CENTRAL DELTA WATER AGENCY

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August 19, 2019

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RE: Notice of Proposed Rulemaking Delta Levees Investment Strategy

Dear Council Members:

The Central Delta Water Agency (CDWA) encompasses approximately 120,000 acres of the Delta as defined in Water Code section 12220 and is located in western San Joaquin County. The primary land use is agriculture with some recreation, habitat and urban use. The purposes of the agency include protection of the water supply of the agency lands against salinity intrusion, assurance of a dependable supply of water of suitable quality to meet present and future needs and assisting in reclamation and flood control matters.

Preserving the Delta requires an adequate water supply and an adequate levee system. Preserving the levee system is the key to providing an adequate water supply and preserving the physical characteristics of the delta.

We are opposed to the adoption of the proposed amendment to the regulation and urge that attached revised version be considered for adoption as a recommendation. **Exhibit A** attached hereto is the result of the local reclamation district representative's effort to reach consensus on proposed changes. This effort followed meetings with your staff, representatives of DWR and representatives of the CVFPB. Other parties who may be interested were not in attendance.

It may be productive to provide additional time to attempt to resolve differences and we support the requests from others for extensions of time.

A major difference between **Exhibit A** and the proposed amendment is the objective to preserve the physical characteristics of the Delta and the levees as a system. The local view is to fund improvement of the Delta Levee System to the DWR Bulletin 192-82 and/or USACE PL 84-99 Delta agricultural standards with a 24 foot crown and to satisfy USACE OMRR&R on the nonurban project levees in the primary zone **simultaneously** with improvement of higher priority levees to higher standards. This would improve the opportunity to qualify for disaster assistance from FEMA on the nonproject levees and from the USACE on the project levees. The urban levees where improvements are funded through the urban levee programs and or the USACE should be removed from the priority list.

The changes in **Exhibit A** are in the form of a recommendation rather than a regulation and also attempt to reduce unnecessary and costly analysis and reporting. Priority is established in the level of improvement and can be further prioritized in the allocation of funding to each objective. Attached as **Exhibit A-1** is the July 9, 2008 5 year plan on behalf of the local representatives which basically suggested allocation of 12% for the Delta Levee Subventions, 44% to Special Projects for improvements of all program levees and 44% for improvement of those levees deemed to be of higher priority. At that time there was $775 million of bond money designated for Delta levees and a much larger sum for the State Plan of Flood Control. Proposition 1 added $295 million for the Delta levee programs. Although some of the funds for Delta levees somehow get redirected the separation of the funding for the different State levee programs should be retained and future bond funding for levees should be pursued.

The current Delta levee programs managed by DWR and the CVFPB have been working and should not be dismantled. The effort should be directed at reducing unnecessary requirements and more efficiently get dollars into levee improvement.

Our objections to the proposed regulations follow.

THE PROPOSED REGULATIONS IGNORE THE IMPORTANCE OF THE LEVEES AS A SYSTEM AND ATTEMPT TO MANDATE OBSTRUCTIONS TO PRESERVATION OF A MAJOR PORTION OF THE DELTA

The Proposed Regulations Are Inconsistent With Legislative Acts

The proposed regulations provide that "The priorities listed in the Table **shall** guide State discretionary investments in the improvement and rehabilitation of Delta Levees." The proposed regulations also mandate a report and justification for any deviation. The justification involves comprehensive and expensive analysis which is tantamount to a penalty.

Contrary to the Legislature's finding and declaration in WC 12981 the proposed regulations fail to include preservation of the physical characteristics of the Delta as a State interest

The legislative finding and declaration in Water Code section 12981 which was enacted in Statutes 1973 Chapter 717 sets forth the State interest in preserving the physical characteristics of the Delta.

"12981. The Legislature hereby finds and declares that the delta is endowed with many invaluable and unique resources and that these resources are of major statewide significance. The Legislature further finds and declares that the delta's uniqueness is particularly characterized by its hundreds of miles of meandering waterways and the many islands adjacent thereto, that in order to preserve the Delta's invaluable resources, which include highly productive agriculture, recreational assets, and wildlife environment, the physical characteristics of the delta should be preserved essentially in their present form, and that the key to preserving the delta's physical

characteristics is the system of levees defining the waterways and producing the adjacent islands".

The approach to prioritization in the Initial Statement of Reasons at page 8 lists the State interests as people, property, habitat and water supply. The risk to property is characterized by an annual damage dollar amount and not the impact on the physical characteristics of the Delta. The obstructions to levee work imposed by the proposed regulations are inconsistent with the Water Code section 12981 legislative finding and declaration that the physical characteristics of the Delta be preserved essentially in the then present form (1973). Attached hereto as **Exhibit B** is a map titled Preliminary Draft Delta Levees Investment Priorities. It is page 43 from Chapter 7 of the Amended Delta plan and appears to reflect the same priorities as in Figure 1 of the Initial Statement of Reasons. It is clear from the map that directing the funding to the red areas is inconsistent with the preservation of the physical characteristics of the Delta as it was in 1973 and as it is today. **Exhibit C** attached hereto is from page 31 of Chapter 7 of the Amended Delta Plan and shows that much of the area left out of the highest priority for funding has a very low or low ability to pay or not rated. The proposed regulation is intended to drive 80% or more of funding to the Very High Priority with only limited maintenance assistance to most of the rest of the Delta.

The proposed regulations are inconsistent with Water Code Section 85054 Coequal Goals

Water Code section 85054 Coequal Goals provides:

"Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring and enhancing the ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."

Sacrificing a major portion of the land in the Delta is not consistent with protecting and enhancing the unique cultural, recreational, natural resource and agricultural values of the Delta. Additionally the proposed impediment to funding Delta levee improvement will greatly reduce the reliability of the water supply in the delta for California including in delta needs, exports and those downstream of the delta. The priority Table lists 17 of the 144 islands or tracts as Very High Priority including McCormack-Williamson Tract which is in a floodway where levees were subject to elevation control and now degraded, 36 as High Priority and 91 as Other Priority. 4 of the Very High Priority Islands or Tracts involve urban federal project levees improved with federal, State and local agency funding. The urban federal project levees have 3 feet of freeboard above the 100 year flood plain and are typically built to an engineering standard. These levee systems are less likely fail than the other levees in the Delta and are planned to be more greatly improved to 200 year protection with 3 feet of freeboard and other Urban Levee Design Criteria requiring cutoff walls. This will require investment of billions of dollars and with the proposed priorities will leave little or no funding for high and other priorities. Typically the State shares of urban federal project levee improvements have been funded separately from the levees within the Delta Levee Subvention and Special Project Programs and are tied to federal projects. The proposed regulations have lumped together the funding for urban federal project levee improvements and Delta program levee improvements. The proposed priorities will result in

little or no funding for the High Priority improvements and none for the Other Priority improvements. Many of the levees in the High Priority and Other Priority categories do not yet meet the agricultural levee standards in DWR Bulletin 192-82 or those in USACE PL 84-99 Delta standards. Since most are precluded from development by the primary and secondary zone limitations in the Delta Protection Act and Delta Stewardship Delta plan the levee work is dependent upon the agricultural land ability to pay and constrained by Prop 218 requirements. Without levee improvement the risk of levee failure will remain high and increase with state predicted sea level rise, climate change and earthquakes.

When Delta levees fail during the summer or dry periods there has historically been an interruption in exports from the delta either due to salinity intrusion or difficulty in efficiently meeting Delta standards due to disruption of the expected hydraulics of the delta. There are also issues with contamination, turbidity and increase in salinity due to increased evaporative losses. There can also be a shortening of the path for salinity to intrude into the Delta and reach the export pumps. A resulting increase in the tidal prism could also induce greater salinity intrusion. The Delta Protection Act, Water Code sections 12200 et seq. "prohibits project exports from the Delta of water necessary to provide water to which the Delta users are 'entitled' and water which is needed for salinity control and an adequate supply for Delta users."(182 Cal. App. 3d. 82 (1986) pg. 139). Inconsistency with the referenced coequal goals statute is also evidenced from the system impacts. The Delta overlies sands and gravels which extend beneath numerous islands and tracts. When an area floods seepage usually increases in adjoining lands and levees increasing the risk of levee failure, causing damage to crops and rendering portions of the land unfarmable. Wind across the flooded area generates waves impacting the unprotected interior levee slopes which could break through the flooded island levee causing damage to adjoining lands and levees. Over time the wind will wash away the flooded island levees including riparian habitat and greatly increase the wind wave height and run up on adjoining levees. If the flooded island is not promptly reclaimed the adjoining levees and drainage systems must be substantially improved and some of the damage will persist. If such reclamation is not accomplished additional levee failures and other adverse impacts will result. Franks Tract which flooded in 1938 is an example the wind wave generation across the flooded are has eroded most of the remnant levee contributing to the levee failure on Holland Tract and requiring substantial improvements beyond the agricultural standards to resist the increased wave action. Additionally the loss of the levee along False River caused a more direct path for salinity intrusion to reach the export pumps. This triggered the need for the emergency placement of the temporary rock barrier in False River at a cost of about $40 million. Loss of the physical characteristics of the Delta includes the loss of farmland, miles of meandering waterways, riparian habitat, protected areas for recreation, including boating, fishing, sightseeing, swimming and the like. When flooding occurs terrestrial habitat is destroyed, terrestrial species are displaced or drowned, some of which are endangered, fish become stranded and subject to greater predation, waterfowl of the Pacific Flyway lose critical wintering habitat, water quality is degraded due to spreading of contaminates including those from upstream sources such as hazardous sites, flooded waste treatment facilities, broken pipelines and the like, generation of methyl mercury, propagation of harmful algal blooms and the related toxins, increased water temperature, production of undesirable aquatic vegetation, propagation of vectors such as mosquitoes together with the spreading of related diseases and the harmful impact of chemicals

used to control the same, increased evaporation of fresh water and the resulting increased concentration of salinity. The cumulative effect of the elimination of funding for levee improvements over such a broad area will essentially destroy the physical characteristics of the delta with substantial adverse impacts to human health and safety. The cumulative impact of contaminants, toxins, vectors and disruption of the evacuation routes through the Delta could result in significant additional loss of life not included in the risk computations referenced as support for the proposed priority determinations.

The Authority to Promote and Recommend Priorities for State Investment in Delta Levees Does Not Constitute Authority to Regulate

The proposed regulations seek to mandate that the Department of Water Resources follow the DSC priorities and provide justifications for any deviations. Water Code section 85306 Recommendation of priorities for state investments in levees provides:

"The council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and nonproject levees."

The proposed regulations constitute mandates rather than recommendations and are beyond the authority of the council. Water code section 85305 reference to the council promoting strategic levee investments does not constitute authorization to regulate. Recommendations and promotion do not even appear to be appropriate subjects for regulation.

The Proposed Regulations Will Jeopardize Federal Disaster Assistance

The proposed regulations exclude "maintenance" from the mandated priorities but define "maintenance" to exclude levee rehabilitation and improvement which is necessary to meet minimum acceptable levels to receive federal disaster assistance to restore public facilities after a flood emergency. For nonproject levee restoration FEMA must be satisfied and for project levee reconstruction assistance it is the USACE that must be satisfied.

The State through the Central Valley Flood Protection Board (formerly the Reclamation Board) is the nonfederal sponsor for federal project levees and is obligated to operate and maintain the project levees in accordance with an Operation and Maintenance Manual incorporating USACE requirements. In most cases the State has contracted with a local agency to maintain the project levee in accordance with the Operation and Maintenance Manual. The local maintaining agency (LMA) in many cases is a Reclamation District. The USACE has become more demanding as to its Operation and Maintenance requirements including enforcement of the no vegetation requirements and has become less willing to proceed with reconstruction assistance. The USACE Operation and Maintenance is in reality the OMRR&R requirement. OMRR&R is Operation, maintenance, repair, rehabilitation and replacement. The Maintenance responsibility for the State includes maintaining the integrity of the flood control system and designated floodways. "Levee inspection reports provided by the USACE indicate severe levee maintenance deficiencies in over 90% of State Plan of Flood Control levee

systems." (See **Exhibit D** CVFPB Resolution No. 2018-06) Inability of the LMA to fund the maintenance or lack of agreement to fund as defined will result in State funding or loss of USACE reconstruction assistance. USACE reconstruction assistance could be in the hundreds of millions of dollars.

