



CALFED
BAY-DELTA
PROGRAM

Revised Phase II Report

December 18, 1998

7. Fund levee improvements up to PL84-99 in first stage (yr 1-7); e.g., proportionally distribute available funds to entities making application for cost sharing of Delta levee improvements.
8. Further improve levees which have significant statewide benefits in first stage (yr 1-7); e.g., statewide benefits to water quality, highways, etc.
9. Coordinate Delta levee improvements with Stage 1 water conveyance, water quality improvements and with potential conveyance improvements in subsequent stages (yr 1-7).
10. Enhance existing emergency response plans, approximately \$29 million in Stage 1 (yr 1-7); e.g., establish \$10 million revolving fund, refine command and control protocol, stockpile flood fighting supplies, establish standardized contracts for flood fighting and recovery operations, outline environmental considerations during emergencies.
11. Implement current BMPs to correct subsidence effects on levees. Assist CMARP activities to quantify the effect and extent of inner-island subsidence and its linkages to all CALFED objectives (yr 1-7).
12. Complete total risk assessment for Delta levees (yr 1-7) and develop and begin implementation of risk management options as appropriate to mitigate potential consequences. Available CALFED risk management options may include:
 - Improving emergency response capabilities
 - Developing storage south of the Delta
 - Reducing the fragility of the levees
 - Improving through-Delta conveyance
 - Releasing more water stored north of the Delta
 - Restoration of tidal wetlands
 - Controlling and reversing island subsidence
 - Curtailing Delta diversions
 - Continued monitoring and analysis of total risk
 - Constructing an isolated facility

Water Quality

The water quality program will consist of a wide variety of actions to provide good water quality for environmental, agricultural, drinking water, industrial, and recreational beneficial uses of water. The majority of current water quality actions rely on comprehensive monitoring, assessment, and research to improve understanding of effective water quality management and on the ultimate control of water quality problems at their sources. The Stage 1 water quality effort focuses on reducing constituents contributing toxicity to the ecosystem and affecting water users (including BOD) and on reducing total organic carbon loading, salinity, and pathogens that degrade drinking water quality. In addition, research and pilot studies are recommended to obtain information prior to implementation of some actions. CALFED is pursuing Stage 1

actions to continually improve public health through improvements in drinking water quality which include studies and investigations that will contribute to an assessment on the need for additional conveyance actions and/or other means of providing better quality source water.

1. Prepare project level environmental documentation and permitting as needed (yr 1-7).
2. Coordinate with other CALFED program elements to ensure that in-Delta modifications maximize potential for Delta water quality improvements (yr 1-7).
3. Continue to clarify use of and fine-tune water quality performance targets and goals (yr 1-7).
4. Conduct the following mercury evaluation and abatement work:
 - Cache Creek*
 - Risk appraisal and advisory for human health impacts of mercury (yr 1-5).
 - Support development and implementation of TMDL for mercury (yr 1-7).
 - Determine bioaccumulation effects in creek and delta (yr 1-4).
 - Source, transport, inventory, mapping and speciation of mercury (yr 1-7).
 - Information Management/Public Outreach (yr 5-7).
 - Participate in stage 1 remediation (drainage control) of mercury mines if federal Good Samaritan protection obtained (yr 3-5).
 - Investigate sources of high levels of bioavailable mercury (yr 4-7).
 - Sacramento River*
 - Investigate sources of high levels of bioavailable mercury, inventory, map, and refine other models (yr 3-7).
 - Participate in remedial activities (yr 7).
 - Delta*
 - Research methylation (part of bioaccumulation) process in Delta (yr 1-2).
 - Determine sediment mercury concentration in areas that would be dredged during levee maintenance or conveyance work (yr 3-7).
 - Determine potential impact of ecosystem restoration work on methyl mercury levels in lower and higher trophic level organisms (yr 3-5).
5. Conduct the following pesticide work:
 - Develop diazinon and chlorpyrifos hazard assessment criteria with DFG and the Department of Pesticide Regulations (yr 1).
 - Support development and implementation of a TMDL for diazinon (yr 1-7).
 - Develop BMPs for dormant spray and household uses (yr 1-3).
 - Study the ecological significance of pesticide discharges (using \$1.5 million of ERP funds) (yr-1-3).
 - Support implementation of BMPs (yr 2-7).
 - Monitor to determine effectiveness (yr 4-7).
6. Conduct the following heavy metals work:

