

2.5 DELTA LEVEE RISK ASSESSMENT AND RISK MANAGEMENT STRATEGY

Delta levees and islands are at risk of failure from floods, seepage, subsidence, earthquakes, and other threats. Also, a key management decision will be made at the end of Stage 1 Implementation as to the effectiveness of the CALFED Preferred Alternative. The following key levee related question must be answered at the end of Stage 1: "Are the risks to export water supply from levee failure acceptable, or are other actions required?" To address these needs, CALFED will develop and implement an appropriate risk management strategy during Stage 1. The goal of the Delta Levee Risk Assessment and Risk Management Strategy is to quantify the risks to Delta levees, evaluate the consequences, and develop an appropriate risk management strategy.

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2.5.1 INTRODUCTION

Many CALFED agencies and stakeholders have voiced concern over the need to quantify Delta levee risk, to determine the consequences of failure and to implement an appropriate risk management strategy.

The greatest threat to Delta levees is overtopping and seepage during flood flows. Since their reclamation, every Delta island has flooded at least once. Over the past 50 years, dozens of islands have flooded. Some islands have flooded many times. Some islands were never reclaimed. The vulnerability of the Delta levee system to failure during earthquakes is also a concern. Although levee failure from a seismic event has never been documented, the Delta has not experienced a significant seismic event since the levees reached their current size. The risk to Delta resources must be managed if the CALFED objectives are to be achieved. Appendix D list the major resources in the Delta.

2.5.2 PAST AND PRESENT EFFORTS

Over the past 25 years, the existing Delta levee program has reduced the flood and seepage risk by improving Delta levees.

Research and demonstration projects are being conducted to quantify the effects of subsidence and determine how to reduce its threat to Delta levees.

In the late 1980s, DWR's Division of Engineering embarked on a long-term seismic stability evaluation of Delta levees. Strong-motion accelerometers were installed at several sites in the Delta. Field and laboratory testing is being done to better determine the static and dynamic properties of organic soils and to better determine liquefaction potential. The potential activity of the Coast Range/Sierra Nevada Boundary Zone is being evaluated. In 1992, DWR published a report titled, "Seismic Stability Evaluation of the Sacramento-San Joaquin Delta Levees, Volume I." DWR's seismic investigation is being continued. DWR continues to collect data from their seismic monitoring instruments and continues field and

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laboratory testing. This data will be published in future reports.

In 1998, a seismic vulnerability sub-team began a seismic risk assessment of Delta levees. The sub-team was comprised of a group of experts in the fields of seismology and geotechnical engineering. This assessment identified the risk to Delta resources during catastrophic seismic events and comments on the general feasibility of various actions to reduce exposure to the risk. The seismic vulnerability sub-team's report titled "Seismic Vulnerability of the Sacramento-San Joaquin Delta Levees" dated April 2000, is included in Appendix G of this report.

...a significant seismic risk is present; however, improved preparedness can reduce the potential damage."

2.5.3 PROPOSED RISK ASSESSMENT

As part of CALFED's Stage I Actions, CALFED staff will work with stakeholders, the public, and state and federal agencies to develop and implement a Delta Levee Risk Assessment and Risk Management Strategy. CALFED will incorporate the findings from the Seismic Sub-team's assessment into an overall risk assessment. Once the risk to Delta levees is quantified, and the consequences evaluated, CALFED will develop and implement an appropriate risk management strategy.

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Several risk management options have been developed for inclusion in the CALFED Preferred Program Alternative. The available risk management options include, but are not limited to:

- Improving emergency response capabilities,
- Reducing the fragility of the levees,
- Improving through-Delta conveyance,
- Constructing an isolated facility,
- Developing storage south of the Delta,
- Releasing more water stored north of the Delta,
- Restoring tidal wetlands,
- Controlling and reversing island subsidence,
- Curtailing Delta diversions, and
- Continuing to monitor and analyze total risk.

The final Risk Management Plan will include a combination of these options and others identified as a result of the risk assessment.

Table 8 Lists Implementation Objectives, Targets, and Actions Associated with the Delta Levee Risk Assessment and Risk Management Strategy Element.

Table 8. Implementation Objectives, Targets, and Actions Associated with the Delta Levee Risk Assessment and Risk Management Strategy element

Implementation Objective	Target	Action
Prepare a Delta Levee risk Assessment and Risk Management Strategy	Document findings in a report to CALFED	<p>Assemble a Levee Risk Assessment Team</p> <p>Quantify risks to Delta levees from Overtopping, seepage, subsidence, earthquakes, etc.</p> <p>Quantify the consequences to resources at risk.</p> <p>Develop potential risk management strategies that are consistent with CALFED's Preferred Alternative. Coordinate with CALFED Program Managers, agencies and stakeholders. Develop viable funding methodologies.</p> <p>Make recommendations to CALFED on specific risk management actions and funding methodologies.</p>
Implement appropriate risk management strategies	Integrate risk management strategies into CALFED's Preferred Alternative	CALFED to take appropriate action on selected risk management actions