FEMA assistance for nonproject levee reconstruction after emergencies is dependent upon a good faith State effort to mitigate damages. The general policy question is why should federal money be used to repair damage resulting from the State's deferred action? The general approach in emergencies is locals exhaust their ability and then the State exhausts its ability up to $100 million (a somewhat arbitrary number) and then FEMA will assist unless there is an issue of State deferred maintenance or failure to proceed with mitigation. In the case of repeated emergencies FEMA requires a mitigation plan. As a result of multiple Delta levee breaks in 1980 where the Director of the Department of Water Resources did not provide support but FEMA and State OES did, FEMA required a Flood Hazard Mitigation Plan for the Delta. Attached hereto as **Exhibit E** is the Flood Hazard Mitigation Plan for the Sacramento-San Joaquin Delta dated September 15, 1983. The plan was prepared by the Department of Water Resources for the Office of Emergency Services and accepted by FEMA. I along with other Reclamation District Representatives participated in the discussions leading to preparation. The short term mitigation plan was to work towards a levee configuration with 1 foot of freeboard above the 100 year flood elevation, a 16 foot crown width, a 1.5 to 1 waterside slope, a 2 to 1 landside slope and an all-weather access road. **(See Exhibit E page 13)** This came to be known as the HMP Standard. It was recognized that the HMP Standard was not an engineered standard but merely a gage to reflect good faith improvement. The long term mitigation plan was to implement within 20 years a Delta Levee System plan as "described in the Corp' Draft Feasibility Report, dated October 1982 and in the Department's Bulletin 192-82, Delta Levees Investigation, dated December 1982 ...All islands should be included in the System Plan for stage construction, as recommended in the Corps' plan." **(See Exhibit E page 15)** The proposed regulation will surely jeopardize future FEMA assistance which could involve hundreds of millions of dollars of damages. Attached hereto as **Exhibit F** are the cover and pages 32 and 33 from the June 15, 2007 Technical Memorandum, Delta Risk Management Strategy Phase 1, Impact to Infrastructure. The entire memorandum is available on the web under DRMS Technical Memorandum June 15, 2007. The memorandum provides the estimated replacement costs of Delta Infrastructure within Mean Higher High Water at $6.1 billion (2005 dollars) and $8.5 billion (2050 dollars). The estimated replacement cost within 100-year limits is $56.3 billion (2005 dollars) and $67.1 billion (2050 dollars). Preservation of the physical characteristics of the Delta is critical to the preservation and enhancement of the Delta, the maintenance of water quality, and the conveyance of water through the Delta with or without a tunnel.

The Economic and Fiscal Impact Analysis of the Proposed Amendments Is Substantially Flawed

1) North Stockton, Central Stockton, Reclamation District 17 and West Sacramento have been included in the Very High Priority for Delta Levee Investment Funding. These areas are not in the primary zone of the Delta and are urbanized. The future levee improvements are not eligible for funding through the Delta Levee Subvention Program or the Delta Special Project Program. North Stockton and Central Stockton are included in the USACE Lower San Joaquin

Project, West Sacramento levee improvements are currently being funded by the USACE, DWR Urban Levee Program and locals. Reclamation District No. 17 Levee Seepage Repair Project is currently being funded as an early implementation project 60% by DWR and 40% by RD 17. The inclusion of these areas which have the significant populations distorts the analysis towards support for the priorities.

2) The Estimated Annual Damage (EAD) methodology does not take into account the system impacts and impacts to the physical characteristics of the Delta. The annualized cost of repair of a levee break, dewatering and repair of the flooded area levees does not account for the damage to adjoining levees, land, crops and improvements, the ongoing detrimental impacts such as to water quality, water supply, human health and safety, recreation and wildlife and secondary impacts such as those to safe evacuation, supporting businesses such as trucking, equipment sales and services, construction companies, impacts to residents and to workers both on and off the flooded land and for cumulative impacts such as reflected in the DRMS estimate of billions of dollars to replace damaged infrastructure. Reduction in land value due to an annualized cost of flooded island restoration. Without State or federal assistance (FEMA or USACE) it is unlikely that many levee systems would be restored.

3) The Delta Stewardship Council Decision Support Tool for the Bay-Delta Levee Investment Strategy does not account for many of the adverse impacts of increasing the risk of flooding in the high and other priorities and therefore incorrectly diminishes the benefit of reduction of flood risk from levee improvement in the high and other priorities.

a) The risk to life only accounts for population residing in the area and not for those traveling through the area or those working in the area or those trying to evacuate other areas and are stranded by the flooding of the road or highway on the flooded island. For example Bouldin Island which contains a portion of Highway 12 has a population at risk of 4, Victoria Island which contains a portion of Highway 4 has 0 expected annual fatalities.

b) Important Islands for Protecting Water Supply does not include Islands north of the San Joaquin River along the conveyance route from the Delta cross channel or the mouth of Georgiana Slough to the export facilities in the South Delta. Also not included is the loss of fresh water due to increased evaporation, or the adverse impact to water quality from increased concentration of salts, methyl mercury, algae related toxins, increased water temperature and contaminants from the land, equipment and fuel storage on the flooded area. Induced salinity intrusion from the increased tidal prism or change in Delta hydraulics is also left out.

c) Risk to High-Value Non-Habitat ignores the value of the farmland, ditches, canals and trees to terrestrial species, some of which are endangered, and ignores the acreage of farmland which is flooded in the winter and provides critical wintering forage for the waterfowl of the Pacific Flyway.

d) Delta as a Place Public Roadways ignores the local roads in much of the Delta which serve areas other than the particular Island or Tract on which they are located and ignores the threat to roads from the flooding of adjoining areas causing seepage into the land and levees where the road is located and wind waves breaking through the flooded area levees. A major part of the flood fight on Upper Jones Tract in 2004 was to keep the floodwaters within the tract from overtopping or washing out the Highway 4 road embankment. Protection of Highway 12 on Bouldin Island was a major concern in trying to contain the floodwater within Venice Island in the 1982 flood event.

e) The Value of Property Vulnerable in the Delta understates the value of land on Venice Island where there is a pending sale in excess of $10,000.00 dollars an acre. It appears that values are quite out of date.

f) Probability of Flooding is substantially different from previous DWR projects of 10 per year roughly 3 from earthquake and 7 from flooding.

g) The inclusion of urban levee areas outside the Primary Zone into the Very High Priority and into the economic analysis has distorted the result. Reclamation District No. 17, West Sacramento, Maintenance Area 9 North and Maintenance Area 9 South have not been funded through the Delta Levee Subvention or Delta Levee Special Project Programs. North Stockton and Central Stockton are urbanized and are part of the USACE Lower San Joaquin Project with State cost share funding from the Urban Levee programs their inclusion in the economic and fiscal impact also distorts the results. **Exhibit G** from the Delta Levees Investment Strategy as Decision Support Tool shows the weighting for these areas as to risk to life and risk to property as compared to areas in the Delta from which the levee improvement funding would be shifted. As a result the economic analysis is inappropriately shifted in favor of the proposed regulation.

h) The economic analysis ignores the billions of dollars of cumulative impact to infrastructure as reflected in the DRMS Impact to Infrastructure Technical Memorandum that will result from not funding the improvement of the high and other priority levees. See **Exhibit F**.

The Proposed Amendment Shifts Funding from the area of greatest need to areas already funded from a different source and will result in significant costs and losses to the areas which flood

The Delta levee programs have been directed at the nonproject and nonurban areas within the primary zone of the Delta. These areas are restricted as to development, have the lowest ability to pay and the greatest risk. The flooding of these areas will have a significant adverse impacts on the residents, landowners, recreation, habitat and businesses that will not be replaced with the funding shifted to other areas. These areas are in the State. The local levee agencies and the State will be exposed to greater liability and in the case of the local agencies may lose the ability to obtain liability insurance. Without funding assistance the cost to the levee agency of levee improvements to achieve an acceptable engineering standard will greatly increase and due to the limited ability to pay will never be achieved in many areas. The proposed amendment will jeopardize the availability of disaster assistance and areas flooded are likely to remain flooded. Significant losses and costs to the locals and State will result.

We urge that the proposed amendment not be adopted and that the DSC work with our local reclamation districts and levee districts, DWR and the CVFPB to find a better path forward.

Respectfully Submitted

Dante John Nomellini
Manager and Cocounsel

Changes to Proposed Amendments to DSC Prioritization of State Investments in Delta Levees
August 14, 2019

§ 5001. Definitions. As used in this division, the terms listed below shall have the meanings noted:

(w) "Levee improvement" means levee improvements, other than "Levee operation, maintenance, repair, rehabilitation and replacement", intended to reduce the probability of flooding. An example of a levee improvement would be changing a levee geometry to reach a higher level of protection.

(x) "Levee operation, maintenance, repair, rehabilitation and replacement" means levee work ~~annual or routine levee maintenance work~~ intended to preserve the Delta levee system and the Delta's physical characteristics in ~~its~~ essentially their then present form (Water Code Section 12981, Stats. 1973, c. 717).~~current condition.~~ Such work shall include all work authorized by Water Code section 12980 et seq. and 12310 et seq. 1) including for nonproject levees all levee operation, maintenance, repair, rehabilitation and replacement work to achieve , restore or maintain the agricultural standards in DWR Bulletin 192-82 and /or USACE PL 84-99 Delta Agricultural standards with a minimum crown width of 24 feet to allow for raises in freeboard to meet sea level rise, and 2) including for project levees all work to meet operation and maintenance requirements including repair, rehabilitation, and replacement as defined in USACE Engineering Regulation ER 1110-401. ~~Examples of maintenance~~ Such work includes patrols, surveys and inspections, extermination and control of burrowing animals, work on the levee crown to ~~improve~~ provide adequate access ~~or~~ and drainage, removing vegetation or debris, control of seepage and boils, addressing encroachments, cleaning drains and toe ditches, restoring rock protection, ~~and~~ maintenance of levee-related habitat improvement sites, flood fight and repair of flood or other emergency or critical damage.~~.~~

~~(y) "Levee rehabilitation" means levee repair work needed to restore the levee integrity and preserve existing flood risk reduction benefits. Examples of rehabilitation work include raising the levee crown to offset subsidence, flattening waterside slopes, constructing landside berms, and widening levee crowns.~~

§ 5012. Prioritization of State Investments in Delta Levees and Risk Reduction.

(a) Fund "L~~l~~evee operation, maintenance, repair, rehabilitation and replacement". Funding for "L~~l~~evee operation, maintenance, repair, rehabilitation and replacement" as defined above shall continue to be available throughout the Delta where authorized by Water Code section 12980 et seq. and 12310 et seq. or any other program and not subject to the priorities set forth below.

Exhibit A

(b) Delta levees investment strategy.

(1) Prioritize levee improvements. The recommended priorities listed in the Table below shall ~~guide~~ be considered for State discretionary investments in the improvement ~~and rehabilitation~~ of Delta levees. As the California Department of Water Resources selects levee improvement ~~or levee rehabilitation~~ projects for funding through its levee funding programs, it should consider priorities~~fund projects at the Very-High Priority islands or tracts~~ as identified in Table 1 and depicted in Delta Plan Appendix P dated [XXXX], which Appendix P is incorporated herein by this reference as if fully set forth, subject to consideration of ~~the benefits, costs, engineering considerations, and other factors,~~ how the project protects lives, property and the State's interests in water supply for the delta and other parts of the State and how the project achieves restoration, protection, and enhancement of the Delta ecosystem while considering the Delta's unique agricultural, natural, historic, and cultural values. ~~before approving projects at High Priority islands or tracts or Other Priority islands or tracts. If available funds are sufficient to fully fund levee improvement and levee rehabilitation projects at the Very-High Priority islands or tracts, then funds for levee improvement or levee rehabilitation projects on High Priority islands or tracts may be provided, and after those projects have been fully funded, then levee improvement or levee rehabilitation projects at Other Priority islands or tracts may be funded.~~

(2) Annual Report.

(A) The California Department of Water Resources shall submit a written annual report to the Council, as well as present the report to the Council, identifying decisions to award State funds for Delta levee improvement ~~and levee rehabilitation~~ projects, including the location of each funded levee improvement, the priority of the funded islands or tracts, the levee improvements funded, including the relevant levee improvement type, habitat mitigation or enhancement features, ~~estimated reduction in levee fragility, expected reduction in annual fatalities and damages,~~ State funds awarded, and local or federal matching funds. At least 30 days prior to the oral presentation before the Council, the California Department of Water Resources shall submit the written annual report to the Council and make the report publicly available.

(B) When the California Department of Water Resources' contributions towards levee improvements ~~and levee rehabilitation~~ vary from the priorities identified in (b)(1), the annual report shall identify how the funding is inconsistent with the priorities, describe why variation from the priorities is necessary, and explain how the funding nevertheless protects lives, property, and the State's interests in water supply reliability for the Delta and other areas of the State, and restoration, protection, and enhancement of the Delta ecosystem while considering the Delta's unique agricultural, natural, historic, and cultural values.

(c) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves discretionary State investments in the improvement and rehabilitation of Delta levees. "Levee operation, maintenance, repair, rehabilitation and replacement" work as defined above meets the definition of Water Code section 85057.5 (b) (5) and is not a covered action. Nothing in this policy establishes or otherwise changes existing levee standards.

CENTRAL DELTA WATER AGENCY
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July 9, 2008

Via email mikemi@water.ca.gov

Mike Mirmazaheri
Program Manager
Delta Levee Program
Department of Water Resources
1416 Ninth Street
Sacramento, CA 94236

Re: Five (5) Year Levee Plan

Dear Mr. Mirmazaheri:

Thank you for the opportunity to provide a suggested five (5) year levee plan. This submittal is intended to provide the overarching plan within which Districts would submit five (5) year plans outlining the intended levee work categories with rough estimates of cost. These work plans will necessarily change with conditions in the field and progress of work. The five (5) years included are 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14. For 2008-09 we suggest the same priorities. For Delta Levees Proposition 84 provided $275 Million and Proposition 1E $500 Million for a total of $775 Million. For the five years it is assumed that at least $100 Million will be available each year.

