Public Involvement and Outreach

Delta Levees and Habitat Advisory Committee meetings are held monthly to promulgate program information, address deficiencies, and discuss issues. These meetings are highly effective in surfacing issues, gaining consensus, and providing a base for making program changes.

CALFED Levees and Habitat Subcommittee meetings are conducted monthly and deal with issues specific to CALFED including funding, program plan, annual report, cross element coordination, and others.

Cross-Program Relationships

Solving the complex issues facing the Delta and Suisun Marsh requires extensive integration. For example, achieving levee element goals in isolation does not address hydrodynamic changes which can affect water quality, tidal marsh restoration, or fish migration. Furthermore, projects to address seismic risk, potential THM precursor reductions and water supply conveyance needs will require modifications to the levee system to be consistent with those needs.

Storage Program - The Delta Wetlands Project (aka In-Delta Storage) is part of CALFED's Storage Program. It consists of 20,000 acres located on four Delta islands, contained by 56 miles of levees. A great deal of analysis has been done on the project that may be useful to the Levee System Integrity Program. That work includes consideration of both levee design and land use changes. It is an example of how a cross-program look at levee issues can benefit the Levee System Integrity Program.

Of specific interest to the Subcommittee are the following reports:

- a.. Draft In-Delta Summary Report (a summary of the other 17 reports)
- b.. Risk Analysis Report (dealing with levee failure and other risks)
- c.. Embankment Design Analysis Report
- d.. Seismic Analysis Report
- e.. Flooding Analysis Report
- f.. Results of Geologic Exploration Program
- g.. Draft Engineering Investigations Summary
- h.. Draft Environmental Evaluations

Ecosystem Restoration Program – The Levee System Integrity Program has achieved notable success in preserving existing habitat and developing new habitat in the Delta and Suisun Marsh. There are additional opportunities to improve the amount, type and quality of ecosystem enhancement improvements through cooperation with other CALFED elements. The Ecosystem Restoration Program has common goals and objectives with the Levee System Integrity Program and partnership with them will facilitate net habitat improvements in the Delta. The USACE continues to support efforts and funding for the Cosumnes and Mokelumne Rivers Feasibility Study. The USACE supports the ongoing Feasibility Reports prepared in association with the State Reclamation Board and DWR for the Delta Special Studies.

Conveyance Program – The Delta levees are the borders of the channels for the water conveyance systems through the Delta. State-wide water conveyance abilities can be affected if a Delta or Suisun Marsh levee fails. A strong Levee System Integrity Program assures the viability of through-Delta conveyance; the program will remain strong as long as adequate, timely, and consistent funding is available. Levee System Integrity Program staff is committed to work with Conveyance Program staff to target critical projects and implement effective solutions. The USACE continues to support efforts and funding for the North Delta Improvements Project whenever a state or local partner wants to initiate the work.

Water Quality Program – The Delta and Suisun Marsh levees restrain the daily chloride contamination of export water for more than 23 million Californians and 7,000,000 acres of farmland due to tides. Water quality is preserved through preservation of the Delta's levees and improvement in water quality is a natural by-product of the maintenance, preservation, and improvement of the Delta and Suisun Marsh levee systems. Also, modification of selected levee systems within the Delta and Suisun Marsh can result in significant improvements to water quality. Levee System Integrity Program staff is committed to work with Water Quality Program staff to implement projects that are mutually beneficial.

Water Supply Reliability – Perhaps the weakest link in the delivery system for export water is the conveyance through the Delta. Without improvements to the Delta levees there is a continuing risk of levee failure that results in "flushing" fresh water from storage out to sea in order to preserve the salinity levels essential for export. A single levee failure on Brannan-Andrus Island in 1972 required more than 500,000 acre feet of fresh water to reduce salinity levels in the Delta and restore suitable water quality. The Upper Jones Tract levee failure required much less, but, still took a large amount of water releases to prevent salt intrusion into the central Delta. Through consistent levee maintenance, restoration, and improvements the risk of levee failure is reduced and the water supply is protected. Levee System Integrity Program staff is committed to work with Water System Reliability Program staff on projects of mutual benefit to both programs.

Funding

Levee System Integrity (\$ in millions)	Yr 6	Yr 7	Yr 8	Yr 9	Total
State ¹	\$18.80	\$4.00			\$22.80
Federal ²	\$0.20				\$0.20
Local ³	\$3.00	3.00	3.00	3.00	\$12.00
Water User ⁴	\$0.40	\$0.40	\$0.40	\$0.40	\$1.60
Available Funding Total	\$22.40	\$7.40	\$3.40	\$3.40	\$36.60
<p>1. State funds reflect the \$18.79m from the final enacted budget in Year 6 (FY 05-06) for the Department of Water Resources (DWR), Department of Fish and Game (DFG), and California Bay-Delta Authority (CBDA).</p>					
<p>2. Federal funds reflect President's budget for the U.S. Army Corps of Engineers (USACE). Federal appropriations beyond Year 6 are unknown.</p>					
<p>3. Local funding are estimated at \$3 million annually. The actual, historical reclamation district contribution for maintenance costs is significantly higher than shown for "Local". It has been approximately 50% of the total Subventions expenditures due to the historically unreliable State funding for the program. It should, also, be noted that the proposed funding levels in years 7 and 8 will still be insufficient to complete the total level of improvement envisioned in the CALFED Record Of Decision.</p>					
<p>4. Water user funding includes State Water Project funds that are collected from state water contractors but are budgeted and appropriated through the state government</p>					

Funding by Task

Levee System Integrity (\$ in millions)	Yr 6	Yr 7	Yr 8	Yr 9	Total
Subventions	\$11.20	\$5.00	\$3.00	\$3.00	\$22.20
Special Improvement Projects	\$7.60	\$1.00	\$0.40	\$0.40	\$9.40
Other Components	\$3.60	\$1.40			\$5.00
Available Funding	\$22.40	\$7.40	\$3.40	\$3.40	\$36.60
1. CALFED Levees and Habitat Subcommittee disagrees with using Subventions funding for the Delta Risk Management Strategy.					

Geographic Distribution

Levee System Integrity Projects are contained in the six counties making up the legal Delta and Suisun Marsh.

