



Delta Levees Special Flood Control Projects

2014 Guidelines For Providing Funding to Local Public Agencies

**Department of Water Resources
FloodSAFE Environmental Stewardship
and Statewide Resources Office
June 13, 2014**

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. DEFINITIONS AND ACRONYMS.....	2
III. NO-REGRETS PROJECTS.....	7
IV. AVAILABLE FUNDING	7
V. ELIGIBILITY	8
VI. ELIGIBLE PROJECTS	8
VII. INELIGIBLE PROJECTS	10
VIII. ELIGIBLE COSTS	10
IX. INELIGIBLE COSTS.....	11
X. FIVE-YEAR PLANS.....	12
XI. APPLICATION PROCESS	12
XII. REQUIRED APPLICATION MATERIALS	13
XIII. SUBMITTAL DEADLINE.....	14
XIV. PROJECT ELIGIBILITY CRITERIA	14
A. Levee Project Eligibility Requirements	16
B. Habitat Project Eligibility Requirements.....	17
XV. PROJECT EVALUATION CRITERIA.....	17
A. Levee Project Evaluation Criteria	18
B. Habitat Project Evaluation Criteria	20
XVI. COST SHARE FORMULA.....	21
A. Project Cost-Share	21
B. Project Cost-Share Enhancements	23
XVII. DIRECTED ACTIVITIES.....	25
XVIII. RESERVE FUND	25
XIX. PROJECT ADMINISTRATION	25
EXIBITS	
A. Delta Levee Standards Summaries	
B. Typical Delta Levee Cross-Sections	
C. Local Agency Benefit Assessment	
D. Requirements for the Five-Year Plan	
E. Definition of Delta Levees Habitat Types	

I. INTRODUCTION

The Delta Levee Special Flood Control Projects Program (Program or Special Projects) was established in 1988 by Senate Bill 34. It continues to operate under subsequent legislation that extended and provided funding for the Program. Originally, the Program was authorized to address flooding on the eight Western Delta Islands and in the towns of Thornton and Walnut Grove. In 1996, Assembly Bill 360 expanded the Program to include the entire Delta and to portions of Suisun Marsh (approximately 12 miles of levees on islands bordering the Northern Suisun Bay from Van Sickle Island westerly to Montezuma Slough) as outlined in Section 12311 of the California Water Code. Today, any Local Agency with a Project or Non-Project Levee in the Primary Zone of the Delta or a Non-Project Levee in the Secondary Zone of the Delta is eligible to submit proposals and apply for Special Projects funding.

The State, through the Delta Levees Maintenance Subventions Program and Delta Levees Special Flood Control Projects, has invested over \$400 million in the Delta to improve flood management, restore habitat, research causes and methods to stop subsidence, and for reuse of dredged material¹. These efforts were largely carried out by Local Agencies in the Delta. Most Department of Water Resources (Department or DWR) funding has been dedicated to maintaining and improving Delta levees. Under California Water Code Section 12314, the Program must fully mitigate the habitat impacts of each Project it funds, and ensure that the Program results in net long-term habitat improvements in the Delta. Section 12311 of the California Water Code also identifies the primary purpose of the Program as “. . . the protection of discrete and identifiable public benefits, including the protection of public highways and roads, utility lines and conduits, and other public facilities, and the protection of urbanized areas, water quality, recreation, navigation, and fish and wildlife habitats, and other public benefits.”

To be consistent with the Governor’s Water Action Plan, future funding under the Program will focus on multi-benefit projects that help simultaneously improve the environment, flood management, and water supply reliability.

This document provides guidance for funding and implementing the Special Projects Program to accomplish the Department’s goals and objectives for the foreseeable future.

The California legislature authorized funding for various flood management and ecosystem related Projects. The Department expects that additional funds will be available through the State budget process for the Program in future years.

These Guidelines implement several important DWR goals, including, but not limited to:

- preserving water quality, accomplishing water supply reliability and ecosystem restoration through levee maintenance, modifications, and improvement;

¹ Since the Delta Levees Maintenance Subventions Program is also under the Delta Levees Program, there may be overlap in the policies of the two programs for the purpose of consistency.

- protecting statewide interests through raising delta levees to appropriate standards;
- protecting life and infrastructure through other levee improvements, such as selectively funding construction of levees that offer increased levels of protection;
- funding studies and research that help to characterize the Delta soils, deepen the Department’s understanding of levee stability issues, or further the goals of subsidence reversal;
- funding habitat mitigation and enhancement projects to protect, enhance, and benefit Delta ecosystem functions and protect statewide interests; and
- funding subsidence reversal work and efforts to beneficially reuse suitable dredged material.

Each application for grant funding must meet certain common eligibility requirements, and additional category-specific (e.g. Levee, Habitat Enhancement, etc.) requirements to be eligible for funding under the Program.

Depending on current conditions when funding is available, DWR will issue periodic Projects Solicitation Packages targeted to achieve specific goals that are compatible with these Guidelines, “DRAFT V3 DHF and SMB, FloodSAFE, A Framework for Department of Water Resources Investments in Delta Integrated Flood Management” (Framework) (or any approved successor), and consistent with the Delta Stewardship Council’s Delta Plan and the Central Valley Flood Protection Plan (CVFPP). The PSP will contain requirements for eligibility and a clear statement of the types of work to be performed, along with the scoring criteria.

The types of projects eligible for funding may include, but are not limited to, construction, design, engineering work, and habitat enhancement, multi-benefit projects, levee improvement, studies and/or research projects. The Department will not fund Projects that do not meet the requirements of Water Code Sections 12310 - 12318.

All complete applications will be reviewed and scored². Selected projects will be funded and cost-shared according to the requirements detailed in the PSP.

II. DEFINITIONS AND ACRONYMS

“Ability to Pay Study:” Is a study a Local Agency may perform or have performed to derive an Alternative State Cost-Share based on the Local Agency’s ability to generate revenue to pay for its expenses related to levee and/or habitat maintenance and improvements.

“Alternative State Cost-Share:” Refers to the State cost-share determined by a Local Agency’s Ability to Pay Study or Local Agency Benefits Assessment (LABA).

² Scoring criteria will be defined in the Projects Solicitation Packages.

“Anthropogenic Accommodation Space (AAS):” The flooded volume in acre-feet of a Local Agency’s acreage that would be flooded in the event of a levee failure. This is directly related to the depth of the acreage below mean high tide elevation.

“Applicant:” Refers to the agency submitting an application under these Guidelines. Also referred to as “Local Agency” or “Reclamation District.”