Our view of the need to preserve Delta levees extends to all of the present levee systems. The inter-relationship of the various islands and tracts due to seepage, wind wave generation and as habitat for both local and migratory fish and wildlife mandates that the plan should attempt to preserve all levee systems with due consideration of the Legislature's concern that preservation of all may not be economically justifiable. Outlined herein are the priorities and constraints which will provide economic support with appropriate justification.

The Legislature's findings and declarations in Water Code sections 12981 and 12982 provide the guidance in which we concur.

"§ 12981. Unique resources with statewide significance; preservation

(a) The Legislature finds and declares that the delta is endowed with many invaluable and unique resources and that these resources are of major statewide significance.

Exhibit A-1

(b) The Legislature further finds and declares that the delta's uniqueness is particularly characterized by its hundreds of miles of meandering waterways and the many islands adjacent thereto; that, in order to preserve the delta's invaluable resources, which include highly productive agriculture, recreational assets, fisheries, and wildlife environment, the physical characteristics of the delta should be preserved essentially in their present form; and that the key to preserving the delta's physical characteristics is the system of levees defining the waterways and producing the adjacent islands. However, the Legislature recognizes that it may not be economically justifiable to maintain all delta islands.

(c) The Legislature further finds and declares that funds necessary to maintain and improve the delta's levees to protect the delta's physical characteristics should be used to fund levee work that would promote agricultural and habitat uses in the delta consistent with the purpose of preserving the delta's invaluable resources."

"§ 12982. Public benefit from privately maintained levees

The Legislature further finds and declares that while most of the delta's levees are privately owned and maintained they are being subjected to varied multiple uses and serve to benefit many varied segments and interests of the public at large, and that as a result of the varied multiple uses of such levees, added maintenance costs are being borne by adjacent landowners."

Although the smallest of islands may at first blush appear to be expendable, the habitat value (which in many cases is supported with private funds) would be lost. Such habitat value is extremely difficult to replace especially in terms of supporting habitat for waterfowl in the Pacific Flyway and providing meandering shoreline. With increasing development along the entire west coast of the United States, the opportunity to preserve supporting habitat for the Pacific Flyway is greatly diminishing. It is also extremely difficult to replace the meandering shoreline habitat and meandering waterway recreational opportunity provided by even the smallest levee systems. The impacts of seepage and wind-generated waves on surrounding levees and lands are assumed to be less critical with the flooding of smaller islands however, significant impacts can still result. Scour in adjoining channels resulting from levee breaks or even from the ongoing tidal flow of water in and out of the flooded area, scour from rerouting of channel flow (including the flow of water to the export pumps) and changes to the land surface such as from oxidation of organic soils can result in major long lasting adverse impacts to adjoining areas.

Limited Ability to Generate Local Revenue for Cost Share and Project Funding

The limited ability to generate revenue from local assessments to meet cost-sharing requirements and to fund the levee work in advance of reimbursement is a primary constraint under the Levee Subvention Program. Local assessments are based on allocations of the benefits derived from the levee-related services provided by the local levee maintaining districts. In most cases these are reclamation districts. Pursuant to California Constitution Article XIII D increases in assessments must be submitted to an assessment ballot proceeding where a majority protest based on the maximum dollar amounts to be assessed will stop the assessment. The benefit allocations are typically based on land use where the ratios for allocation from one use to another are fairly well bracketed and the constraint is the agricultural use ability to pay. Further consideration of ability to pay for districts which have significant agricultural use is unnecessary as the limitations are clearly demonstrated by previous analysis. As to urban levee systems, it is important to continue to recognize that State funding is intended to provide contribution from beneficiaries of the levee system other than the landowners within a particular district and to in part compensate for damages to the levee system caused by users of the Delta other than the landowners. We believe the funding priorities and cost shares set forth herein adequately account for ability to pay for all eligible districts including those with urban levee systems.

As presently structured, the Delta Levee Subvention portion of the Delta Levee Program cannot facilitate timely completion of urgently needed levee work. The substantial under-funding of the Delta Levee Subvention Program in recent years coupled with substantially increased cost of meeting regulatory requirements has left most participating districts with very little capability to fund additional levee work.

FEMA Eligibility

FEMA is applying a very rigid interpretation of the requirements under the so-called Delta Hazard Mitigation Plan (HMP). Instead of the good faith progress approach applied in previous years, FEMA has denied eligibility if any part of a levee system fails to meet HMP requirements. For the 2005/06 flood event, the one (1) foot above the 100 year flood elevation requirement was the greatest constraint. Portions of the Delta levees are settling and can be expected to continue settling for many years to come. The crowns of levees on which county roads and State highways are located are typically raised less frequently to reduce disturbance of costly road surfacing. Changes in historical benchmark elevations have added to the non-compliance. Although federal funding has not been made available to support the Delta levee programs, federal Disaster Assistance has at times been substantial. Priority funding is needed to re-establish and maintain HMP compliance to help assure future FEMA assistance. HMP compliance with a robust levee program should demonstrate a good faith effort on the part of the State and locals towards reasonably reducing the threat of future flooding. We would expect such effort to be recognized by FEMA.

HMP is not an acceptable levee standard but rather a means of measuring progress to satisfy FEMA. The PL 84-99 agricultural standard is viewed as the minimum acceptable level of protection against failure due to flooding. Any other higher levels of protection should be determined and prioritized by DRMS, Delta Vision, etc. and funding for those more expensive fixes would be expected to come from other sources of state money and other beneficiaries.

5-Year Plan

Definitions - Urban Islands and Tracts are those with levee systems which protect areas with existing and ongoing urban development where the levees have at one time been accredited or are in the process of being accredited as meeting FEMA requirements for urban development.

Non-Urban Islands and Tracts are those other than Urban Island and Tracts.

Project levee and non-project levee shall be as defined in WC 12980.

Special Project Program - The Special Project portion of the Delta Levee Program should incorporate broader funding of needed levee work throughout the Delta. We suggest that the Special Levee Project program be separated into two parts: State Special Projects and Local Special Projects.

The State Special Projects would continue the past practice with emphasis for the eight (8) western Delta islands thought to be most important to restrain salinity intrusions, assistance for levees protecting the towns of Thornton and Walnut Grove and for other levee projects. For the 5 year planning period, the expenditures should be focused on levee improvement. Other expenditures including habitat enhancement should not exceed ten (10) percent of the amount of funding for the State Special Projects.

The Local Special Projects would be applied throughout the Delta to the non-project , non-urban islands and tracts other than the eight (8) western Delta islands. The first priority for the local special projects should be funding of work necessary to achieve and maintain HMP requirements on the non-project, non-urban islands and tracts and achieving and maintaining minimum project levee standards on project levees. This work should be funded 100% by the State. The non-project levee work should be designed to raise crown elevations to one (1) foot above the 100 year flood elevation plus an additional one-half (1/2) foot to account for periodic levee settlement. For areas with public roadways the design should include the one (1) foot above the 100 year flood elevation plus an additional one (1) foot. For non-project levees, the crown width should at a minimum meet the HMP required sixteen (16) feet but should seek to achieve a minimum of twenty-two (22) feet on levees without public roadways and the then current crown width or twenty-eight (28) feet (whichever is greater) for levees with such roadways. The HMP required all weather road on the levee crown must be included. The second

priority should be funding ninety percent (90%) of the cost of habitat mitigation related to non-urban islands and tracts for all priorities of work including PL 84-99 and DWR Bulletin 192-82 agricultural standards. The third priority should be funding ninety percent (90%) of the cost of work on non-project, non-urban islands and tracts to reach the PL- 84-99 or DWR Bul. 192-82 agricultural standard with a height of eighteen (18) inches above the 100 year flood elevation plus one-half (1/2) foot of additional elevation for levees without public roadways and one (1) foot of additional elevation for levees with public roadways. Crown width should be twenty (20) feet on levees without public roadways and the then current crown width or twenty-four (24) feet (whichever is greater) for levees with such public roadways.

Levee Subvention Program

$1,000.00 per mile deductible.

First Priority - 75% reimbursement up to $20,000.00 per mile for annual levee maintenance.

Second Priority - 75% reimbursement for habitat mitigation.

Third Priority - 75% reimbursement for all levee work in excess of First Priority work up to an additional $20,000.00 per mile including HMP work and work to meet the PL 84-99 or DWR Bul. 192-82 agricultural standards with an additional one-half (1/2) foot of crown elevation to account for periodic settlement on levees without public roadways and an additional one (1) foot on levees with public roadways. Crown width should be twenty-two (22) feet on levees without public roadways and the then current width or twenty-eight (28) feet (whichever is greater) for levees with such public roadways.

Fourth Priority - Third priority work in excess of $20,000.00 per mile.

District Five Year Plans

Each participating district should provide a five year plan setting forth the general description and estimated dollar amount of work proposed for each of the categories set forth above assuming advances for the Subvention Program as currently applicable and payments by the State for Special Projects as invoices are received. Special State Projects and Special Local Projects will require specific plans and project review consistent with current practice. Local district development of plans, conduct of soil investigations and preparation of project documents will be funded through the Local Special Projects at a cost share of 90% State, 10% Local.

Additional Priorities Established Through the Annual Allocation of Funding to the Following Categories: (assumes One Hundred Million Dollars per year)

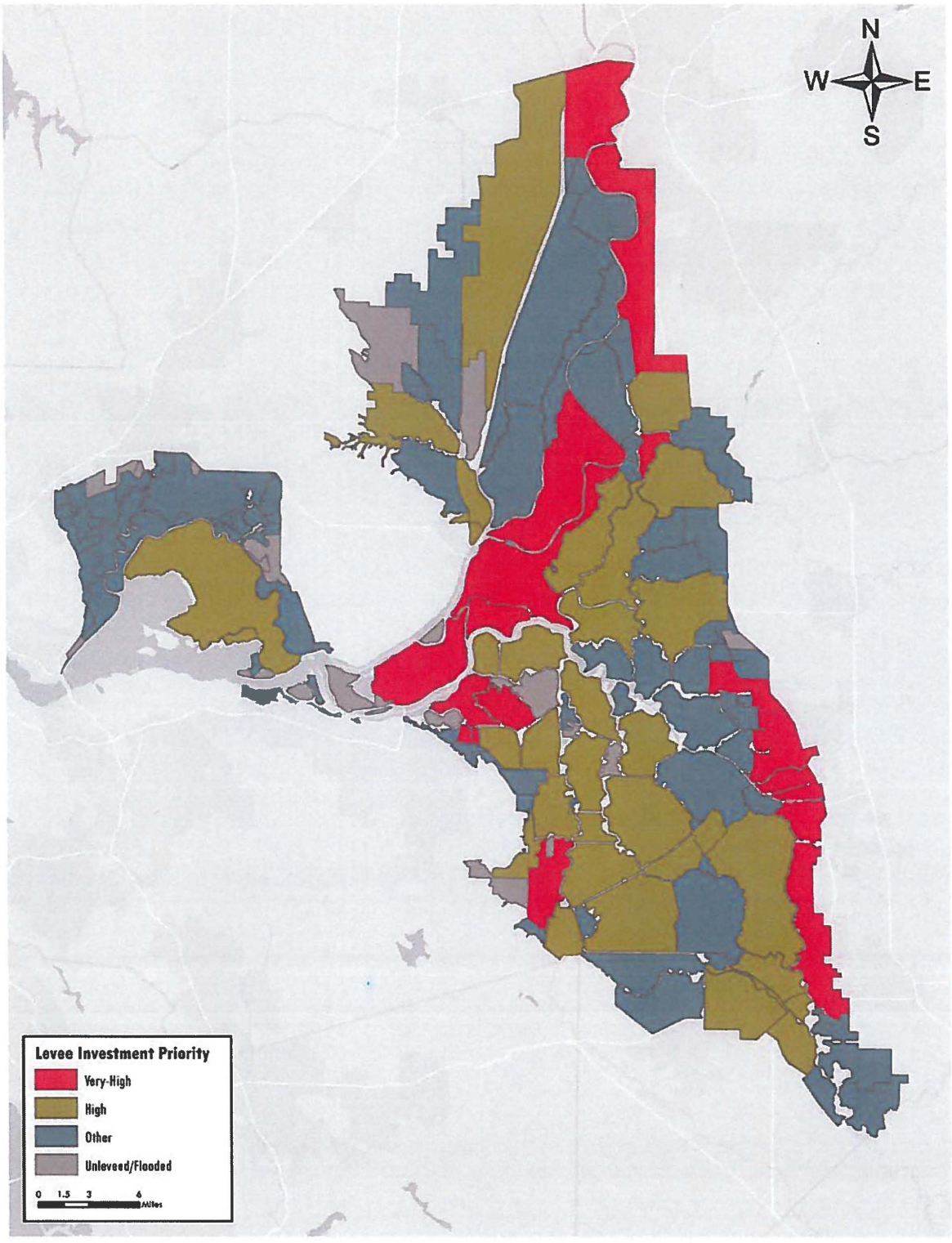
Delta Levee Subventions	12 million
State Special Projects	44 million
Local Special Projects	44 million