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- Determine spatial and temporal extent of metal pollution (yr 3-7).
 - Determine ecological significance and extent of copper contamination (yr 1-3).
 - Review impacts of other metals such as cadmium, zinc, and chromium (yr 1).
 - Participate in Brake Pad consortium to reduce introduction of copper (yr 1-7).
 - Partner with municipalities on evaluation and implementation of stormwater control facilities (yr 2-5).
 - Participate in remediation of mine sites as part of local watershed restoration and delta restoration (yr 2-7).
7. Conduct the following salinity reduction work in coordination with the San Joaquin Valley Drainage Program:
- Develop and implement supply water quality management activities to improve supply quality (yr 1-7).
 - Develop and implement a management plan to reduce drainage and reduce total salt load to the San Joaquin valley (yr 1-7).
 - Encourage source reduction programs including tiered pricing, expansion of drainage recirculation systems, land management, and land retirement where other options are infeasible (yr 1-3).
 - Conduct pilot projects to evaluate the feasibility of water reuse, through agroforestry, of various concentrations of saline water (yr 4-6).
 - Study feasibility of desalination methods including reverse osmosis (yr 7).
 - Study cogeneration desalination (yr 7).
 - Implement real time management of salt discharges (yr 3-7).
8. Conduct the following selenium work:
- Conduct selenium research to fill data gaps in order to refine regulatory goals of source control actions; determine bioavailability of selenium under several scenarios (yr 1-5).
 - Research interactions of mercury and selenium (yr 2-3).
 - Refine and implement real-time management of selenium discharges (yr 1-7).
 - Expand and implement source control and reuse programs (yr 1-7).
 - Coordinate with other programs (yr 1-7); e.g., recommendations of San Joaquin Valley Drainage Implementation Program, CVPIA) for retirement of lands with drainage problems that are not subject to correction in other ways. (CVPIA alone will retire approximately 70,000 acres of land with selenium-caused water quality problems during time period of Stage 1.)
9. Conduct the following sediment reduction work/organochlorine pesticides:
- Participate in implementation of USDA sediment reduction program (yr 1-7).
 - Promote sediment reduction in construction arenas and urban SW, and

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- other specific sites (yr 1-7).
 - Implement stream restoration and revegetation work (yr 4-7).
 - Quantify and determine ecological impacts of sediments in target watersheds, implement corrective actions (yr 4-7).
 - Coordinate with ERP on sediment needs (yr 1-3).
10. Conduct the following nutrients work:
- Complete studies of causes for DO sag in San Joaquin River (yr 1-2).
 - Define and implement corrective measures for DO sag (yr 1-7).
 - Encourage regulatory activity to reduce nutrients discharged by unpermitted dischargers (yr 1-7).
 - Develop inter-substrate DO testing in conjunction with ERP (yr 2-4).
 - Study nutrient effects on beneficial uses (yr 4-7).
11. Conduct the following unknown toxicity work:
- Participate in identifying unknown toxicity and addressing as appropriate (yr 1-7).
12. Other actions specific to drinking water improvements:
- Control TOC contribution through control of algae, aquatic weeds, agricultural runoff, and watershed improvement (yr 1-7).
 - Study brominated and chlorinated disinfection byproduct operational controls at water treatment plants and implement incremental improvements as warranted (yr 1-7)
 - Control of pathogens through control of cattle, urban storm water, sewage, boat discharge, and possibly recreational swimming; includes various projects depending on area of impact (yr 3-7).
 - Study recreational swimming impacts, wild animal impacts (yr 4).
 - Relocate Barker slough intake (yr 7+).
 - MTBE reductions in various areas (yr 3-5).
 - Address water quality problems in terminal reservoirs (yr 3-5).
 - Perform public health effects studies, as needed, to more specifically identify the potential health effects of bromide related disinfection byproducts (yr 1-3).
 - Investigate alternative sources of and means of providing high quality water supply for urban users of Delta water (yr 1-7).
 - Investigate, as needed, advanced treatment technologies for the removal of salt, bromide, total organic carbon, and pathogens in urban water supplies (yr 1-7).
 - Investigate combinations of new supplies and technologies that can minimize salt content of urban water supplies and provide greater public health protection (yr 1-7).
 - Convene a Delta Drinking Water Council in a public forum to consider relevant technical data to inform the governing entity in its consideration of solutions to identified public health issues for urban users of Delta

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- water (yr 1-7).
 - Develop a plan sufficient to meet forthcoming EPA and Department of Health Services standards for brominated disinfection byproducts (by yr 7).
13. Conduct the following turbidity and sediment work:
- Implement protection actions in the upper watershed to reduce sedimentation of fish spawning habitat (yr 1-7).
 - Implement erosion control BMPs in the upper watershed (yr 1-7).
 - Construct sedimentation basins in urban and suburban areas (yr 1-7).
 - Evaluate use of a head control structure on lower Dominici Creek (yr 2-4).
 - Perform quantitative analysis of river sediment loads, budgets, and sources (yr 1-7).

Ecosystem Restoration

The CALFED ecosystem restoration program (ERP) is designed to maintain, improve, and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species. A foundation of this program element is the restoration of ecological processes associated with streamflow, stream channels, watersheds, and floodplains. Implementation of the ERP over the 20 to 30 year implementation period will be guided through an ecosystem-based, adaptive management approach. ERP goals and objectives for ecosystem, habitat, and species rehabilitation are designed to produce measurable and progressive improvements to the Bay-Delta ecosystem that should result in a high level of ecosystem health and species recovery that exceeds existing regulatory requirements while improving water supply reliability and water quality of the Bay-Delta Ecosystem. The Stage 1 restoration efforts are structured to accomplish significant improvement in Bay-Delta ecological health through a large scale adaptive management approach in which the actions inform management decisions in later stages of implementation.

Success of ERP Stage 1 actions is also critically dependent on other program elements, including water quality improvement actions throughout the Bay-Delta watershed, levee system integrity actions, and integration with a watershed management strategy and a water transfers market. The general priorities for restoration activities will be first on existing public lands as appropriate, second to work with landowners in voluntary efforts to achieve habitat goals including the acquisition of easements, third a combination of fee and easement acquisition, and fourth on acquisition of fee title as necessary to achieve program objectives. Acquisition will be on a willing seller basis and with emphasis on local coordination and partnerships and include appropriate mitigation for agricultural resource impacts. The intent is to maximize habitat benefits while minimizing land use impacts.