“Base State Cost-Share:” Is the amount the State will pay in a given cost-share arrangement assuming the Local Agency does not qualify for an Alternative Cost-Share and has not proposed a Project with qualifying Enhanced Cost-Share features.

“Beneficial Reuse:” Refers to the practice of making beneficial use of suitable dredged materials.

“Bulletin 192-82 Design Standards:” See Exhibits A and B.

“CEQA:” The California Environmental Quality Act.

“Channel Margin Habitat (Delta Specific)” or “Fish Friendly Levee Habitat:” The complex of aquatic, wetland, and riparian habitats at the edges of watercourses in association with Delta levees. See Exhibit E

“Corps:” The United States Army Corps of Engineers.

“Cost-Share Recommendation and Report:” Refers to the recommendation and report regarding cost-share that the Applicant must include as part of its Special Projects application.

“Delta:” The area of the Sacramento-San Joaquin Delta as defined in Section 12220 of the Water Code. Also referred to as the "Legal Delta."

“Delta Special Flood Control Projects” or “Special Projects:” Refers to a Project(s) funded under these Guidelines - a Delta Special Flood Control Project, one of the components of the Department's Delta Levees Program codified at Sections 12300 - 12318 of Water Code.

“Delta Plan:” The Delta Plan was adopted by the Delta Stewardship Council on May 16, 2013 and may affect work done within the Delta and Suisun Marsh. Some projects funded under these Guidelines may require a Certification of Consistency with respect to Covered Actions under the Delta Plan.

“Delta Primary Zone” or “Primary Zone:” Is the Delta land and water area of primary State concern situated within the boundaries of the Delta, as described in Section 12220 of the Water Code, but is not within either the urban limit line or sphere of influence line of any local government's general plan or studies existing as of January 1, 1992. The precise boundary lines of the Primary Zone includes the land and water areas as shown on the map titled "Delta Protection Zones" on file with the California State Lands Commission. Where the boundary between the Primary Zone

and Secondary Zone is a river, stream, channel, or waterway, the boundary line shall be the middle of that river, stream, channel, or waterway. The Primary Zone consists of approximately 500,000 acres. Cal. Pub. Resources Code Section 29728.

“Delta Secondary Zone” or “Secondary Zone:” The Delta land and water area within the boundaries of the legal Delta not included within the Primary Zone, subject to the land use authority of local government, and that includes the land and water areas as shown on the map referenced above. The Secondary Zone consists of approximately 238,000 acres. Cal. Pub. Resources Code Section 29731.

“Delta Specific PL 84-99 Design Standards:” See Exhibits A and B.

“DSC:” Delta Stewardship Council

“Department” or “DWR:” The Department of Water Resources.

“Direct Expenditures” or “Directed Activities” or “Directed Actions:” Projects implemented by the direction, and at the discretion, of the Department that are not necessarily in response to a competitive proposal from a Local Agency, but rather are made to implement Department priorities.

“Eligible Projects:” Refers to Projects determined by DWR to be eligible for funding under these Guidelines.

“Eligible Project Costs:” The reasonable and necessary actual costs associated with an Eligible Project.

“Eligible Real Estate Capital Outlays:” Refers to real estate costs that are eligible for full or partial reimbursement under these Guidelines

“Enhanced Cost-Share:” Refers to increased State cost-share (above the Base State Cost-Share or Alternative State Cost-Share) which an Applicant earns by offering Project aspects that qualify it for a higher cost-share under the PSP.

“Financial Plan:” Refers to the plan required by these Guidelines that describes, in detail, how the Applicant will fund design, permitting, construction, mitigation, and maintenance of the proposed Project.

“Five-Year Plan” or “Plan:” The Five-Year Plan is a document that describes, in detail, an Applicant's integrated work plan to repair and improve flood protection infrastructure for the next five to ten years in the geographic area controlled by the Applicant.

“Funding Agreement” or “Agreement:” An Agreement entered into by a successful Applicant and the State to provide funds for the Project.

"Habitat Projects:" Refers to Projects under these Guidelines that support net long-term habitat improvement or habitat mitigation sites. This category includes planning and on-going management where appropriate.

"Habitat Mitigation Site:" An area of habitat lands created to provide mitigation for unavoidable habitat impacts that accrue to projects carried out through the Delta Levees Program. The habitat mitigation site creates transferable credits of habitat, allows transfer of liability for habitat impacts, and maintains a system of accounting.

"HMP Design Configuration:" See Exhibits A and B.

"Integrated Flood Management" or "IFM:" A comprehensive approach to flood management that considers land and water resources at a watershed scale within the context of integrated water management; employs both structural and nonstructural measures to maximize the public benefits of floodplains and minimize the loss of life and damage to public infrastructure; incorporates ecosystem functions to create more sustainable water and flood management systems.

"Integrated Water Management" or "IWM:" Refers to features that provide a variety of services including flood protection, flood water management, conveyance of water, protection of water quality, definition of navigation channels, and other aspects of water management.

"Investment Framework" or "Framework:" A Framework for Department of Water Resources Investments in Delta Integrated Flood Management. This definition refers to the current version of the Framework ("DRAFT V3 DHF and SMB, FloodSAFE Framework for Department of Water Resources Investments in Delta Integrated Flood Management"), or any approved successor, including the final document.

"Local Agency:" Means a reclamation district or levee district or other public agency responsible for the maintenance of a Non-Project levee as defined in Water Code Section 12980(e) or a Project Levee as defined in Water Code Section 12980(f).

"Local Agency Benefits Assessment (LABA):" Is the benefits assessment a Local Agency may perform or have performed to derive an Alternative State Cost-Share based on the benefits the proposed Project will provide to the Local Agency, separate from the benefits that the Project offers statewide or to other nearby beneficiaries.

"Local Agency Emergency Response Plan:" Refers to an Emergency Response Plan developed by or for Applicant for emergency response in a particular Reclamation District or area.

"Multi-benefit Projects:" Projects that can help simultaneously improve the environment, flood management, and water supply reliability.

"Non-Construction Costs:" Costs associated with engineering, design, permitting, environmental compliance, Eligible Real Estate Capital Outlays and other aspects of the Project that do not include actual construction.

“Non-Eligible Projects:” Projects determined by DWR to not be eligible for funding under the Special Projects Program.

“Non-Project Levee:” Means a local Delta levee that is not a project facility under the State Water Resources Law of 1945, as shown on page 38 of the Department of Water Resources "Sacramento-San Joaquin Delta Atlas," dated 1993 (Section 12980(e) of Water Code).

“No Regrets Projects:” Are Projects that meet the No Regrets requirements outlined in these Guidelines. Generally, these are Projects that the Department sees as an imperative to build even if they are built out of sequence or before all long-term planning has concluded. These Projects will not create stranded investments.