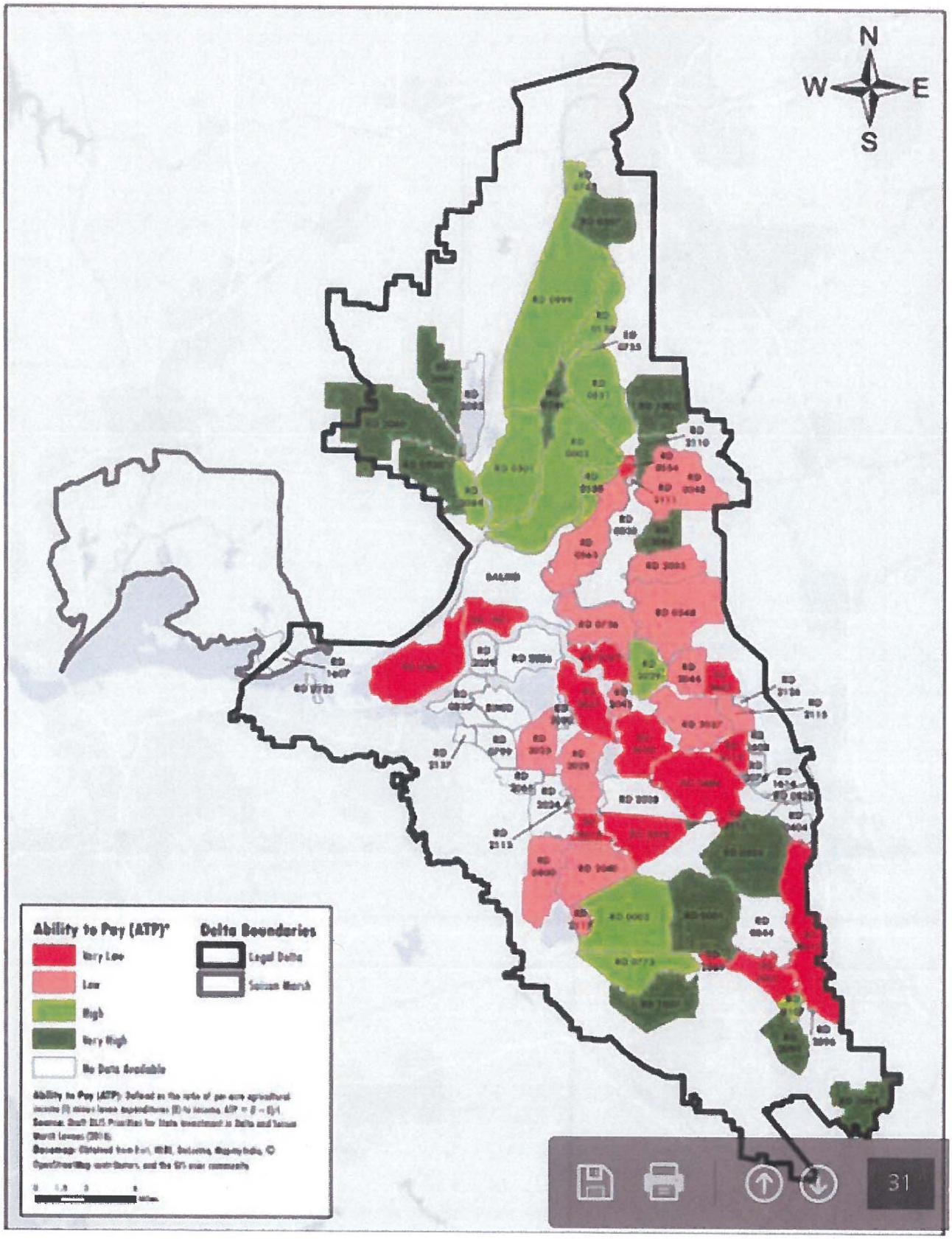
If funding is insufficient to fund all acceptable projects in the Delta Levee Subvention and/or the Local Special Projects Categories for the particular fiscal year, the funding will be allocated within each category first, based on the specific priorities and second, prorated within the underfunded priority to fully fund a segment of qualifying work in each applying District. The proration will be based on the total lineal feet of acceptable levee work within the underfunded priority which is included in the application of a particular district as compared to the total lineal feet of acceptable levee work included in all applications for the particular fiscal year in the specific priority. The District may elect to receive the funding available to provide maximum State cost share for a segment of the work and defer the remainder of the work in the priority to a subsequent year. Any excess of funds within the Delta Levee Subventions or Special Local Projects Categories shall be applied first to fund any shortfall in the other category within the particular fiscal year and second to supplement funding in the particular category in the subsequent fiscal year.

DANTE JOHN NOMELLINI
Manager and Co-Counsel

DJN:ju
cc: David Mraz via dmraz@water.ca.gov
Locals

Preliminary Draft Delta Levees Investment Priorities




N
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Ability to Pay (ATP)*
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Low
High
Very High
No Data Available
Delta Boundaries
Legal Delta
Suisun Marsh
31

Exhibit C

STATE OF CALIFORNIA
THE NATURAL RESOURCES AGENCY
CENTRAL VALLEY FLOOD PROTECTION BOARD
RESOLUTION NO. 2018-06 FOR
ACCEPTABLE OPERATION AND MAINTENANCE OF THE
STATE PLAN OF FLOOD CONTROL

BACKGROUND:

A. **WHEREAS**, in 1911 the Legislature created the Reclamation Board. The Reclamation Board was given regulatory authority over the Sacramento Valley's levee system and levee maintaining agencies with the objectives of (1) assuring a logical, integrated system for controlling flooding along the Sacramento and San Joaquin Rivers and their tributaries in cooperation with the United States Army Corps of Engineers (USACE), (2) cooperating with various agencies in planning, constructing, operating, and maintaining flood control works, and (3) maintaining the integrity of the flood control system and designated floodways. In 1913 the Reclamation Board was given regulatory authority over the San Joaquin Valley's levee system and levee maintaining agencies. In 2007 the Legislature restructured the Reclamation Board and renamed it as the "Central Valley Flood Protection Board"; and

B. **WHEREAS**, as the non-federal sponsor of the State-federal flood control system in California's Central Valley, the Central Valley Flood Protection Board (Board) has provided the federal government with assurances that the flood control system would be operated and maintained as prescribed by regulations of the Secretary of the Army that require compliance with the USACE Standard Operation and Maintenance (O&M) manuals for the Sacramento River Flood Control Project (1955) and for the Lower San Joaquin River Levees – Lower San Joaquin River and Tributaries Project (1959) pursuant to the authority in California Water Code Section 8617; and

C. **WHEREAS**, pursuant to Section 3 of the Flood Control Act of 1936 and Section 103 of the Water Resources Development Act of 1986 (WRDA 86), non-Federal interests are required to pay 100 percent of the costs of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of structural flood damage reduction projects. In addition, the USACE has issued a policy guidance memorandum dated August 16, 2005 which states that a project is only eligible for reconstruction assistance from the USACE if a non-federal sponsor has performed adequate maintenance; and

D. **WHEREAS**, the USACE has issued Engineering Regulation (ER) 1110-2-401, dated September 30, 1994 which defines "repair, replacement, and rehabilitation" for projects managed by non-federal sponsors. "Repair" is considered to entail those activities of a routine nature that maintain the project in a well-kept condition. "Replacement" covers those activities taken when a worn-out element or portion thereof is replaced. "Rehabilitation" refers to a set of activities as necessary to bring a deteriorated project back to its original condition; and

Exhibit D

E. **WHEREAS**, the legislature granted the Board jurisdiction and authority over the State Plan of Flood Control (SPFC) as denoted in California Water Code, including Section 8534, which requires the Board to enforce on behalf of the State the erection, maintenance and protection of the SPFC which in its judgment will best serve the interests of the State and Section 8608 which requires the Board to establish and enforce standards for the operations and maintenance of the SPFC; and

F. **WHEREAS**, California Water Code Section 12642 states "In all cases where the Federal Government does not maintain and operate projects, it is the responsibility and duty of the county, city, state agency, or public district affected to maintain and operate flood control and other works, constructed pursuant to Chapters 1 and 2 of this part, after their completion and hold and save the State and the United States free from damages."; and

G. **WHEREAS**, California Water Code Section 12828 states "Except where the co-operation required by the United States in addition to the costs of all lands, easements, and rights-of-way, has been authorized to be assumed by the State prior to March 12, 1946, the department shall not reallocate the funds allocated to it, nor shall the Reclamation Board expend any funds appropriated directly to it, for acquisition of property rights or contributions to the United States, for any project for which the Reclamation Board is directed to give assurances to the United States unless and until a public agency other than the Reclamation Board has either assumed the obligations of maintenance and holding the United States harmless from damages due to the construction of works, directly with the United States, or has by binding agreement with the Reclamation Board agreed to assume such obligations and to hold the State and the Reclamation Board harmless from any claims therefor..."; and

H. **WHEREAS**, many local maintaining partners provided assurances to the Board and signed agreements with the Board for continued operation and maintenance prescribed by regulations of the Secretary of the Army for the flood control system in the Central Valley; and

I. **WHEREAS**, in 2005, Hurricane Katrina caused portions of the federal levee system to fail in New Orleans, resulting in significant loss of life and property and subsequently, the USACE embarked upon a nationwide scrutiny of the federal levee system; and

J. **WHEREAS**, after Hurricane Katrina, the people of California recognized the Sacramento-San Joaquin Valley as an area significantly at risk for similar devastation suffered by New Orleans and passed Proposition 1E, which provided $4 billion for flood protection for the Central Valley, which has been utilized over the past 11 years to significantly improve the SPFC facilities in the Central Valley; and

K. **WHEREAS**, the Central Valley Flood Protection Act of 2008 (2008 Act) directed that the Department of Water Resources (DWR) prepare a Central Valley Flood Protection Plan (CVFPP) to be adopted by the Board by July 1, 2012 (CWC § 9612(b)); and

L. **WHEREAS,** DWR prepared a 2017 update to the CVFPP pursuant to the requirements of the 2008 Act. The 2017 update was adopted by the Board through Resolution of Adoption 2017-10 on August 25, 2017; and

M. **WHEREAS,** through Resolution of Adoption 2017-10, the Board stated the following:

i. That in order to successfully implement the 2017 CVFPP Update, essential and adequate funding is necessary to continue to operate and maintain the flood system, that additional funding is required to correct identified deferred maintenance issues, and that further funding is essential to continue to make vital improvements to California's aging flood system.

ii. That since the adoption of the 2012 CVFPP, the levee inspection reports provided by the USACE indicate severe levee maintenance deficiencies in over 90% of State Plan of Flood Control levee systems.

iii. That it is committed to working with the local maintaining agencies to correct these operation and maintenance deficiencies in order to obtain or regain eligibility for the Public Law 84-99 Rehabilitation Program.

iv. That it acknowledges the importance of all eight key policy issues identified in the 2017 CVFPP Update and will facilitate resolution of these interrelated policy issues with the understanding that the Board has identified funding and operation and maintenance of the flood system as the highest priorities to advance prior to the 2022 CVFPP Update.

N. **WHEREAS,** through multiple successful Coordinating Committee meetings, the Board has facilitated a discussion regarding the definitions of OMRR&R, including valuable participation by the USACE, maintaining agencies, and stakeholders.

NOW, THEREFORE THE BOARD FINDS:

1. That the above recitals are true and correct.

2. That this Resolution 2018-06 is being adopted by the Board as confirmation of the State's standards for OMRR&R for SPFC facilities. It is also intended to notify all interested parties that the Board will enforce its standards as necessary to fulfill its mandates pursuant to California Water Code and its federal assurances.

3. That the USACE requires that all SPFC facilities be operated and maintained in accordance with the Code of Federal Regulations, Title 33, Section 208.10 (33 CFR 208.10), with federal O&M manuals, in accord with ER 1110-2-401 and that all levee systems pass periodic inspections with acceptable ratings to be eligible for the federal Public Law 84-99 Rehabilitation Program.

4. That except as noted below, the State's priority and long-term goal is for maintaining agencies to substantially improve operation and maintenance practices to reach compliance with all requirements of applicable federal regulations and O&M manuals ensuring eligibility for the federal Public Law 84-99 Rehabilitation Program under current federal interim guidelines. The State does not believe that compliance with the USACE vegetation standards is appropriate or practical within the SPFC in light of

competing interests under the Endangered Species Act and therefore has promoted alternative levee vegetation objectives that require maintaining agencies to instead comply with the State's current levee vegetation management strategy.

5. That the obligation to perform routine operation and maintenance did not change with the addition of 33 U.S.C. 2213 from WRDA1986.

6. That the required operations and maintenance as identified in existing O&M manuals includes "repair, replacement, and rehabilitation" as described in ER 1110-2-401, but does not include reconstruction of a project or project segment that has reached the end of its design service life or is deficient due to a design or construction defect.

7. That many local maintaining agencies have advised the State that lack of sustainable funding is a major hurdle to adequately operate and maintain SPFC facilities.

8. That identifying and securing a sustainable funding source for operation and maintenance of the SPFC is a State priority.

9. That the State is committed to working with the maintaining agencies to correct operation and maintenance deficiencies that will reduce risk to the people and property of the Central Valley, and obtain, regain, and maintain eligibility for the federal Public Law 84-99 Rehabilitation Program.

10. That the State acknowledges the value of maintaining agencies and applauds those agencies which received acceptable ratings. The State appreciates those maintaining agencies that have developed and submitted System Wide Improvement Framework (SWIF) plans.

