

Sustainable Water and Environmental Management in the California Bay-Delta (2012)

SUMMARY

Water management in the California Bay Delta is directed toward providing a more reliable water supply for California, and protecting and rehabilitating the Delta ecosystem, including five endangered and threatened populations and species of fish that live in or migrate through the Delta. However, water management in the Bay and Delta is distributed among many agencies and organizations, a structure that hinders the development and implementation of an integrated, comprehensive plan. As a result, recent Bay Delta planning efforts have not resolved the best plan for the environment or for satisfying anticipated water needs. Challenges include the fact that water scarcity has not been adequately addressed in planning for Delta water and environmental management; the interacting effects of the many environmental stressors that impact the Delta ecosystem, and the many biological and physical effects of climate change. This report discusses the issue of scarcity, factors affecting the listed species and the Delta ecosystem in general, future water-supply and delivery options, scientific uncertainties, the degree of restoration likely to be attainable, and the need for comprehensive planning.

Key Findings

- Planning efforts to implement the two goals of providing a more reliable water supply for California and protecting and rehabilitating the Delta ecosystem have not led to clarity on how the inevitable tradeoffs between the two goals should be managed, particularly when water is in short supply.
- Climate change is one of most challenging and important issues confronting the management and rehabilitation of the Delta ecosystem. Changes in climate are expected to have profound effects on the physical and ecological structure and functioning of the Delta, as well as on the availability of water in California.
- Many environmental stressors, including water diversions, contaminants in the water, and introduced species affect the structure and functioning of Delta ecosystems. Interactions among stressors and between stressors and ecosystem processes are widespread and complex. Furthermore, species differ in their responses to stress. This complicates the interpretation and evaluation of the effects of stressors on the ecosystem, and makes it impossible to identify which stressor is the root cause of a certain environmental problem, or even to rank the stressors with any certainty.
- The large number of stressors, their effects and interactions lead to the conclusion that efforts to eliminate any one stressor are unlikely to reverse declines in listed species. Opportunities exist to mitigate or reverse the effects of many stressors. Continued effects analyses, modeling, and monitoring are necessary to ensure actions taken to rehabilitate the ecosystem are cost-effective.
- Due to the extensive physical changes that have already taken place and are still occurring in the Delta ecosystem and its tributary watersheds, it will not be possible to restore the habitat to its pre-disturbance state. Delta restoration programs will need to

balance consideration of an ecosystem approach with the Endangered Species Act's emphasis on individual species.

- Assessments suggest that many species will be affected by shifts changes in the pattern and type of precipitation due to climate change. Projected increases in mean sea level and extremes of precipitation have the potential to increase the frequency of levee failures and the inundation of islands, in part because the levees continue to subside due to the oxidation of peat. Sea level rise also has the potential to enhance salt water intrusion and alter water quality.
- Planning and evaluation of future environmental and economic scenarios will need to address uncertainties in projections, integrated analysis, and the development of risk management strategies. Future planning should also include a climate-change based risk model and analysis that incorporates data on the actual changes in Delta conditions as well as alternative future climate change scenarios and their probability.
- The instability of levees and the fact that the failure of one levee can affect others are likely to be major issues for achieving any measure of water-supply reliability or ecosystem rehabilitation. Continuing the status quo of improving levees will not always be the most environmentally sustainable or economically defensible response in the years ahead.
- Science is necessary to inform actions and proposals, but does not provide the entire, prioritized, integrated analysis needed. Societal and political considerations are also important factors in determining the most appropriate policy.
- Undertaking a comprehensive review of water planning and management functioning would allow California to anticipate future needs such as water scarcity, balanced consideration of all statewide water use practices, and water engineering alternatives. As a result, the Delta would be an effective partner in statewide water management plans.
- It is likely that the scarcity of water for all needs in the Delta will become severe. While more effective planning is developed, the state will need to use its water resources efficiently and productively.
- The committee has not analyzed the benefits and disadvantages of an isolated conveyance facility, because not enough specific information was available about it, and therefore there is no recommendation with respect to its adoption as a major part of water management in the Delta. However, the considerations such as the form such a facility would take, its size, location, and the diversion design and operation, including the role of current diversions, should be analyzed as part of any integrated Delta plan, and compared to alternative water management options, including current operations.