“OMRR&R:” Operation, maintenance, repair, replacement, and rehabilitation.

“Project:” Means a proposal for work to be cost-shared by the State under these Guidelines.

“Project Description:” Is the document each Applicant must include with their application that describes the proposed Project in detail. The Project Description must offer as much detail and documentation as possible about the Project, the eligibility criteria, selection criteria, cost-share formulae established in these Guidelines and in the PSP to which the applicant is responding. This significant specific information is necessary to allow the Project description to be properly evaluated and scored.

“Project Levee:” Is a federal flood control levee, as shown on page 40 of the Department of Water Resources "Sacramento-San Joaquin Delta Atlas," dated 1993, that is a project facility under the State Water Resources law of 1945 (Chapter 1 (commencing with Section 12570) and Chapter 2 (commencing with Section 12639 of Part 6)).

“Projects Solicitation Package (PSP):” Refers to a specific offering by DWR of potential funding. The PSP establishes specific goals to be accomplished, baseline funding, opportunities for enhanced State Cost Share, and any special requirements for eligibility. The PSP also provides information concerning deadlines and scoring, specific to that PSP.

“Scope of Work:” After a Project is selected and before a Project Funding Agreement is signed, the Applicant must develop a complete Scope of Work that provides detailed plans and information about how the Project will be implemented.

“Setback Levee:” A new levee constructed (landside) behind or adjacent to an existing levee that allows for sustainable flood management and creation of additional floodplain connected to the waterway. In the Delta, a Setback Levee may not necessarily result in removal of the existing levee.

“State:” The State of California, acting by and through the Department of Water Resources.

“State Cost Share:” The amount of eligible project cost, expressed as a percentage, DWR agrees to fund, as specified in the Funding Agreement.

“Stranded Investments:” Are funds committed to Projects that do not eventually contribute to the overall Department purpose or, at the very least, provide lasting benefits that are greater than the Project cost.

III. NO-REGRETS PROJECTS

The Department issues these Guidelines to continue critical flood management work in the Delta while Delta-wide planning is ongoing. As a matter of sound investment principle, these Guidelines require all Projects to be No-Regrets. All work funded under these Guidelines must be a strategic action that can take advantage of available funding to improve integrated water management strategies and/or sustainability of ecosystem functions. These actions must not conflict with current knowledge within the plans currently under consideration by the Department and/or other agencies, and will not foreclose future levee or habitat restoration opportunities. Such Projects are not likely to lead to Stranded Investments.

No-Regrets Projects include levee works and habitat projects that:

- Are clearly legislatively authorized; and
- Protect assets of statewide importance; and
- Ensure no net long-term loss of habitat; and
- Are consistent with a net long-term habitat enhancement program.

In addition to the above required components, No Regrets Projects must include one of the following characteristics:

- Repair or improve levee sections that provide protection of public infrastructure, water conveyance, and water supply reliability; or
- Improve the levees to standards acceptable to DWR to be appropriate for land use in the protected area or as provided for in these Guidelines; or
- Support needed urgent repairs to prevent levee breach or failure; or
- Provide studies or research critical to Delta flood management issues; or
- Meet the Special Projects net habitat enhancement priorities.

In addition, if a Local Agency has any interaction with ongoing flood management programs it must consider that relationship and detail how it is coordinating this Project with those programs.

IV. AVAILABLE FUNDING

The Framework provides guidance for Department investments to improve Integrated Flood Management (IFM) in the Delta and portions of Suisun Marsh. It is intended to

provide a clear context and rationale for discussing, evaluating, and making the difficult choices about investing limited State funds in IFM projects in the Delta. Table 1.1 of the Framework provides funding priorities for the Department for the Delta.

V. ELIGIBILITY

Potential participants must meet certain specific requirements to be eligible to obtain funding under this Program. In addition to the requirements set forth in Sections 12300 – 12318 of the California Water Code, applicants must also be in compliance with all the requirements associated with this Program, and the Delta Levees Subventions Program.

VI. ELIGIBLE PROJECTS

Eligible Projects will be determined by requirements stated in the PSP and may include levee evaluation, repair, modification and/or improvement, studies to reuse dredged material and habitat enhancement. Acceptable work is not limited to construction but also may include engineering, permitting, studies, research, and design. Under these Guidelines, Eligible Projects must meet the No Regrets requirements discussed in Section III, the eligibility requirements, and any additional category-specific requirements discussed in Section XIII.

Eligible Projects in no specific order may include, but are not limited to:

- Field Investigations, including electromagnetic survey, topographical survey, geotechnical studies, or other testing or research needed to formulate the Scope of Work;
- Habitat Projects, including restoration and protection of habitats that meets Program objectives to ensure no net loss of habitat and net habitat enhancement. This includes planning, management, monitoring, and maintenance.
- Setback Levees, to reduce the probability of flooding and to protect or provide discrete and identifiable public benefits where appropriate;
- Levee Improvement, to reduce the probability of flooding for the Local Agency;
- Levee Repair, as needed to improve the levee integrity and preserve existing flood risk reduction benefits to the Local Agency;
- Emergency Response Planning and Preparedness, planning efforts and flood preparation efforts (such as stockpiling flood fight materials) to support or improve emergency response. Such work should be consistent with the Department's Delta Specific Flood Emergency Operation Plan that is currently under development.
- Engineering Analysis and Design work, needed to pursue a Project;

- Environmental Permitting and Planning work. This work includes preparing CEQA or NEPA documents, obtaining other environmental permits (e.g., USACE, FWS, or CDFW permits), preparing and filing environmental documents related to a specific project or developing programmatic documents for future projects;
- Planning Studies, to better understand the future flood management needs of the Local Agency. This may include updating an existing Five-Year Plan;
- Scientific Studies and Research, to assist the Department and Local Agency to better understand Delta characteristics such as subsidence or ecosystem restoration related to setback levee alignments or other improvement of levees to appropriate standards;
- Beneficial Reuse Projects, to assist federal, State, and Local Agencies to promote the Beneficial Reuse of clean dredged materials for levee rehabilitation and habitat enhancement projects as appropriate, for improvement of levees to appropriate standards;
- Water Projects, a project to improve/reinforce/setback levees that protect water supply and quality, to the extent that such Projects are a component of a larger Project intended to improve a levee to appropriate standards; and
- Development or Update of a Five-Year Plan, for rehabilitation, repair or improvement of a Local Agency's facilities to a desired levee standard or level of protection.