11. That the State encourages all other maintaining agencies currently not meeting federal Public Law 84-99 Rehabilitation Program eligibility criteria to develop, submit, and adhere to SWIFs as an initial phase to regain eligibility for the federal Public Law 84-99 Rehabilitation Program. As an interim phase of compliance with the requirements of 33 CFR 208.10 and federal O&M manuals, the maintaining agencies may address the unacceptable items identified in the USACE inspection reports that fall within the list of items used to determine Public Law 84-99 eligibility, currently described in the USACE memorandum dated March 21, 2014 with subject line "Interim Policy for Determining Eligibility Status of Flood Risk Management Projects for the Rehabilitation Program Pursuant to Public Law (P.L.) 84-99".

12. The Board will seek to update or execute assurance agreements with local maintaining agencies to standardize such agreements in a manner that explicitly recognizes operation and maintenance requirements include repair, rehabilitation, and replacement as defined in ER 1110-2-~~104~~ 401.

NOW, THEREFORE, BE IT RESOLVED, THAT THE BOARD ESTABLISHES THE FOLLOWING POLICIES:

I. Maintaining agencies who have not received acceptable ratings from recent Department inspections, shall make every effort to receive "acceptable" ratings from annual Department inspections.

II. Maintaining agencies shall make every effort to obtain or regain, and maintain, eligibility for the federal Public Law 84-99 Rehabilitation Program, including participating in the federal SWIF program as an initial phase while working toward an interim phase of compliance by addressing the unacceptable items within the USACE's list described in the USACE's interim policy.

III. Maintaining agencies shall make every effort to comply with the State's long-term requirement of full compliance with 33 CFR 208.10 and federal O&M manuals consistent with the State's current levee vegetation management strategy.

IV. Maintaining agencies that are unable to meet OMRR&R requirements shall seek necessary funding to comply with OMRR&R requirements or participate in the federal SWIF program.

V. The State is committed to improving operation and maintenance of SPFC facilities in all areas. Where the State is required to perform OMRR&R, the State shall continue to obtain, regain, and maintain eligibility in the Public Law 84-99 Rehabilitation Program. The State shall also make every effort to address non-compliant encroachments systemwide.

VI. The State will investigate all remedies available to it as authorized by California Water Code, in areas where local maintaining agencies are unable or unwilling to fund proper operation and maintenance practices in compliance with 33 CFR 208.10 and federal O&M manuals.

This resolution shall constitute the written decision of the Board in the matter of acceptable operation and maintenance of the State Plan of Flood Control.

PASSED AND ADOPTED by vote of the Board on Month XX, 2018

William H. Edgar

William H. Edgar, President

Jane Dolan, Secretary

State of California

FLOOD HAZARD MITIGATION PLAN

FOR THE

SACRAMENTO-SAN JOAQUIN DELTA

Covering portions of Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties

---

Disaster Declarations

FEMA-633-DR, FEMA-651-DR, FEMA-669-DR, FEMA-677-DR

Prepared by
Department of Water Resources
for
Office of Emergency Services

September 15, 1986

Exhibit E

State of California

FLOOD HAZARD MITIGATION PLAN

FOR THE

SACRAMENTO-SAN JOAQUIN DELTA

Covering Portions of Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties

Disaster Declarations

FEMA-633-DR, FEMA-651-DR, FEMA-669-DR

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September 15, 1983

CONTENTS

Page

Appendices

Figures

State of California
GEORGE DEUKMEJIAN, GOVERNOR

The Resources Agency
GORDON K. VAN VLECK, Secretary for Resources

Department of Water Resources
DAVID N. KENNEDY, Director

Alex R. Cunningham	Arthur C. Gooch	Howard H. Eastin
Deputy Director	Acting Deputy Director	Acting Deputy Director

CENTRAL DISTRICT

Robert G. Potter . . . . . District Chief

This report was prepared under the direction of

Lee W. Carter — Chief, Data and Operations Branch

Special thanks are extended to the following people
for their cooperation and expertise given
during the preparation of this report

H. Roger Pulley . . . . . Office of Emergency Services
A. J. Brown . . . . . Department of Water Resources

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John Wright		Bill Dutra

Legislative Assistants

Gladys Ikeda . . . . . Representing Senator John Garamendi
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Counties

Jim Dixon . . . . . Sacramento County
Peggy Keranen . . . . . San Joaquin County

PART I. SUMMARY AND RECOMMENDATIONS

A summary of the State Hazard Mitigation Plan for the Sacramento-San Joaquin Delta is as follows:

A. Short-Term Mitigation Plan

1. By February 1, 1984, the State will give the U. S. Army Corps of Engineers a Letter of Intent to sponsor a federal-state flood control project.

2. The Department of Water Resources will request an increase in funding for the Delta Levee Maintenance Subventions Program from Tidelands Oil revenue beginning in 1984-85 and continuing until a major federal levee rehabilitation project can be implemented.

3. The Department of Water Resources, in cooperation with local districts, will use appropriate construction and maintenance standards for nonproject levees to upgrade these levees to the standards described in the "Short-Term Rehabilitation Plan".

4. The local districts will implement a levee inspection program and file a report by June 1 of each year with the Director of the Department of Water Resources for 1983-84 and 1984-85. The Department of Water Resources will develop a state levee inspection program and request funding for the program beginning in 1984-85.

5. The local districts should complete their annual levee maintenance by November 1.

6. The Department of Water Resources will develop a program to reevaluate land subsidence rates in the Delta and request funding to begin the study in the 1984-85 fiscal year.

7. The local districts should develop and file with the Office of Emergency Services (copy to the Department of Water Resources) an emergency response and evacuation plan by June 1, 1984.

8. The State of California should continue to request emergency declarations for federal assistance for serious levee failures and severe storm damage that occur prior to implementation of a federal-state-local flood control project.

B. Long-Term Mitigation Plan

The State intends to develop a comprehensive federal-state-local flood control project that would consider all islands in the Delta and to seek legislation to finance the nonfederal share.

PART II. INTRODUCTION

A. Background

On February 9, 1983, President Reagan determined that damage resulting from severe storms, flooding, high tides, and wave action in certain areas of California warranted a major disaster declaration under provisions of the Federal Disaster Relief Act of 1974 (Public Law 93-288). This declaration included damage resulting from storms and flooding that took place from November 27, 1982, through March 30, 1983. In a letter dated February 16, 1983, the Federal Emergency Management Agency (FEMA) outlined the terms of the FEMA-State Disaster Assistance Agreement for the major disaster designated FEMA-677-DR. This agreement was executed by the FEMA Regional Director and the Governor. By letter dated March 17, 1983, Amendment No. 1 was added to the agreement to include that portion of the Sacramento-San Joaquin Delta (see Figure 1) located within the counties of Contra Costa, Sacramento, and San Joaquin.

B. Requirement for a Plan

Section 406 of Public Law 93-288 requires, as a condition to receiving federal disaster aid, that repairs be done in accordance with applicable codes, specifications, and standards. It also requires the state or local government recipient of federal aid to evaluate the natural hazards of the area in which the aid is to be used and, if appropriate, take mitigating action.

C. Interagency Flood Hazard Mitigation Report

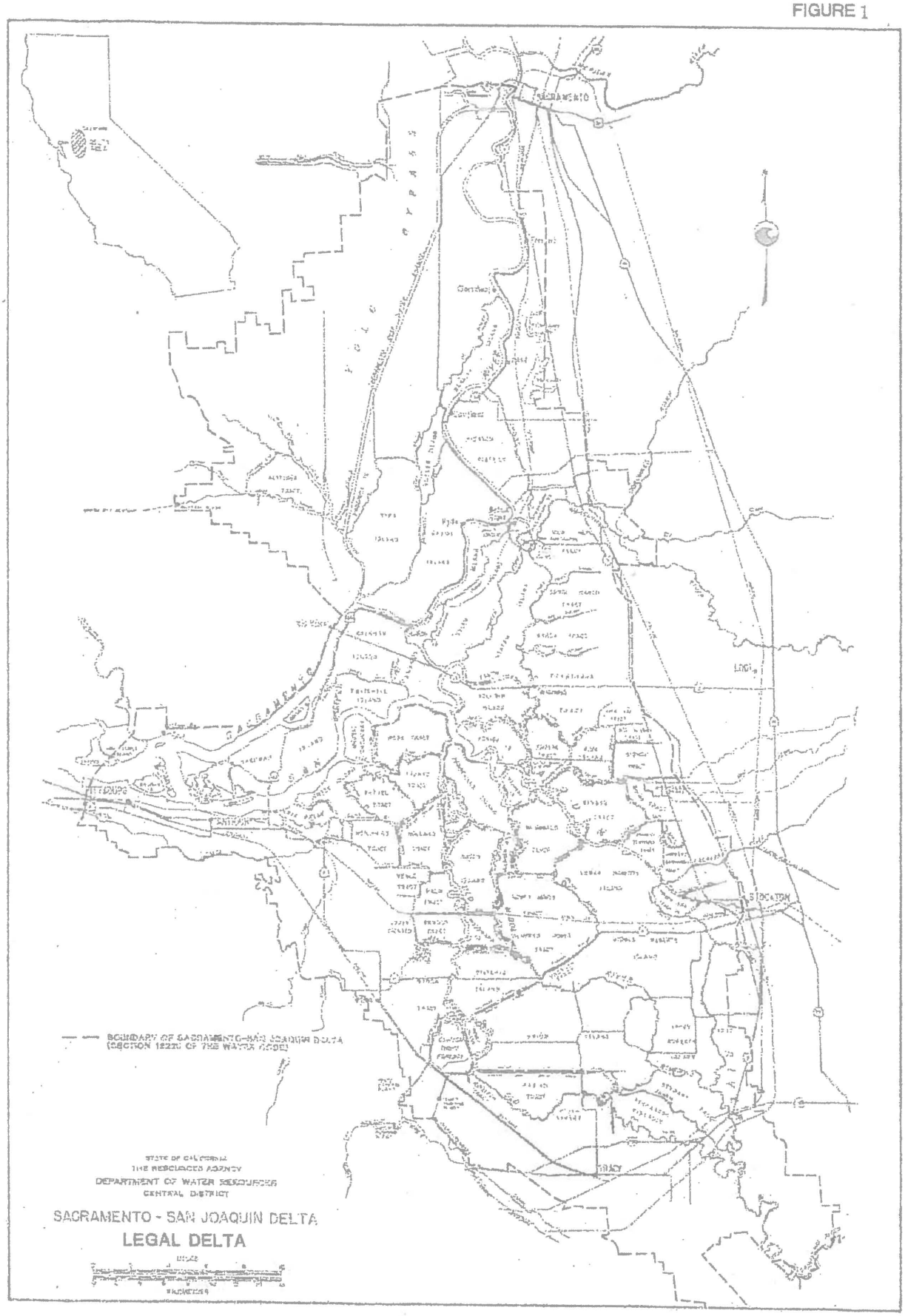
A Federal Interagency Flood Hazard Mitigation Report is prepared by the (federal) Region IX Interagency Flood Hazard Mitigation Team within 15 to 30 days following each presidentially declared major flood disaster. A report covering the recent major disaster, FEMA-677-DR, was dated March 11, 1983. Supplement No. 1 to this report, dated March 24, 1983, made specific recommendations and provided a framework for a State Flood Hazard Mitigation Plan for the Sacramento-San Joaquin Delta.

D. Objective of This Plan

The objectives of this plan are to:

1. Follow up, in detail, recommendations of the Interagency Flood Hazard Mitigation Report.

FIGURE 1


SACRAMENTO
STOCKTON
BOUNDARY OF SACRAMENTO-SAN JOAQUIN DELTA
(SECTION 12220 OF THE WATER CODE)
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
SACRAMENTO - SAN JOAQUIN DELTA
LEGAL DELTA

2. Recommend hazard mitigation alternatives for local, state, and federal agencies.

3. Establish immediate and long-term planning frameworks for implementation of hazard mitigation efforts.

E. Purpose of This Plan

The purpose of this plan is to implement the requirements of Section 406 and the requirements of Amendment No. 1 to the FEMA-State Agreement. Amendment No. 1, Paragraph 10(b), states in part:

> "The State ... will prepare and submit, not later than August 1, 1983, to the Regional Director for concurrence, a comprehensive hazard mitigation plan for the entire Sacramento-San Joaquin Delta area. This plan shall address state, local, private and federal activities and interests as they currently exist, are currently being developed, or are planned. This plan shall also identify major hazard mitigation measures to be taken for each district (applicant), by whom, sources of funding, and schedules for accomplishment. Such measures shall include: (1) establishment of applicable codes, specifications and standards for new construction, repair, and maintenance; (2) upgrading of levees and other related facilities to applicable codes, specifications, and standards; (3) periodic inspections, reports, and follow-up of all levee and related facilities; and (4) correction of maintenance deficiencies."

