13. Suisun Marsh Levee System

CALFED has added the Suisun Marsh levee system to the Levee Program as an optional strategy to achieve its ecosystem quality, water supply reliability, and water quality objectives. Efforts to clarify linkages of these actions to the CALFED objectives are ongoing.

Ensuring the integrity of the exterior levees in the Suisun Marsh is critical to sustaining seasonal wetland values provided by the marsh's managed wetlands. Improved levees would ensure that conversion to tidal wetlands will not be due to levee failure but instead will be planned with consideration of landowner support Ecosystem Restoration Program targets, regional wetland goals, endangered species recovery plans, and Delta water quality objectives.

Continued management of the Suisun Marsh for waterfowl and recreational activities is threatened by periodic flooding and the problem of maintaining a proper salt balance.

13.1 INTRODUCTION

The Suisun Marsh consists of approximately 57,000 acres of marshland and 27,000 acres of bays and waterways. Waterways include a network of tidal sloughs, principally tributaries of Suisun and Montezuma Sloughs, together with many drainage sloughs. Major streams carrying runoff from surrounding hills and floodplains include Green Valley, Suisun, Ledgewood, Laurel, McCoy, Union, and Denverton Creeks.

The Suisun Marsh is one of the few major marshes remaining in California and furnishes habitat for a variety of plants and animals. The Suisun Marsh serves as a principal waterfowl wintering area and also is highly valued for fishing and recreation. Despite reclamation improvements in the late 1800s and early 1900s, agricultural development in the Suisun Marsh has been largely unsuccessful due to poor drainage and salt accumulation in the soil. Limited cattle production and dry farming of grain crops occurs today where suitable soils exist. For the most part, however, the marshlands have been converted to private duck clubs and state wildlife management areas. Continued management of the Suisun Marsh for waterfowl and recreational activities is threatened by periodic flooding and the problem of maintaining a proper salt balance.

The Suisun Marsh is an area of regional and national importance, providing a broad array of benefits that include recreation use and fish and wildlife habitat. The Suisun Marsh's

approximately 229 miles of exterior levees are an integral part of its landscape and are key to preserving the Suisun Marsh's physical characteristics and processes.

The focus of the Suisun Marsh component of the Levee Program is to provide long-term protection for multiple Suisun Marsh resources by maintaining and improving the integrity of the Suisun Marsh levee system. The Suisun Marsh component of the Levee Program focuses on the legally defined Suisun Marsh.

13.2 BACKGROUND INFORMATION

Most of the Suisun Marsh land surface elevations are below sea level. Suisun Marsh levees are vulnerable to failure, especially during floods, because of poor levee construction and inadequate maintenance.

Most of the Suisun Marsh land surface elevations are below sea level. Suisun Marsh levees are vulnerable to failure, especially during floods, because of poor levee construction and inadequate maintenance.

A chronological summary of reclamation and water management activities that influenced the current Suisun Marsh is provided in Table 15. AB 360 currently includes only selected exterior levees in the Suisun Marsh.

Inundation of one or more islands in the Suisun Marsh can disrupt wildlife habitat and other land uses either permanently or until repairs can be made. Inundation of roads, electric power lines, telephone lines, gas mains, and other infrastructure can cause lengthy delays in service. Several Suisun Marsh roads run along levees that are vulnerable to collapse due to erosion or overtopping. If a flooded island is not repaired and drained, the resulting large body of open water can expose adjacent islands to increased wave action and additional seepage.

Table 15. Chronological Summary of Events Important to the Suisun Marsh

Time	Event
1850s	Settlers began to build low sod levees to "reclaim" tidal wetlands in the Suisun Marsh for agricultural uses.
1860s	Levee construction increased and over 20 reclamation districts were formed in the Suisun Marsh.
1930	By this date, approximately 44,600 acres of tidal wetlands had been converted to commercial agricultural purposes in the Suisun Marsh.
1950s	By this date, the majority of the diked lands in the Suisun Marsh had been converted from agriculture to seasonal managed wetlands and duck clubs.
1972	Passage of the Federal Coastal Zone Management Act.
1977	Passage of the Suisun Marsh Preservation Act triggered a series of actions to more aggressively protect the Suisun Marsh and its fish and wildlife values.