VII. INELIGIBLE PROJECTS

Ineligible Projects include projects that do not meet eligibility requirements and those directly related to work on agricultural, private or local water supply, private recreational, and private or local waste disposal facilities. Such Projects generally do not meet the primary purpose of the Special Projects and the intent of California Water Code Section 12311: "the [flood] protection of discrete and identifiable public benefits, including the protection of public highways and roads, utility lines and conduits, and other public facilities, and the protection of urbanized areas, water quality, recreation, navigation, and fish and wildlife habitats, and other public benefits."

Under these Guidelines Ineligible Projects might also include Projects that do not meet the No Regrets requirements, but might otherwise be eligible. To the extent a Project appears ineligible but actually may meet the intent of Water Code Section 12311, the Department retains discretion to approve the Project. Examples of Projects that are not eligible include, but are not limited to:

- Drainage projects when the scope of the proposed Project is the responsibility of the Local Agency as part of its routine maintenance work;
- Irrigation projects;

- Projects that support agricultural operations, such as repair of pumping stations, or routine maintenance activities, such as maintaining drainage ditches that are the responsibility of the Local Agency;
- Water supply projects to develop or repair facilities for the purpose of water delivery within the jurisdiction of the Local Agency (Projects increasing protection of water supply facilities may be eligible);
- Waste disposal projects to develop or repair conveyance facilities for the purpose of waste disposal within the jurisdiction of the Local Agency; and
- Projects that do not meet the No Regrets requirements discussed above.

VIII. ELIGIBLE COSTS

Eligible Project Costs are the reasonable and necessary actual costs associated with an Eligible Project, so long as they are not prohibited by funding legislation.

Reimbursement will not be provided for Eligible Project Costs incurred before a Project Funding Agreement is fully executed, except in extraordinary circumstances when the Local Agency has obtained specific authorization from the Department prior to incurring the cost. Credit may normally be provided for Eligible Project Costs incurred prior to execution of a Funding Agreement with written approval from the Department prior to incurring the cost. Eligible Project Costs may include, but are not limited to, the following:

- Project engineering, design, and construction costs;³
- Costs of planning, implementing, and maintaining habitat mitigation and/or enhancement associated with, or built as part of, the project
- Costs of obtaining environmental permits and associated environmental mitigation including the costs of preparing CEQA and NEPA documents (if applicable) that are directly related to and necessary for the proposed project;
- Costs of obtaining necessary federal or state governmental approvals;
- Reasonable legal fees associated with incurring Eligible Project Costs, such as those listed above will be at the discretion of the Department on a case by case basis;
- Reasonable overhead costs directly relating to the construction of the Project;
- Eligible Real Estate Capital Outlays. Special Projects real estate costs are generally the responsibility of the Local Agency. For some Projects, such as Habitat and Setback Levee projects, the Department may fund a portion of real estate costs. Only the fair market value of real estate costs for land or easements that have been appraised and deemed suitable for the intended purposes by the Department will be considered Eligible Costs.

³ For construction Projects, the State will only pay its State share of Non-Construction Costs up to 20% of the total Project cost. Any additional reimbursement exceeding the 20% will require prior approval by the Department.

- The Department may consider costs for removal or relocation of encroachments on a case by case basis.

IX. INELIGIBLE COSTS

Costs that are generally not eligible may include, but are not limited to, the following:

- Operation, maintenance, repair, replacement, and rehabilitation costs of the completed levee works, including the cost to maintain the appropriate level of flood protection once achieved;
- Purchase of equipment that is not an integral part of the Project;
- Replacement of existing funding sources for ongoing projects;
- Support of existing Local Agency requirements and mandates;
- Purchase of land in excess of the minimum required acreage or at a price in excess of its market value, unless the Local Agency provides evidence demonstrating the cost effectiveness of the transaction. The Project Funding Agreement will detail the terms and conditions of such an exception;
- Costs that the State does not authorize as part of final accounting; i.e. work not related to flood management and/or habitat.
- Costs incurred as part of any and all necessary response and cleanup activities required under CERCLA, RCRA, Hazardous Substances Control Act or other applicable law; and
- Costs, including engineering and environmental expenses, associated with preliminary studies that are not directly related to the proposed Project, unless approved in writing by the Department prior to incurring the cost.

X. FIVE-YEAR PLANS

The Five-Year Plan assesses the current conditions of a Local Agency's levees and sets out a strategy for rehabilitation, repair, and/or improvement of its facilities to meet a desired levee standard and/or level of protection. All Applicants seeking funding for Special Projects will be required to provide, with their application, a complete Five-Year Plan. While most Local Agencies seeking funding have completed a Five-Year Plan, it will be necessary to periodically update their Five-year Plan.

For this reason the Department may periodically offer funding to update existing Five-Year Plans, and strongly urges all Local Agencies that need to update their Five-Year Plan to request funding for such a Plan update before applying for other Special Projects. Details of the DWR offer along with special eligibility requirements will be provided at the time funding is available.

To be considered for updating, the existing Five-Year Plan must provide an assessment of the district's existing levee system and a strategic plan to meet a desired levee standard and/or level of protection. These plans must identify risks to island assets,

assets of statewide importance and provide a long-term funding strategy for improving the levee system and maintaining the realized level of flood protection. Plans must also describe how habitat impacts from proposed levee work will be avoided or mitigated, whether any enhancement activities are planned, and how the planned projects will address CEQA and consistency with the Delta plan, and environmental permitting requirements. The plan shall be submitted to DWR for review and evaluation. An outline of what is required to be included as part of a Five-Year Plan is attached as Exhibit D.

XI. APPLICATION PROCESS

The Department anticipates that it will issue multiple PSPs under these Guidelines. As part of its PSP process, the Program may first solicit conceptual proposals, and then follow up with the applicants of the conceptual proposals deemed to meet the most Program requirements to invite preparation and submission of a full application.

A notice of the release of a PSP will be sent out to all Local Agencies that may qualify for Special Project Funding. These PSPs will be posted on the Special Projects website and may also be available as a hard copy. They will describe all application requirements and will establish the application and selection timeline as well as the scoring system to rank each proposal.

Unless exempted by Department authority, **Five-Year Plans will be required of all successful Applicants** seeking funding for Special Projects.