Amendment No. 1, Paragraph 10(b), further states:

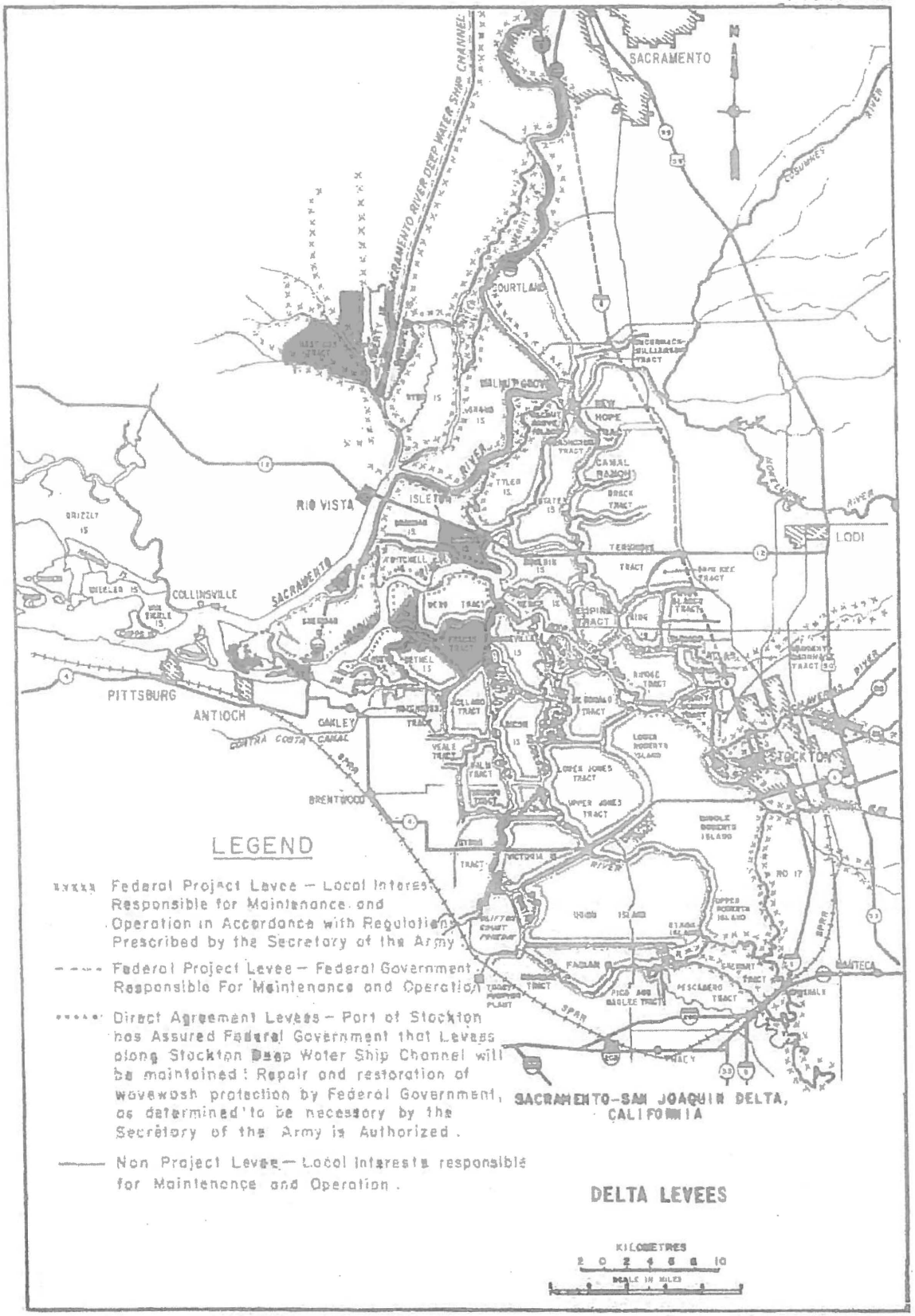
> "It is understood that one plan will be submitted which will incorporate the requirements of Section 406 of the Act and which will also satisfy the requirements for major disaster declarations FEMA-633-DR, FEMA-651-DR, FEMA-669-DR, and FEMA-677-DR."

This mitigation plan fulfills these requirements for both nonproject and direct agreement levees in the Delta (see Figure 2).

F. Flood Hazard Mitigation

Flood hazard mitigation is a management strategy in which current actions and expenditures to reduce the occurrence or severity of potential flood disasters are balanced with potential losses from future floods. Flood hazard mitigation can reduce the severity of the effects of flood emergencies on people and property by reducing the cause or occurrence of the hazard, reducing exposure to the hazard, or reducing the effects through preparedness, response, and recovery measures.

FIGURE 2


SACRAMENTO
N
SACRAMENTO RIVER DEEP WATER SHIP CHANNEL
COURTLAND
RIO VISTA
ISLETON
WALNUT GROVE
HOPE TRACT
CANAL RANCH
BRACK TRACT
TERMINOUS TRACT
LODI
COSUMNES RIVER
MOKELUMNE RIVER
COLLINSVILLE
SACRAMENTO RIVER
PITTSBURG
ANTIOCH
OAKLEY
CONTRA COSTA CANAL
BRENTWOOD
STOCKTON
MANTECA
TRACY
SPRR
LEGEND
Federal Project Levee – Local Interest Responsible for Maintenance and Operation in Accordance with Regulations Prescribed by the Secretary of the Army.
Federal Project Levee – Federal Government Responsible For Maintenance and Operation.
Direct Agreement Levees – Port of Stockton has Assured Federal Government that Levees along Stockton Deep Water Ship Channel will be maintained; Repair and restoration of wavewash protection by Federal Government, as determined to be necessary by the Secretary of the Army is Authorized.
Non Project Levee – Local interests responsible for Maintenance and Operation.
SACRAMENTO-SAN JOAQUIN DELTA, CALIFORNIA
DELTA LEVEES
KILOMETRES
2 0 2 4 6 8 10
SCALE IN MILES

Flood hazard mitigation includes such actions as:

- Minimizing probability of flood occurrence (e.g., restoration of damaged dams and levees, dam safety measures).
- Improving structures and facilities at risk (e.g., flood-proofing, restoring damaged public facilities to meet applicable codes and specifications).
- Identifying hazard-prone areas and standards for prohibited or restricted use (e.g., flood plain regulations, structural and nonstructural floodproofing, hazard mitigation plans).
- Providing loss recovery and relief (e.g., insurance, disaster grants and housing, low interest loans).
- Providing hazard warning and population protection (e.g., procedures for warning, emergency public information, direction and control, protective measures, shelter, relocation, training).
- Considering opportunities for sharing the cost of levee improvements in connection with water transfer plans (see Appendix A).

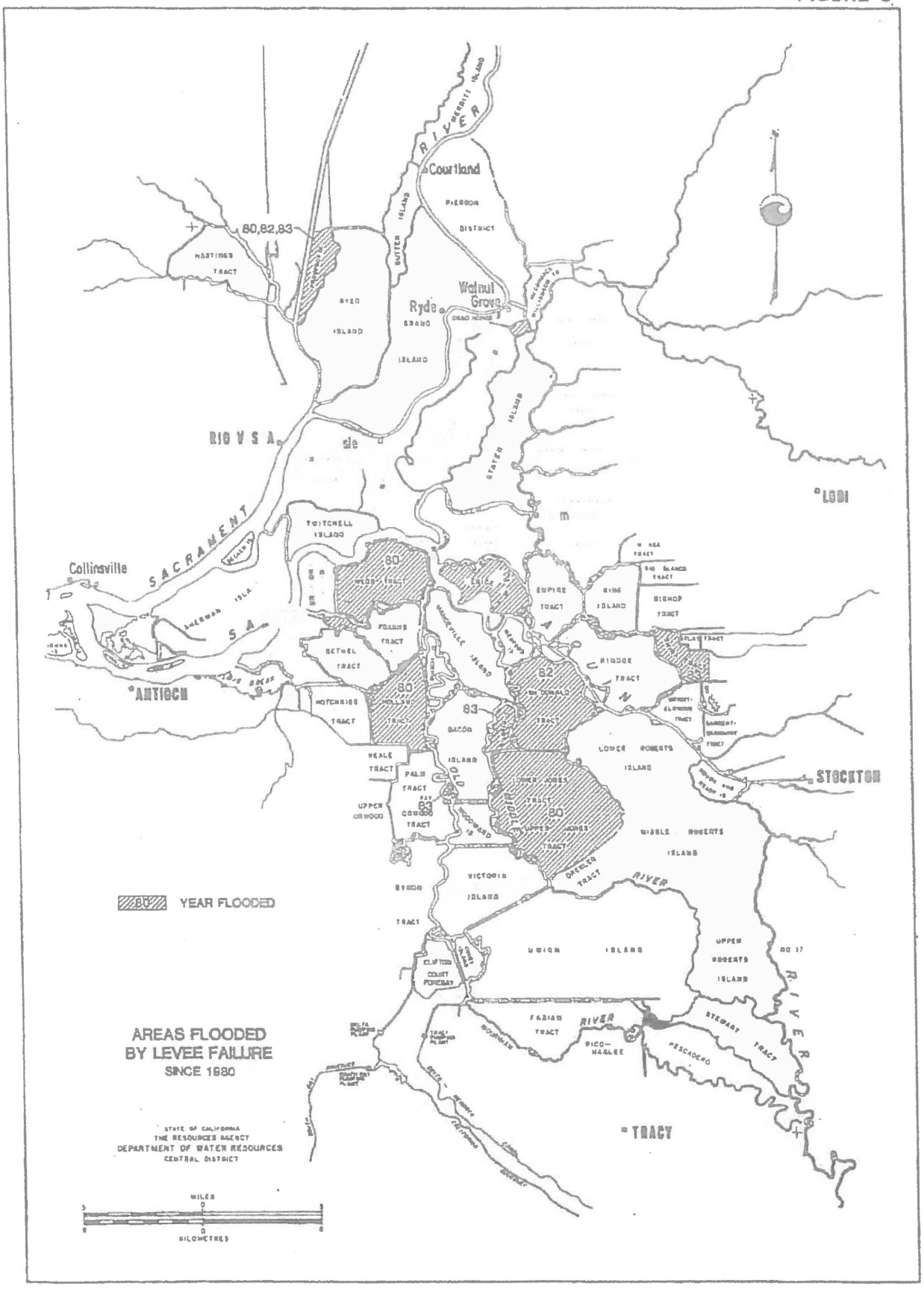
G. Hazards

Since 1980, levee failures have occurred on 12 of about 60 Delta islands (see Figure 3). Factors that contribute to levee failures include: instability of the levee section and foundation materials; subsidence; rodent burrows; erosion from wind waves and boat wakes; inadequate height (freeboard); seismic activity; and seepage.

Specific locations of levee instability and foundation weakness are difficult to identify because weak areas are not readily apparent from visual inspections. Beaver dens often are not apparent until a portion of the levee collapses. Erosion is more readily apparent and can be corrected if identified. Increased moisture from seepage through and under levees, which reduces the shear strength of the soils and thereby contributes to instability of the levees, may or may not be apparent. It is suspected that, in some areas, dredging soil from the channels as a source of material for bolstering levees has contributed to increased instability, subsidence, and seepage.

Flooding of islands can have several adverse impacts, including temporary detriments to water quality due to ocean water intrusion, increased loss of water by evaporation, increased seepage on islands adjacent to the flooded areas, loss of agricultural land, damage to urban and recreational developments, and fish and wildlife losses.

FIGURE 3


Courtland
Walnut Grove
Ryde
80,82,83
RIO V S A
SACRAMENT
Collinsville
*ANTIOCH
*LODI
STOCKTON
*TRACY
RIVER
YEAR FLOODED
AREAS FLOODED
BY LEVEE FAILURE
SINCE 1880
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
MILES
KILOMETRES

PART III. GOVERNMENTAL AND REGULATORY STRUCTURES

A. General

The existing governmental structure could provide necessary assurances to implement a Delta levees mitigation plan, both on a short-term and long-term basis. However, development of a Delta-wide reclamation district with authority to collect revenues, set maintenance standards, provide assurances, set priorities, and carry out maintenance would facilitate completion of a comprehensive Delta levees rehabilitation plan.

B. Local Districts

Essentially all of the islands and tracts in the Delta have an organized district to administer levee maintenance and restoration. Reclamation and levee districts currently have authority to raise funds from three major sources:

1. The districts are empowered under specific Water Code sections to create and update assessment rolls of the lands within their boundaries on which the governing boards can periodically levy assessments.

2. Water Code sections also allow the governing boards of reclamation districts to establish a schedule of charges and fees for services and benefits provided by the districts.

3. Those districts that use county assessment rolls to levy special taxes for levee maintenance continue to receive an allocation under the post-Proposition 13 tax collection by the county, which includes not only property revenues but also state subventions.

Until 1980, funds made available for levee maintenance and restoration from these sources had been relatively small -- less than $1 million per year. Because of the many levee failures since 1980, the local districts have been assessed up to their capability to pay. In fact, because many districts are in debt for money borrowed to repair and restore their levees, their funding capabilities may not be sufficient to accomplish the flood hazard mitigation obligations requested by FEMA.

C. Counties and Cities

The Delta area includes land in five counties: Contra Costa, Sacramento, San Joaquin, Solano and Yolo. These counties are members of a Delta Advisory Planning Council (DAPC); the

objective is to provide a unified county position with regard to Delta matters. All five counties are participating in the National Flood Insurance Program.

Counties have the necessary authority to control land use. This authority has been exercised to control urban development in the Delta. Under this plan, counties would continue to exercise land use control as part of their general plan.

