

**AN IN-DEPTH PORTRAIT OF THE CURRENT DELTA
LEVEE CONDITIONS AND CHALLENGES FOR
IMPROVEMENT**

PRESENTED BY:

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**STUDY PERFORMED BY KLEINFELDER-GEOMATRIX TEAM UNDER
CONTRACT TO UNITED STATES ARMY CORPS OF ENGINEERS,
SACRAMENTO DISTRICT**

PROGRAM OVERVIEW & TIMELINE

CALFED Levee Stability Program

Program Initiated in 2006 by submitting a Report to Congress

**Funding Approved as Part of the Water Resources Development Act
(WRDA) in 2007**

**Program is Managed by US Army Corps of Engineers, Sacramento
District**

Contract was Awarded to Kleinfelder-Geomatrix Team in 2008

AUTHORIZATION LANGUAGE

Section 103(f)(3) of PL 108-361, as amended by Section 3015 of the Water Resources Development Act (WRDA) of 2007, authorizes the Secretary of the Army to undertake the construction and implementation of levee stability programs or projects in the Bay Delta area for such purposes as flood control, ecosystem restoration, water supply, water conveyance, and water quality objectives as outlined in the CALFED Bay-Delta Program Programmatic Record of Decision (August 2000 ROD). It also includes rehabilitation of the Suisun Marsh levees.

PROVISIONS WITHIN SECTION 3015

- (i) Reconstruct Delta levees to a base level of protection (also known as the "Public Law 84-99 standard") as described in the August 2000 ROD;**
- (ii) Enhance the stability of levees that have particular importance in the system through the Delta Levee Special Improvement Projects Program;**
- (iii) Develop best management practices to control and reverse land subsidence on Delta islands;**
- (iv) Develop a Delta Levee Emergency Management and Response Plan that will enhance the ability of Federal, State, and local agencies to rapidly respond to levee emergencies;**

PROVISIONS WITHIN SECTION 3015 (Cont.)

(v) Develop a Delta Risk Management Strategy after assessing the consequences of Delta levee failure from floods, seepage, subsidence, and earthquakes;

(vi) Reconstruct Delta levees using, to the maximum extent practicable, dredged materials from the Sacramento River, the San Joaquin River, and the San Francisco Bay in reconstructing Delta levees;

(vii) Coordinate Delta levee projects with flood management, ecosystem restoration, and levee protection projects of the lower San Joaquin River and lower Mokelumne River floodway improvements and other projects under the Sacramento-San Joaquin Comprehensive Study; and

(viii) Evaluate and, if appropriate, rehabilitate the Suisun Marsh levees.