XII. REQUIRED APPLICATION MATERIALS

Applications may include but will not be limited to the following:

- An application cover sheet that provides an overview of the Project;
- A statement identifying the Applicant's representatives;
- A resolution signed by the Local Agency authorizing submission of the application and designating a representative to sign the application, entering into a contract with the State of California, implementing a flood protection management, and providing the local cost-share;
- A detailed Project Description; including maps, drawings and a statement explaining the assets of statewide interest the Project will protect and justification for the project based on the criteria contained in the PSP. The level of detail provided in the Project Description is at the discretion of the Applicant, but it is in the Applicant's interest to offer as much detail and documentation as possible, as the eligibility and ranking criteria in the PSP will require a great deal of specific information;
- References for information used in the proposal should be cited.
- A statement from a California registered professional civil engineer who has reviewed the Project Description discussing the benefits of the project to flood protection and levee stability;

- A statement from a qualified Environmental Scientist or Restoration Specialist who has reviewed the Project Description discussing the benefits of the project to Delta ecosystem restoration.
- A detailed statement of expected Project costs and a detailed Financial Plan showing the Applicant's ability to pay invoices in advance of State reimbursement or advance payment;
- A detailed description of the impact the Project has on habitat and the environment, a detailed discussion of the environmental permits required for the Project based on the anticipated impact, and a schedule for permit completion;
- A statement addressing the impacts of climate change on the Local Agency levees and possible features allowing accommodation or adaptation to future moderate changes.
- A statement of measures employed by the applicant to comply with California Water Code Section 12316(g);
- A detailed description of how the Project will mitigate for all environmental impacts, including the requirements of Water Code Section 12314, which requires no net long-term loss of habitat (through impact avoidance, minimization, and/or mitigation). The statement of expected Project costs should include habitat mitigation costs;
- A cost-share recommendation and report detailing the amount of State cost-share to which the Local Agency believes it is entitled and a Local Agency Benefit Assessment (LABA) if the Local Agency intends to request an Alternative Cost-Share.

All participants are subject to State and Federal conflict of interest laws. Failure to comply with these laws, including business and financial disclosure provisions, will result in the application being rejected and any subsequent contract being declared void. Other legal action may also be taken. Applicable statutes include, but are not limited to, Government Code Section 1090, and Public Contract Code Sections 10410 and 10411, for State conflict of interest requirements.

In addition, the Applicants will be required to keep informed of and take all measures necessary to ensure compliance with applicable California Labor Code requirements, including but not limited to Section 1720 *et seq.* of the California Labor Code regarding public works, limitations on use of volunteer labor (California Labor Code Section 1720.4), labor compliance programs (California Labor Code Section 1771.5) and payment of prevailing wages for work done under a Funding Agreement.

Where required by the funding source, the Local Agency must maintain a labor compliance program that meets the requirements of California Labor Code Section 1771.5. Written evidence of the Labor Compliance Program will need to be submitted to the State before the project is funded.

XIII. SUBMITTAL DEADLINE

Project Proposals that do not meet the deadline established in the Projects Solicitation Package will not be reviewed. The Department will review all timely submittals for completeness after proposals are submitted. Proposals that are not substantially complete will not be further reviewed. The Department may contact proponents of proposals that are substantially complete but missing some items. If a Local Agency is contacted by the Department with a request for more materials, the local agency will have one week to provide all requested information or the proposal shall be rejected by the Department as incomplete.

XIV. PROJECT ELIGIBILITY CRITERIA

Under these Guidelines, proposals will be solicited for work that fulfill specific requirements detailed in the PSP, which may include work that improves Delta levees to an appropriate standard, Delta Levee Studies or Research, work that protects discrete and identifiable public benefits in the Delta, work to reduce the risk of levee failures that would jeopardize water conveyance, and/or work that provides significant habitat enhancements. Eligible Projects may include stand-alone engineering and design Projects. Review of stand-alone applications for engineering and design, or studies, will assume that the Project is actually built and will measure the strength of the application based on how the proposed project meets the criteria of the category (HMP, Delta Specific PL 84-99, Bulletin 192-82, etc.) into which it would fall if it were an actual construction Project.

Applications must meet the Eligibility Criteria and other general requirements described in these Guidelines and in the California Water Code for the Delta Flood Protection Plan. Where applicable, applications must also meet category-specific Eligibility Criteria.

1. Project must be responsive to the PSP being offered.
2. Project must not significantly impair the functionality of the levee system.
3. Where and when applicable, the Department reserves the right to limit its participation to fund the level of protection and/or levee standard that the Local Agency seeks to achieve through build-out of its Five-Year Plan.
4. Project should address the impacts of climate change on the Local Agency levees and discuss features that allow accommodation or adaptation to future changes.
5. Project must not contribute to urban growth (e.g. urbanization).
6. Project proposal must include a Project Description, Financial Plan, and a schedule.
7. Application should identify all potential beneficiaries of the proposed Project, including population estimates, infrastructure, environmental resources (terrestrial and aquatic), and other improved properties.
8. Project must meet the requirements of California Water Code Section 12310 *et seq.*

Table 1: Project Eligibility Criteria

A) Levee Project Eligibility Requirements:

Levee Standards
<p>The following levee cross-sections may be supported by DWR and this Program, based on the funding criteria provided in these Guidelines.</p> <ul style="list-style-type: none"> • HMP • Bulletin 192-82 • Delta Specific PL84-99
Project Requirements
<p>Project must be consistent with the Local Agency's Five-Year Plan.</p> <p>Local Agency must provide proof that successful construction of this Project will result in a flood management facility that meets stated standards. Project must raise the specified length of levee to the stated standard.</p> <p>Local Agency must demonstrate that the proposed Project is consistent with the Department's objectives for the Delta.</p> <p>A design upgrade (overbuild) may be proposed to add up to 0.5 foot of extra crest elevation to a project. An additional 0.5 foot may be added if the levee crest includes a state or county paved road, for a total of up to 1.0 foot. Additional overbuild may be considered, with DWR prior approval, if the Local Agency submits adequate engineering analysis.</p> <p>Local Agency's Financial Plan demonstrates a need and a plan to achieve acceptable flood management for the entire protected area (assuming needed state funding is available).</p>
Notes
<p>HMP is a key configuration for levees in the Delta. For some levee systems, the HMP level of protection may provide the appropriate level of flood management to receive State funding; for others, State funding may be justified for Local Agencies to improve their systems beyond this level</p> <p>Local Agencies should, generally, propose to raise all levees within its jurisdiction to HMP configuration before considering work that brings all or a portion of the levees to a higher standard. Local Agencies may propose work to increase flood protection beyond HMP, particularly when completing HMP and Bulletin 192-82 or Delta Specific PL 84-99 improvements concurrently is more efficient and cost effective, if a higher standard is appropriate.</p> <p>The Department is committed to improving most facilities to HMP configuration, but it actually intends to allocate more funds over the course of these Guidelines to Projects seeking to raise their level of protection to the Bulletin 192-82 or Delta Specific PL 84-99 Standards. Levees that meet the PL84-99 Standard may, if the levees are damaged, be able to qualify for Federal rehabilitation assistance if they participate and are certified under the USACE PL 84-99 program.</p>