A number of cities are located on the periphery of the Delta, including Sacramento, Tracy, Rio Vista, Pittsburg, and Antioch. Their involvement with the nonproject levees in the Delta is minimal. Isleton and the western portion of Stockton are within the Delta and are protected by nonproject levees. The cities, like the counties, have authority to control land use, and all are participating in the National Flood Insurance Program.

D. State of California

Many state agencies have regulatory powers covering the Delta area. The two principal agencies involved in flood control activities are The Reclamation Board and the Department of Water Resources. Other state agencies with vested interests in the Delta include, but are not limited to: Department of Boating and Waterways; Department of Fish and Game; Department of Parks and Recreation; State Lands Commission; and the State Water Resources Control Board, including the Central Valley and San Francisco Bay Regional Water Quality Control Boards.

The Office of Emergency Services administers funds made available under the Natural Disaster Assistance Act, which have been used for flood damage repair in the Delta.

E. Federal Government

Many federal agencies are involved and have some regulatory powers concerning the 700 miles of navigable waterways in the Delta. The principal federal interests in the Delta are with the following agencies: U. S. Army Corps of Engineers; U. S. Bureau of Reclamation; U. S. Department of Commerce, including the National Marine Fisheries Service, U. S. Fish and Wildlife Service, and the U. S. Coast Guard.

The Federal Emergency Management Agency (FEMA) administers disaster relief funds, made available under Public Law 93-288, which have been used for repair of flood damage in the Delta.

PART IV. SHORT-TERM MITIGATION PLAN

A. Policy

Water Code Section 12981 declares State policy to preserve the Delta in essentially its current configuration. Many bills (summarized in Appendix B) have been introduced during the current legislative session to reaffirm or modify this policy. Action on these bills will give legislative direction concerning activities in the Delta.

Rehabilitation of levees around individual islands is still the approach desired by most Delta interests. When practical, this course of action should be pursued.

A two-prong program is needed to reduce levee failures: rehabilitation of levees by adding materials; and improved maintenance of existing levees.

B. Maintenance

1. Responsibilities

The local districts are responsible for the expense and the work involved in correcting maintenance deficiencies. Each district should:

a. Prepare a plan of annual levee maintenance by June 1 of each year describing planned maintenance work and a schedule for its accomplishment.

b. Make a profile of the levee crown not less than every fifth year, or more often if determined necessary by the Board of Trustees of the district (i.e. following severe storms).

c. Adopt an emergency response and evacuation plan to be put into effect when flooding is imminent.

d. Complete annual levee maintenance by November 1 of each year.

2. Mitigation Actions

In general, district maintenance includes, but is not limited to:

a. Controlling encroachments on the levee that might endanger the levee or hinder levee construction and maintenance.

b. Exterminating burrowing rodents and filling their burrows with compacted material.

c. Shaping the levee crown for proper drainage.

d. Repairing minor slipouts, erosion, and subsidence of the levee section.

e. Cleaning drain and toe ditches adjacent to the landside levee toe that intercept seepage.

f. Minor repairing of revetment work or riprap that has been displaced, washed out, or removed.

g. Repairing and shaping patrol and access roads.

h. Controlling the weight and speed of vehicles using roads on levee crowns so as to not exceed the strength of the structural section.

i. Cutting, removing or trimming vegetation such as weeds, brush, and trees to the extent necessary to maintain a safe levee.

j. Removing debris and litter from the levee and berm where it interferes with levee maintenance.

k. Inventorying and inspecting pipes and conduits through the levee (and gates on such facilities) to ensure that they are in working condition.

l. Repairing and maintaining gates necessary to control vehicular traffic on the levees.

C. Rehabilitation

1. Policy

Short-term responsibility for levee rehabilitation remains with the local districts. The cost, however, will be shared by the state and federal agencies and possibly by other beneficiaries of the Delta. Until increased funding is available, the local districts will continue to use funds from their own revenues, the Delta Levee Maintenance Subventions Program, and federal and state disaster assistance programs to rehabilitate the Delta levees.

Dredging material for levee repair or restoration will not be permitted within 135 feet of the centerline of any levee below a depth of minus 35 feet mean sea level. (Ship channels will be considered separately.)

Materials used to repair or restore the levees must allow enough consolidation to minimize erosion during wave and tidal action and rain runoff. Districts will take and record soundings before dredging to be sure depths are adequate for the materials required.

2. Short-Term Levee Rehabilitation Plan

a. Local Districts

Local districts should:

(1) Rehabilitate levees as rapidly as possible, considering engineering, fiscal, and environmental restraints, to the following minimum standards:

(a) Levees shall have 1 foot of freeboard above the flood expected once in 100 years. (It is important to recognize that 1 foot of freeboard at a 100-year flood does not mean 100-year flood protection. Common levee design practice calls for 3 feet of freeboard at project design flood. Also, the uncertainties of Delta levee foundations and unpredictability of Delta tide levels suggest that even with 3 feet of freeboard, the degree of protection would be far less than the design flood frequency.)

(b) The minimum crown width shall be at least 16 feet.

(c) Waterside slopes shall be at least 1.5 horizontal to 1 vertical, with revetment in areas where erosion has been a problem. The size of the revetment material shall be appropriate for the slope.

(d) Landside slopes shall be at least 2 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability and seepage have been problems.

(e) The levees shall have all-weather access roads.

(2) Prepare a plan for annual rehabilitation work by June 1 of each year describing rehabilitation work and a schedule for its accomplishment.

b. State of California

(1) By February 1, 1984, the State will give the U. S. Army Corps of Engineers a Letter of Intent to sponsor a federal-state flood control project.

(2) The Department of Water Resources will recommend to the State Legislature increased funding of the Delta Levee Maintenance Subventions Program to $10 million per year from Tidelands Oil revenues, to begin in the 1984-85 fiscal year and continue until a federal-state flood control project is implemented. The Department will also recommend to the State Legislature that the cost sharing formula be changed so that the State would pay 75 percent and the local districts 25 percent of the cost of levee rehabilitation work done under the program.

(3) The Department of Water Resources will request funding for an annual Delta levee inspection program to begin in the 1984-85 fiscal year. Until funds are made available for a state inspection program, the local district's engineer should make a joint inspection with district representatives and submit a summary of work to be completed for the year, present condition of the levees, mitigation measures to be performed the following year, and a reevaluation of natural hazards affecting the district. This summary report should be submitted to the Director of the Department of Water Resources by June 1 of each year.

(4) By April 1984, the Department of Water Resources, working with representatives of local districts, will develop criteria for using soils from the channels as a source of material for bolstering levees. These criteria will reduce the hazard to levees due to this practice.

(5) The Department of Water Resources will request funds in the 1984-85 fiscal year to initiate a program to reevaluate the rate of subsidence in the Delta.

PART V. LONG-TERM MITIGATION PLAN

A. Policy

The long-term mitigation plan is to implement a major levee rehabilitation project within 20 years. The State supports the concept of a System Plan as described in the Corps' Draft Feasibility Report, dated October 1982, and in the Department's Bulletin 192-82, Delta Levees Investigation, dated December 1982, with the understanding that the local districts may complete construction necessary to comply with federal flood control standards on some islands before a federal flood control project is implemented. All islands should be included in the System Plan for stage construction, as recommended in the Corps' plan.

B. Long-Term Levee Rehabilitation Plan

Based on current information, the following islands and tracts are considered to have the most urgent need of levee rehabilitation:

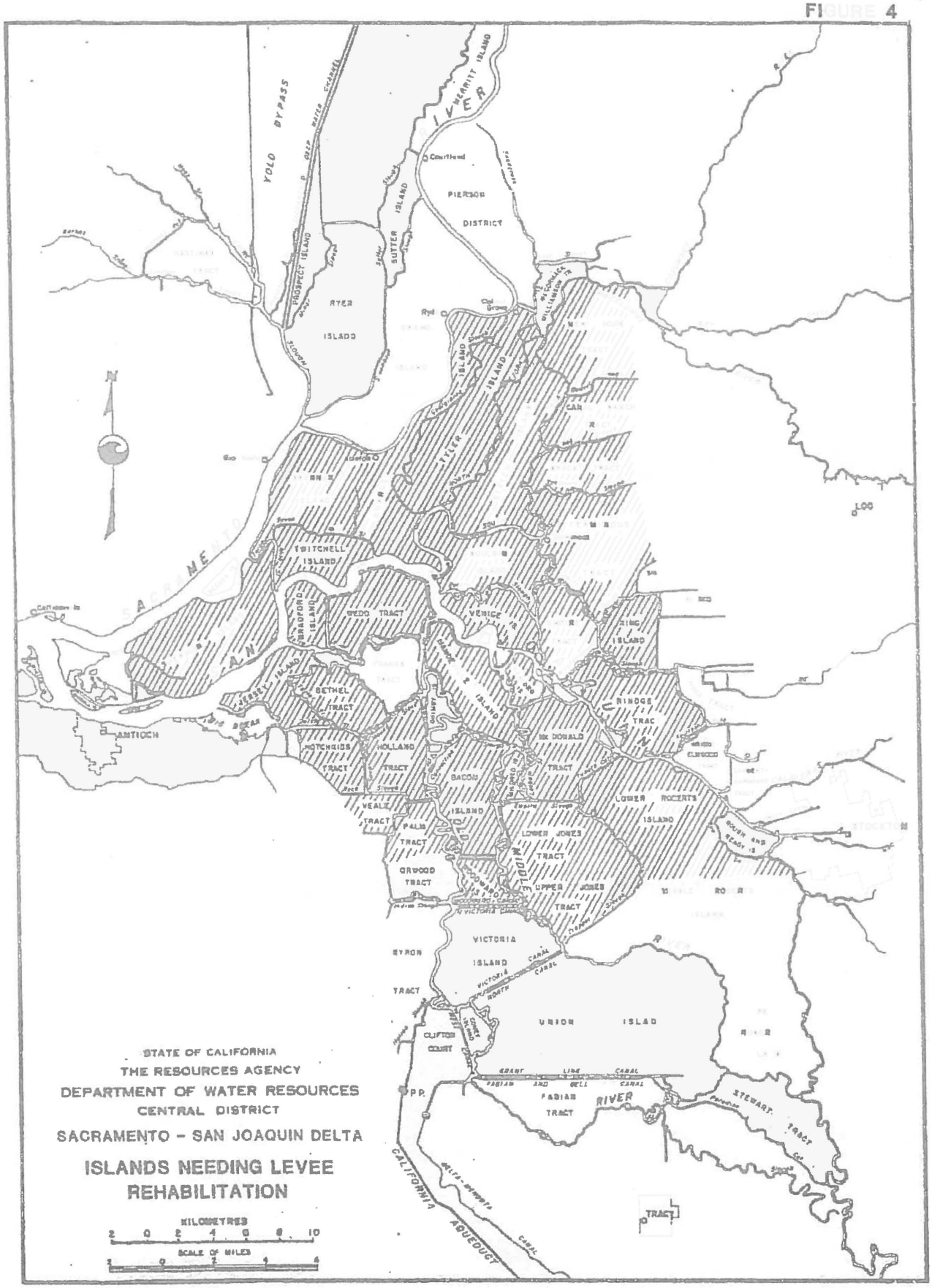
Andrus-Brannan	Hotchkiss	Rindge
Bacon	Jersey	Roberts, Lower
Bethel	Jones, Lower/Upper	Sherman
Bouldin	King	Staten
Brack	Mandeville	Terminous
Bradford	McDonald	Twitchell
Canal Ranch	Medford	Tyler
Dead Horse	Mildred	Venice
Empire	New Hope	Webb
Holland	Palm	Woodward

This list will probably change during the advanced planning stages of the project. (These tracts are shown in Figure 4.)

A joint state-federal levee rehabilitation project requires state legislative and congressional authorizations, funding for detailed planning, and funding for construction. Completion of these actions is expected to take from six to ten years. It is assumed that the funding would be at least 65 percent federal and that the nonfederal funding requirements would be shared 50 percent state and 50 percent local.

In some instances, individual districts have an insufficient economic base to provide even 15 to 20 percent of the cost of modernizing and protecting the island system. In these situations, consideration will be given to a greater State share of such costs, to be reimbursed from subsequent sale or transfer of property rights or value to the State. As an example, public acquisition of land for use in a wildlife management or

FIGURE 4


STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
SACRAMENTO - SAN JOAQUIN DELTA
ISLANDS NEEDING LEVEE REHABILITATION
KILOMETRES
SCALE OF MILES
YOLO BYPASS
PIERSON DISTRICT
RYER ISLAND
TWITCHELL ISLAND
BRADFORD ISLAND
WEDO TRACT
VERICE
RINGE ISLAND
BETHEL TRACT
ANTIOCH
HOTCHKISS TRACT
HOLLAND TRACT
BACON ISLAND
MC DONALD TRACT
LOWER ROBERTS ISLAND
WEALE TRACT
PALM TRACT
LOWER JONES TRACT
ORWOOD TRACT
MIDDLE RIVER
UPPER JONES TRACT
VICTORIA ISLAND
VICTORIA CANAL
BYRON TRACT
UNION ISLAND
CLIFTON COURT
GRANT LINE CANAL
FABIAN AND BELL CANAL
FABIAN TRACT
OLD RIVER
STEWART TRACT
DELTA-MENDOTA CANAL
CALIFORNIA AQUEDUCT

recreational program or acquisition of a flooded area for use as a reservoir as part of the State Water Project and Central Valley Project.