Preliminary modeling studies of the Suisun Marsh indicate that levee failure in the Suisun Marsh may affect western Delta channel water quality. Modeling studies currently are being refined.

13.3 COST ESTIMATE

Most of the Suisun Marsh lies at a level near or below mean tide elevation. To protect marshland from uncontrolled tidal inundation and flooding, levees have been added over the years to supplement the natural levees throughout the Suisun Marsh. Approximately 90% of the marshland now is enclosed by a system of low levees, ranging in height from 4 to 8 feet above ground level. This system of levees is critical to the management of water quality and waterfowl habitat in the Suisun Marsh.

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To prepare estimates, the levee classification strategy developed by Ramlit (1983) was used. This report is entitled "Suisun Marsh Levee Evaluation" and was submitted to the Corps, San Francisco District in February 1983. The levee types and classes used in the following discussion are based on the Ramlit evaluation. Levees were identified according to adjacent waterways and grouped in the following classes:

- Class I. Nine exterior levees protecting all islands and along primary sloughs (Montezuma, Suisun, and Nurse).
- Class II. Exterior levees along all secondary sloughs (Goodyear, Cordelia, and Hill).
- Class III. Dead-end sloughs (Wells, Sheldrake, and Boynton).

Levees also were classified based on the extent of the repairs that would be needed to bring them to Suisun Resource Conservation District (SRCD) standards. Type A levees required the most significant reconstruction effort and could entail the use of imported fill and phased construction. Type D levees would require only limited amounts of repair. Approximately one-third of the Suisun Marsh levees were classified as Type A levees.

The following preliminary cost estimates are for the Suisun Marsh Levee Base Level Protection Plan and the Suisun Marsh Levee Special Improvement Projects Plan without Ecosystem Restoration Program Plan actions.

The estimate is for the total cost to reconstruct Class I A, B, C, and D, and Class II A and B levees in the Suisun Marsh up to the SRCD standard. This estimate assumes work will be performed on approximately 155 of the 229 miles of levee in the Suisun Marsh. The estimate includes costs for design, construction, and LERRDS.

The cost estimate assumes work will be performed on approximately 155 of the 229 miles of levee in the Suisun Marsh.

Methods to prepare the cost estimates focused primarily on the unit costs estimated by Ramlit (1983). Those costs were updated using indices from the Engineering News Record to account for inflation and construction cost increases. Tables 17 and 18 in the Ramlit evaluation were used to calculate the cost estimates for the Suisun Marsh Levee Base Level Protection Plan and Suisun Marsh Levee Special Improvement Projects Plan.

A summary of rehabilitation costs by general waterway classes is given in Table 17. Levees along Class I waterways represent the bulk of the total estimated repair cost (71%). Repair costs for levees on Class II and III waterways amount respectively to 18% to 11% of the total.

Table18 provides a breakdown of estimated costs according to the five general levee types. The percentage of total rehabilitation costs attributable to each levee type are as follows: Type A - 36%; Type B - 8%; Type C - 50%; and Type D - 6%.

The preliminary cost estimate for rehabilitating 155 miles of levees in the Suisun Marsh is estimated at $60 million (all costs are at March 1998 price level).

13.4 ANNUAL MAINTENANCE

The preliminary cost estimate for annual maintenance costs for the 229 miles of exterior levees was computed at approximately $350,000.

13.5 ASSUMPTIONS

The estimate assumes that:

- Quantities are based on a "typical" levee section for existing levees and proposed levee improvement cross sections.
- A majority of the design, construction, and right-of-way acquisition will be accomplished with local resources.
- Beneficial reuse of dredged materials will be maximized.

These estimates are preliminary, and are being developed and evaluated at a programmatic level. CALFED staff is continuing to refine these costs. More focused analysis and detailed estimates will occur in subsequent refinement efforts.

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13.6 FUNDING

Under the proposed program for the Suisun Marsh, funding would be provided and equitably distributed to federal and state governments, and participating local agencies or public wetland managers such as DFG.