Table 1: Project Eligibility Criteria (Continued)

B) Habitat Project Eligibility Requirements:

Project Requirements
<p>Project assists in restoring habitats that can contribute to health of the Delta or Suisun Marsh Ecosystem, consistent with the net habitat improvement requirements of the Program, and serves as mitigation for work under the Program</p> <p>OR</p> <p>Project results in a habitat mitigation site larger than 50 acres that can be used by DWR or any eligible Local Agency within the Program to mitigate the habitat impacts of their levee repair work or other State cost shared work consistent with the Program mandates. Such a habitat mitigation site must be consistent with guidance provided by the Program and may come under a separate directed action.</p>
Notes
<p>The Department intends to fund habitat restoration or improvement projects that benefit habitats important to the Delta that have been impacted by historic levee construction. The Program seeks to enhance or restore the four habitats commonly associated with the Program – Scrub Shrub, Riparian Forest, Freshwater Marsh, and Shaded Riverine Aquatic Habitats.</p> <p>The Department also intends to support a pilot project to develop a habitat conservation (mitigation) site to provide mitigation for multiple islands’ anticipated habitat impacts. Any habitat site funded using State money must be consistent with the regulatory structures that have been developed by DWR and CDFW and be tailored specifically to the needs of the Program. Additional detail on this approach and specific requirements will be provided to Local Agencies in the Projects Solicitation Package.</p>

XV. PROJECT EVALUATION CRITERIA

As discussed above, the Program covers a variety of work. Local Agencies should offer sufficient information to meet the required criteria. The Department retains discretion to check for reasonableness and accuracy of submitted materials. The following tables provide various criteria by which projects may be evaluated for selection and ultimately funding.

It is the intent of these Guidelines that credit for only one condition will apply; therefore, there will be no double counting of Evaluation Criteria for similar aspects of the proposed project.

Table 2: Project Evaluation Criteria

A) Levee Project Evaluation Criteria:

Evaluation Criteria	Notes
Life Safety (Number of People Protected)	This criterion rates each Project based on the total number of people the Project would protect at the stated standard.
Infrastructure (Highways)	This criterion rates each Project based on whether and how much it will increase protection to one or more state highway systems.
Infrastructure (Emergency)	This criterion rates each Project based on whether it increases protection of utilities, roads, services, fuel center, food centers, etc.
Infrastructure (Local Assets)	This criterion rates each Project based on whether it increases protection to local assets, such as local businesses, agricultural operations and facilities, local transportation routes, etc.
Infrastructure (Water Conveyance)	This criterion rates each Project based on whether it increases protection to water conveyance structures.
Infrastructure (Water Supply Reliability)	This criterion rates each Project based on whether it contributes to the reliability of export flow from the Delta.
Water Quality	This criterion rates each Project based on whether it increases protection of Delta water quality.
Habitat Impacts and Mitigation	<p>This criterion rates each Project based on how well it meets the “no net long-term loss” of habitat requirement of the Program.</p> <p>Projects that avoid or minimize, and define how they will mitigate habitat impacts at the time of construction will be favored.</p> <p>Projects that result in unavoidable habitat impacts and describe how these impacts will be mitigated at a future date will be less favored.</p> <p>Local Agency must offer sufficient information to meet this criterion, including documentation of any consultation with CDFW to substantiate the assertions in their application. Department retains discretion to check for reasonableness and accuracy of submitted materials.</p>

Table 2: Project Evaluation Criteria (Continued)

A) Levee Project Evaluation Criteria (Continued):

Evaluation Criteria	Notes
Habitat Improvement and Ecosystem Restoration	<p>This criterion rates the anticipated ecological benefits of the project consistent with the Program’s net long-term habitat improvement requirement and/or the value of the proposed enhancement, as determined by the Program.</p> <p>Consistent with legislated requirements, projects that improve conditions for delta smelt and other native fish are most favored. Projects that create or improve habitats including tidal marsh, wetland, and floodplain habitats fragmented by historic levee construction, or upland habitats associated with the maintenance or improvement of levees will be priorities. All projects will be evaluated by the Program under this criterion based on their demonstrated ecological benefits, soundness of their approach, and feasibility.</p>
Project description and permits	<p>This criterion evaluates the completeness of the Project Description and thoroughness of Local Agency’s plan to obtain the required permits (e.g., an identification of all required permits with corresponding budget and timeline).</p>
Partnerships	<p>This criterion evaluates how much of the Eligible Project cost is being shared by a partner other than the State and Local Agency.</p>
Project Cost	<p>This criterion evaluates the specificity and reasonableness of the project cost estimate.</p>
Project Schedule (Construction)	<p>This criterion evaluates the planning and expedience related to the construction of the project.</p>

Table 2: Project Evaluation Criteria (Continued)

B) Habitat Project Evaluation Criteria:

Habitat Improvement and Ecosystem Restoration	
Evaluation Criteria	Notes
Habitat Goals or Targets	This criterion evaluates the types and locations of habitats the project will establish and describes its benefit to other existing or emerging Delta-wide restoration plans.
Delta smelt, native salmonids, and other native fish	This criterion evaluates the extent to which the proposed project improves habitat conditions for delta smelt, native salmonids, or other native fish.
Ecosystem Benefits	This criterion evaluates the extent to which the project demonstrates its anticipated ecological benefits, including but not limited to opportunities to improve habitats impacted by historical levee work, improve conditions for threatened and endangered species, provide a landscape-scale approach, and restore natural hydrological regimes.
Approach and Feasibility	This criterion evaluates the extent to which the project describes a restoration approach that is feasible based on the best available information, including project location, restoration methods, timing and long-term viability.
Project description and permits	This criterion evaluates the completeness of the Project Description and thoroughness of Local Agency's plan to obtain the required permits (e.g., an identification of all required permits with corresponding budget and timeline).
Technical Capacity and Resources	This criterion evaluates the technical resources of the proposed restoration project team. In addition to engineering competence, this includes restoration ecology and design professionals.
Partnerships	This criterion evaluates how much (if any) of the Eligible Project cost is being shared by a partner other than the State and Local Agency.
Project Performance and Adaptive Management	This criterion evaluates how the project will evaluate its own success and the robustness of its long-term management plan, including the financial resources allocated to manage or maintain the habitat in perpetuity.