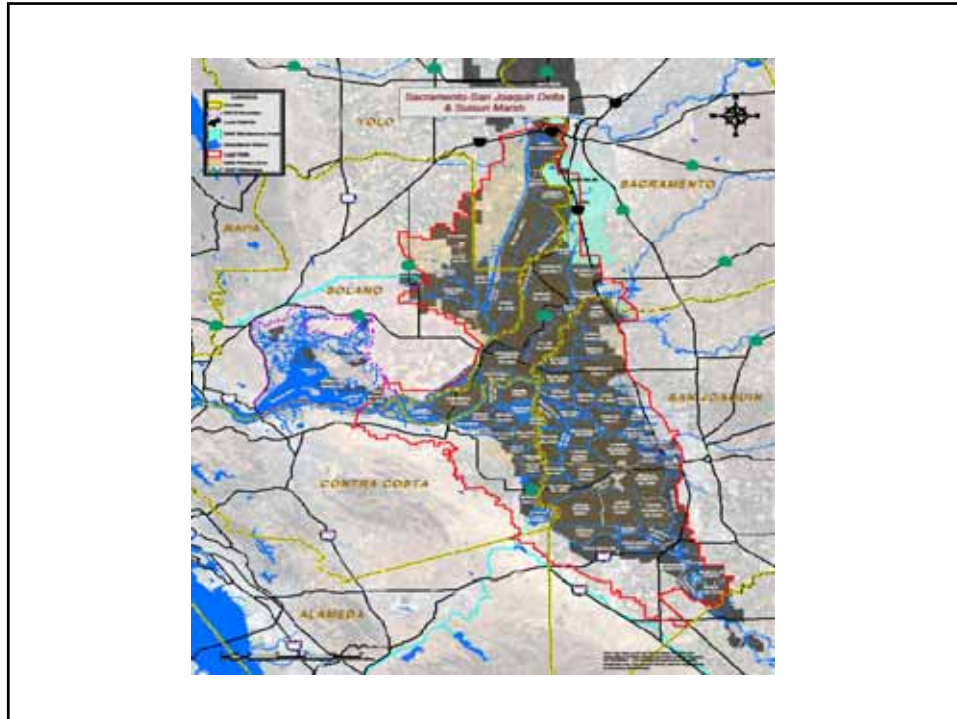
DELTA OVERVIEW

NUMBER OF ISLANDS & TRACTS: 68

PRIMARY ZONE: NO DEVELOPMENT ALLOWED

SECONDARY ZONE: SIGNIFICANT DEVELOPMENT UNDERWAY

NUMBER OF SITES VISITED BY THE TEAM: 30



Delta Levees Subventions Program Design Standards

Agricultural	Urban
<p>Landslide slope section with depth of pile Range 3:1 - 1:1</p> <p>Bulletin 192-82</p>	<p>Landslide slope section with depth of pile Range 3:1 - 1:1</p> <p>Bulletin 192-82</p>
<p>Landslide slope section with height of levee and depth of pile Range 3:1 - 1:1</p> <p>PL 84-99</p>	<p>Landslide slope section Prove of no adverse stability occurred</p> <p>FEMA</p>
<p>Hazard Mitigation Plan</p>	

SITES VISITED & JUSTIFICATION FOR UPGRADE

UPGRADE TO PL 84-99: 19 SITES

17 SITES WORK ON LANDSIDE SLOPE - SOME REQUIRING TOE BERM
2 SITES WORK ON WATERSIDE SLOPE

SUISUN MARSH SITES: 4 SITES

PRIMARILY STABILITY: 2 SITE

PRIMARILY SEEPAGE: 2 SITE

WATER QUALITY: 1 SITE

EMERGENCY RESPONSE: 1 SITE

HABITAT RESTORATION: 1 SITE



Home near toe of levee - landowner requested trees preserved



Down slope view of old historical labor camp housing at toe of levee slope



Northeastern landside view of EBMUD aqueduct penetration into the levee



**Northern view of landside conditions in repaired area
Note: Surface cracks, erosion gullies at mid slope**



**Overview of site, looking downstream from intake
Heavy erosion along Sacramento River requires repair**



Erosion in the waterside slope



Upgrade to PL 84-99 not possible due to presence of the structure on top of the levee



Western view of the waterside conditions along the Sacramento River. Sheet piles and a cellular wall filled with crushed gravel were installed to prevent overtopping



Southern view of the break in Blue Bird Road with other side of break in background (Area was repaired previously as indicated by the remaining sand bags and tarps)



**View of levee failure caused by ongoing subsidence
Note: Levee was set back away from failure**



Steep landside levee slope



Southern view of levee slope where wet spots are noticeable and indicate seepage



Standing water and wet ground on the landside slope as a result of seepage



Northwest view of possible point of internal inundation from the underground effluent lines (under grates in pavement) leading into the head works



A homeowner backyard that spans the levee



Waterside condition in area to be degraded (will be cut down approximately 9 feet)

CHALLENGES FOR IMPROVEMENT

FINANCIAL

- ❖ COST SHARE REQUIREMENT
- ❖ STATE PARTICIPATION
- ❖ LACK OF FUNDS AT THE RECLAMATION DISTRICT LEVEL

TECHNICAL

- ❖ ENGINEERING
- ❖ CONSTRUCTION
- ❖ SOURCE OF BORROW MATERIAL

ENVIRONMENTAL

- ❖ PERMITS
- ❖ PROTECTION OF SENSITIVE HABITAT

POLITICAL

OPPORTUNITIES

DELTA CURRENTLY ENJOYS NATIONAL VISIBILITY

**SIGNIFICANT FUNDING AVAILABLE AT FEDERAL & STATE
GOVERNMENTS**

**LONG-TERM SOLUTIONS ARE BEING EXPLORED BY BOTH PUBLIC
AND PRIVATE SECTORS**

PATH FORWARD

INTEGRATION OF RESOURCES

LONG-TERM SOLUTION

STREAMLINING THE PERMIT PROCESS