Cost sharing and funding must be resolved by the Congress and the State Legislature. The local share would be assigned to the individual districts in proportion to the cost to provide flood control to the island represented by the particular district.

PART VI. FUNDING SOURCES

A. General

All plans to preserve the Delta will require large increases in funding for levee rehabilitation.

B. Short-Term Levee Rehabilitation Plan

1. Local Districts

For the 1983-84 fiscal year, the local districts will continue to use their own revenues, supplemented by State contributions under the Delta Levee Maintenance Subventions Program (presently budgeted at $1.5 million per year), and funds made available under the federal and state disaster assistance programs.

2. State of California

A number of legislative bills under consideration include proposals for increases in funding for the Delta Levee Maintenance Subventions Program. Pending action on these bills, the Department of Water Resources will recommend to the Legislature:

a. An increase in funding for this program, beginning with the 1984-85 fiscal year, to a level of $10 million per year from Tidelands Oil revenues; and

b. A change in the formula for State participation to allow 75 percent State funds with 25 percent local matching funds to upgrade existing Delta levees.

3. Department of Water Resources

The Department of Water Resources will also request special language in a federal-state flood control project authorization that would allow credit to the State and to local districts for work done toward upgrading levees to federal standards before implementation of a federal-state-local flood control project.

C. Long-Term Levee Rehabilitation Plan

A U. S. Army Corps of Engineers report, "Draft Feasibility Report and Draft Environmental Impact Statement, Sacramento-San Joaquin Delta, California", October 1982, indicates federal interest in a Delta flood control project. Although the percentage of federal participation must be determined by the

Congress, the long-term mitigation plan for the Delta contemplates a federal-state-local sharing of costs for levee rehabilitation.

California has traditionally shared in the costs of federal flood control projects. The State is now contributing 75 percent and local flood control agencies are required to contribute 25 percent of the land, easement, and right-of-way costs of federal projects.

The federal government has traditionally paid 100 percent of the construction costs for flood control. Local agencies have been responsible for 100 percent of the cost of operating and maintaining flood control facilities. The Corps of Engineers' Draft Feasibility Report assumes the traditional federal-nonfederal cost sharing relationships.

Chapter 5 of the Emergency Delta Task Force report, dated January 12, 1983, also recommends a cost sharing plan that follows the traditional relationships, but it suggests that boating and commercial shipping should share in the nonfederal flood control costs. The report found that local districts are capable of raising from 15 to 20 percent of the necessary funds for levee rehabilitation projects. It is planned that the State and the local districts will equally share the nonfederal cost of a federal flood control project.

D. Nonfederal Funding

Without federal participation in a Delta levees flood control project, the state would be the logical level of government to implement a levee rehabilitation program. Special bond issues might be necessary to supplement the available Tidelands Oil and other State revenues to finance a long-term Delta levees rehabilitation project.

APPENDIX A

RELATIONSHIP OF DELTA LEVEES PLAN TO A WATER TRANSFER PLAN

The Delta is a point of diversion for both the Federal Central Valley Project and the State Water Project for exporting water to areas in California south and west of the Delta. The State's proposal for a Peripheral Canal to move water in an isolated channel across the Delta was rejected by the voters in June 1982. The State must now develop alternative methods for transferring water across the Delta. Some alternative Delta water transfer plans would require channel enlargements and levee setbacks in the South Fork Mokelumne River and channel enlargements near Clifton Court Forebay. To the extent that these enlargements and levee setbacks coincide with plans for levee rehabilitation, there would be an opportunity for cost sharing between the two projects.

In some areas, levee failures could be detrimental to water transfer operations. In these situations, cost sharing among various beneficiaries should be considered, up to an equitable amount of the benefits derived from the levee improvements.

APPENDIX B

LEGISLATIVE BILLS

Bill and Author	Subject
AB484 - Isenberg	Approve plan set forth in Bulletin 192-82
AB758 - Costa	Include New Hope Cross Channel in State Water Project Facilities
AB857 - Bradley	Immune State from liability in repairing Delta levees
AB1300 - Isenberg	Require exporters of water to enter into contracts with public agencies in Delta
AB1325 - Bradley	Prohibit expenditure for levee repair until cross-Delta water facilities are authorized
AB1607 - Waters	Approve Corps' System Flood Control Plan and authorize DWR to undertake work in advance of federal authorization
AB1612 - Waters	Require DWR to be project sponsor of federal flood control plan; request adoption of Modified System Plan
AB1712 - Johnson	Require plans compatible with Emergency Delta Task Force plan; appropriate $10 million from ERF funds to DWR for program
AB1731 - Costa	Nonsubstantive change in Central Valley Project Act
AB2112 - Isenberg	Require DWR to develop and submit to Reclamation Board recommended levee reconstruction standards and establish a yearly levee inspection program
AB2124 - Campbell	Create Delta Levee Maintenance Fund and deposit a percentage of fishing and hunting license fees, vessel registration fees, and motor vehicle fuel license taxes attributable to vessels
SB15 - Ayala	Authorize additional State Water Project facilities; create a Delta Levee Maintenance Fund; allocate $25 million from Long Beach Oil and Dry Gas revenues to the fund
SB834 - Nielson	Convey title to swamp and overflow lands to purchaser of land including berms and borrow pits

Technical Memorandum:

Delta Risk Management Strategy (DRMS) Phase 1

Topical Area:

Impact to Infrastructure

Final

Prepared by:
URS Corporation/Jack R. Benjamin & Associates, Inc.

Prepared for:
California Department of Water Resources (DWR)

June 15, 2007

Exhibit F

7.2 Summary

The total estimated replacement costs for infrastructure assets within the Delta are summarized in Table 7-8 for the current (2005) and 2050 conditions, for MHHW and 100 year inundation levels. This table accounts for infrastructure assets that could be damaged as a result of levee breaching and island flooding (see Section 1.2). The costs are based on the results presented in Tables 7-1, 7-2, 7-4 and 7-5.

Table 7-8 Comparison of Total Replacement Costs of Delta Infrastructure - Current and 2050[a]

Inundation Level	Current (2005)[c]	2050	Cost Ratio: 2050/Current
Within Mean Higher High Water (MHHW) Limits [b]	$6.7 billion	$8.5 billion [e]	1.3
Within 100-year Flood Limits [b,c]	$56.3 billion	$67.1 billion [e]	1.2

[a] Costs in this table are for infrastructure assets and their contents that could be damaged as a result of levee breaching and island flooding.
[b] See Section 4.1.2 and Figure 4-1 for limits of inundation.
[c] Flood plain limits were developed from FEMA Flood Insurance Rate Maps.
[d] Costs are in 2005 dollars.
[e] Costs are in 2005 dollars; not escalated to 2050.

As indicated in Table 7-8, the total replacement cost of assets within the 100-year flood limits significantly exceeds (about 8 times) these costs for assets within the MHHW limits. The reason for this large difference is explained by referring to Figure 4-1. This figure shows that the 100-year flood event has the potential to inundate major urban areas such as Sacramento and Stockton that have a large inventory of infrastructure assets. However, the MHHW limits do not extend to these large urban areas. Smaller towns and rural/agricultural areas mainly fall within the MHHW limits. The largest differences between damages for the 100-year flood event and other events would be for infrastructure that is located near the edge of the floodplain in urban areas (areas with topographic relief).

Table 7-8 also indicates that over the next 50 years, the total replacement cost of assets could increase by about 20 to 30 percent within the MHHW limits and the 100-year flood plain limits. Likewise, the overall damage repair costs of assets as a result of levee failure are also expected to increase over the next 50 years due to the (1) increase in the amount of infrastructure assets as a result of population growth, (2) Delta water level rise due to climate change, and corresponding increase in MHHW and 100-year flood levels, and (3) decrease in island elevation levels due to subsidence. The increase in water levels, coupled with the decreasing island elevations, would increase the amount of inundation of Delta assets in the future. The damage would therefore increase, resulting in greater future repair costs and repair times.

The repair costs for infrastructure assets will be based on the number of island failures and resulting inundation, and the repair costs will vary from island to island. For both current and 2050 conditions, the overall results of the repair and replacement costs presented in the asset tables indicate that the repair costs due to inundation could be on

the order of 30 percent (for MHHW) and 50 percent (for the 100-year food) of the asset replacement costs, considering all Delta islands and tracts.

7.3 Limitations

As stated in Section 1.2, we consider damage to infrastructure assets that could result from levee breaching and island flooding. Infrastructure assets that would not be damaged by levee failure (e.g., pumping plants and power plants) are beyond the scope of the TM.

As stated in Section 3, because some asset types lack attribute information, it was not always possible to estimate asset costs from the GIS data. In these cases, there is insufficient definition of quantitative attributes to evaluate reliable replacement and repair costs and assumptions had to be made so that damage loss could be estimated. Also, some assets were not available in the GIS database. Further characterization of the Delta infrastructure assets would reduce the uncertainty in the damage estimates.

Because of the lack of information on repair times (due to the absence of historic experience), especially for multi-island failures, judgment was used to estimate repair times.

8. References

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Decision Support Tool for the San Francisco Bay-Delta Levee Investment Strategy

DLIS Decision Support Tool | 1) Instructions and Guide | 2) Islands and Vulnerable Assets | 3) Assessing Risk (Risk Maps) | 4.1) Identify High Risk Islands | 4.2) Create Composit ›

3) Assessing Risk (Risk Maps)

3.1) Evaluating Risk | 3.2) Probability of Flooding Results | **3.3) Risk to Life** | 3.4) Risk to Property | 3.5) Risk to Water Supply | 3.6) Risk to High-Value Non-Tidal Habitat | 3.7) Risk to Delta Place, Legacy To

Risk to Life

Year & SLR Scenario

- (•) 2012, baseline
- ( ) 2030, nominal
- ( ) 2030, high
- ( ) 2050, nominal
- ( ) 2050, high

This map shows the risk to lives, including residents, workers, and visitors. Risk is displayed as expected annual fatalities (lives lost per year on average) from flooding. The risk considers the probability of flooding, population, warning and evacuation, and potential flood depths. The darker color indicates higher risk. Place your mouse over an island to see additional details.

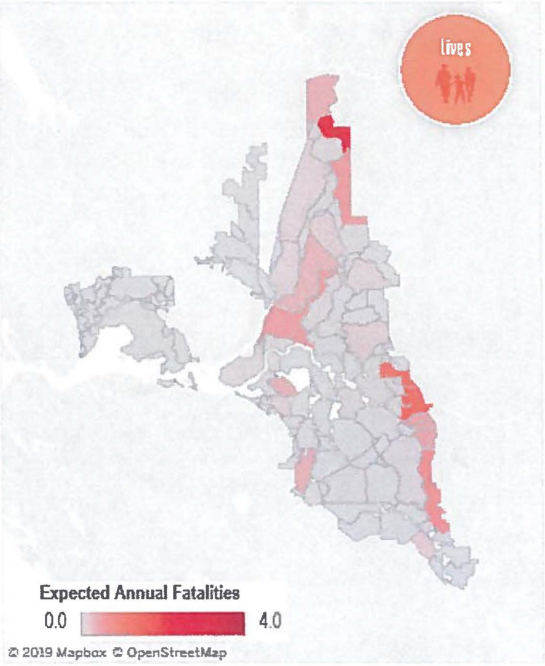


Exhibit G

Decision Support Tool for the San Francisco Bay-Delta Levee Investment Strategy

3) Assessing Risk (Risk Maps)

Risk to Property

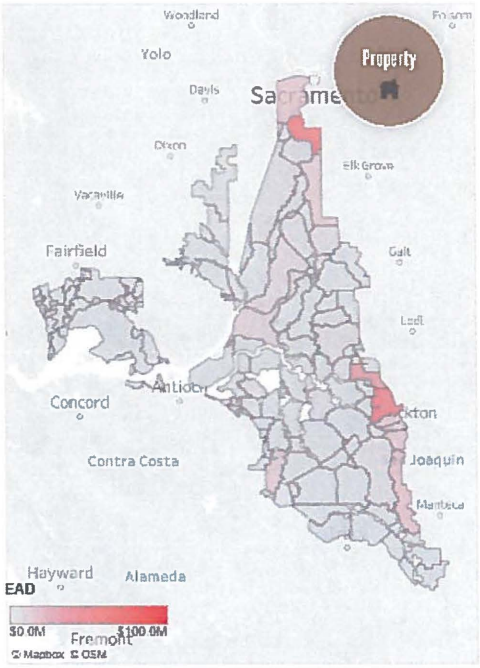
Year & SLR Scenario

- (•) 2012, baseline
- ( ) 2030, nominal
- ( ) 2030, high
- ( ) 2050, nominal
- ( ) 2050, high

Discount Rate

- (•) 0%
- ( ) 7%

This map shows the risk to property (structures, infrastructure, and crops) that could be damaged by flooding. Risk is displayed as expected annual damages from flooding, in dollars. Darker colors on the map are higher risk. Place your mouse over an island to see additional details.



Discount Rate

0%