XVI. COST-SHARE FORMULA

In general, the state share of the Project cost will be limited to no more than \$10 million to achieve economies of scale yet maintain the ability to complete the Project in an efficient and timely manner.⁴ For projects seeking to achieve a levee standard acceptable to DWR, the State share of the cost in excess of \$10 million will be specified in the PSP subject to availability of funds. The State may pay a maximum of 20% for pre-construction engineering costs (e.g. planning, permitting, or design).⁵

State cost-share is determined by Project category. The Local Agency must submit, along with the rest of its application, a cost-share recommendation estimate that makes its claim to the amount of cost-share the State should offer for its proposed Project. Under no circumstances will DWR pay greater than 100% for the cost of a project. The following table describes the cost-share approach by category:

Table 3: Project Cost-Share

A) Project Cost-Share:

Category	Cost-Share
Levee Projects meeting a standard acceptable to DWR.	<p>Levee Projects will be cost-shared in accordance with the following three steps:</p> <p>Base State Share – The Base State Cost-Share for projects within the Primary Zone of the Delta, as defined under the Water Code Section 12220, will be set at 75%. The Base State Cost-Share for projects within the Secondary Zone of the Delta, as defined under the Water Code Section 12220, will be set at 50%. This share is the amount the State will contribute towards the Project before Enhanced Cost-Share is considered (assuming that the LABA does not raise the State Share). If the State or Local Agency identifies specific, discrete third-party beneficiary to the Project (such as a utility company whose transmission or gas lines will experience increased flood protection as a result of the project) and that third-party beneficiary refuses to contribute its fair share to funding the Project, the State reserves the right not to raise its share above this base level or otherwise restrain or withdraw its support for the Project.</p> <p>Alternative State Share – For all projects within the Secondary Zone the Base State Cost-Share may be increased to an Alternative State Share, based on the LABA⁶. The LABA must be performed according to Program methodology.</p>

⁴ The Department may, in unique circumstances, fund projects with a State cost share of more than \$10 million. However, the priority shall be given to projects requesting State share of \$10 million or less.

⁵ This only applies to Projects that include actual construction. Any additional reimbursement exceeding the 20% will require prior approval by the Department.

⁶ The Department will provide a cost-share of 75% for the development of a LABA, up to a maximum of \$20,000. A separate funding agreement will be required for the preparation of a LABA.

Table 3: Project Cost-Share (Continued)

A) Project Cost-Share (Continued):

Category	Cost-Share
	See Exhibit C. ⁷ The maximum State share established by this step will be 75%, unless, at the sole discretion of the Department, it is waived.
Habitat	<p>Projects that assist in restoring one or more habitats that contribute to the improvement in the Delta or Suisun Marsh ecosystem on a system-wide basis consistent with the net habitat improvement requirements of the Program may receive an increased cost-share of up to 40% over base funding⁸ where habitat benefits are judged by the Program to be significant and the Department may pay 100% of the project cost.</p> <p>Projects that establish habitat mitigation sites that satisfy programmatic mitigation needs for the Program may receive an increase of up to 40% over base funding.</p>

⁷ As an example, if a Local Agency's LABA indicates that the benefits the Local Agency will receive (locally) from the Project are 15%, the State Share will generally be raised to 75%.

⁸ DWR may, at its sole discretion, waive this ceiling for projects that have primarily statewide or program wide benefits, such as a habitat enhancement project.

Table 3: Project Cost-Share (Continued)

B) Project Cost-Share Enhancements:

Category	Cost-Share
	<p>Enhancement of State Cost-Share: The State cost-share may be increased, by as much as 20%, if the proposed Project achieves a significant contribution to specific public purposes as described in the PSP. Applicants seeking to enhance their state cost-share must provide documentary information sufficient to demonstrate, to the Department’s satisfaction, that the specific public purposes are significant and an Enhanced State Cost-Share is merited. Enhanced Cost-Share will apply to the entire project; however, it cannot qualify a Project for a 100% State Share. The ceiling for the overall State share (including Enhanced Cost-Share) is generally 95% of the Local Agency expenses to complete the Project (if in Partnership) or total project cost.⁹</p> <p>Potential Enhanced Cost-Share measures are specified in the PSP and may include the following:</p> <p>Emergency Response Measures – The Local Agency should demonstrate how its proposed Project contributes to emergency response and/or preparedness. The State may increase its cost-share of the Project by the amount (expressed as a percentage of the overall Eligible Projects costs) that the emergency response aspect of the Project increases the total cost. The emergency response measures may be separable (emergency response only) costs or emergency response allocable costs. This increase will generally be capped at 10%.</p> <p>Habitat – The State may enhance its cost-share for Projects that fully mitigate habitat impacts prior to or at the time of construction and contribute to program-wide net habitat improvement by incorporating habitat enhancement or ecosystem restoration features consistent with the Program’s net long-term habitat improvement mandate including elements that improve conditions for delta smelt and other native fish.</p> <p>The amount of cost-share enhancements associated with habitat features will be commensurate with the habitat benefits provided by the improvements and will be specified in applicable Projects Solicitation Packages. This increase will normally be capped at 10%. However, where habitat benefits are judged by the Program to be significant, the Department may pay 100% of the project cost.</p>

⁹ DWR may, at its sole discretion, waive this ceiling for projects that have primarily statewide or program-wide benefits, such as a habitat enhancement project.

Table 3: Project Cost-Share (Continued)

B) Project Cost-Share Enhancements (Continued):

Category	Cost-Share
	<p>Subsidence Control or Reversal – The Local Agency should demonstrate how its proposed Project contributes to subsidence control or reversal. The State may increase its cost-share of the Project by the amount (expressed as a percentage of the overall Eligible Projects costs) that the subsidence reduction aspect of the Project increases the total cost. The subsidence reduction measures may be separable (subsidence reduction only) costs or subsidence reduction-allocable costs. This increase will generally be capped at 10%.</p> <p>Export Water Supply Conveyance – The State may increase its cost share for projects that increase export water supply reliability.</p> <p>Statewide Interests – The State may increase its cost-share for Projects that increase flood protection to assets or facilities of statewide interests. Statewide interests include water supply reliability and ecosystem enhancement. Other State interests include water quality protection, or public transportation or other public infrastructure. The State’s cost-share of the Project may be increased up to a maximum of 10%.</p> <p>Beneficial Reuse – The State may increase its Cost-Share for Projects that beneficially reuse dredged material. The Local Agency must demonstrate the savings that use of existing dredged material will create. The State will reimburse these savings to the Local Agencies. Any cost-share calculation will be performed after these savings have been deducted from the project cost. These savings are not to exceed 10% of the Eligible Project Costs.</p> <p>Cost share Partners – Local Agencies may receive a 50% State matching of a third party contribution to the Project, up to 95% of the Local Agency expenses or total Project cost, for secured funding outside of the Program for their Projects.</p>

XVII. DIRECTED ACTIVITIES

The Department reserves the right to develop and support Projects through a collaborative process between the Department and Local Agencies.

Such Projects will be called Direct Expenditures, Directed Activities, or Directed Actions. The Department will apply these Guidelines, as it deems applicable and appropriate, to such Directed Activities. California Water Code Section 12310 *et. seq.*, California Water Code Section 83000 *et seq.* and prevailing California law determine how DWR will direct its expenditures.

The types of Projects that DWR may implement directly are likely to be subsidence reversal and habitat Projects, but may include other kinds of Projects, such as the development of habitat mitigation projects for the Program. DWR may implement these Directed Expenditure Projects directly or through agreements with Local Agencies.

XVIII. RESERVE FUND

Depending on the availability of State funds, no less than \$6 million will be reserved for emergency repairs until after the flood season (April 15) each year. If any of this money is unspent, it will be used to fund Eligible Projects in the Delta.

XIX. PROJECT ADMINISTRATION

Selected Projects will not be funded until a Funding Agreement is fully executed between the State and Local Agency. This Funding Agreement is comprehensive and will cover reporting requirements, work plans, progress reports, statements of cost, State hold-backs, and more. Five-Year Plan Projects will be governed by a streamlined Funding Agreement, but will still require a Funding Agreement.

EXHIBIT A

Delta Levee Standards Summaries

Following are summaries of common levee standards used in the Sacramento – San Joaquin Delta.

(a) Short-Term Hazard Mitigation Plan (HMP) Standards (for Agricultural Levees)

The short-term mitigation plan cited in Water Code section 12984(a) and set forth in the *Flood Hazard Mitigation Plan for the Sacramento-San Joaquin Delta*, prepared by the Department of Water Resources for the Office of Emergency Services, dated September 15, 1983, or as amended, contains criteria that include the following:

- (1) Minimum freeboard of 1 foot above the 100-year flood frequency elevations determined by the Corps of Engineers.
- (2) Minimum crown width of 16 feet with an all-weather access road.
- (3) Waterside slopes no steeper than 1.5 horizontal to 1 vertical, with revetment in areas where erosion has been a problem. The size of the revetment material to be appropriate for the slope.
- (4) Landside slopes no steeper than 2 horizontal to 1 vertical, with flatter slopes in the lower portion of the levee in areas where soil stability or seepage have been a problem.

(b) PL 84-99 Standards (for Agricultural Levees)

The Corps of Engineers publication *Guidelines for Rehabilitation of Non-Federal Levees in the Sacramento-San Joaquin Legal Delta* contains criteria that include the following:

- (1) Minimum freeboard of 1.5 feet above the 100-year flood frequency elevations determined by the Corps of Engineers.
- (2) Minimum crown width of 16 feet with an all-weather access road.
- (3) Waterside slopes no steeper than 2 horizontal to 1 vertical.
- (4) Landside slopes vary with levee height and depth of peat (range 3:1 – 5:1).
- (5) Levee toe drain located 30 feet landward from the landside levee toe.

(c) Bulletin 192-82 Standards (for Agricultural and Urban Levees)

The Department of Water Resources publication *Bulletin 192-82, Delta Levees Investigation*, dated December 1982, contains criteria that include the following:

**Delta Levees Maintenance Subventions Program
Guidelines: Procedures and Criteria**

- (1) Minimum freeboard for levees protecting agricultural and urban land consists of 1.5 feet and 3.0 feet respectively above the 300-year flood frequency elevations determined by the Corps of Engineers.
- (2) Typical levee section has a crown width of 16 feet, a waterside slope of 2 horizontal to 1 vertical, and a landside slope that varies with depth of peat (range 3:1 to 7:1).
- (3) Landside berms should be constructed where necessary to help provide stability for weak, highly compressible, peat foundations. Slopes on landside berms to be as flat as 15 horizontal to 1 vertical where required.
- (4) In deep peat areas, staged construction consisting of periodic raising of the levee crown, back slope, and the landside berm may be required to compensate for continuing subsidence.
- (5) Construction of levees on a new alignment (levee setback) to have a minimum crown width of 12 feet and slopes of 2 horizontal to 1 vertical on both the land and watersides.

EXHIBIT B

Typical Delta Levee Cross-Sections

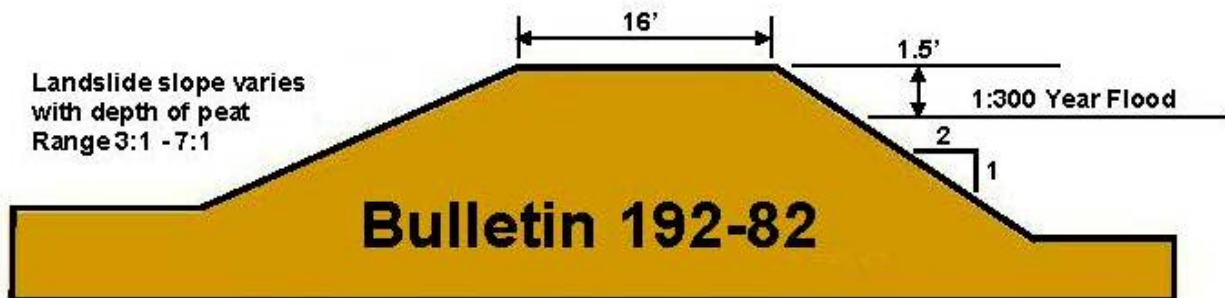
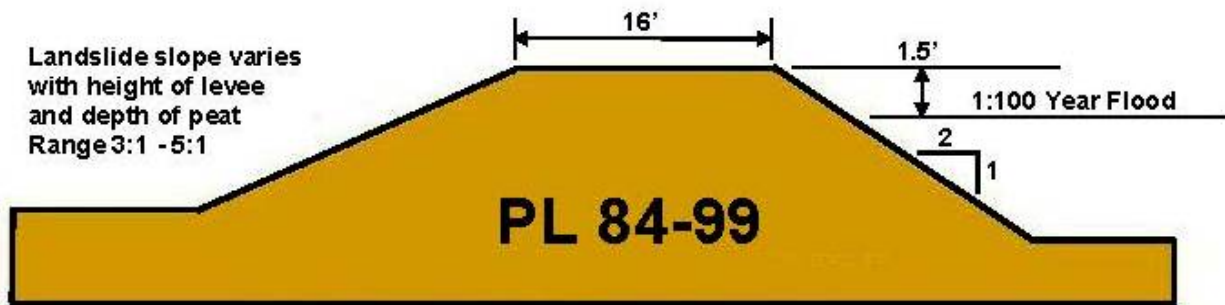
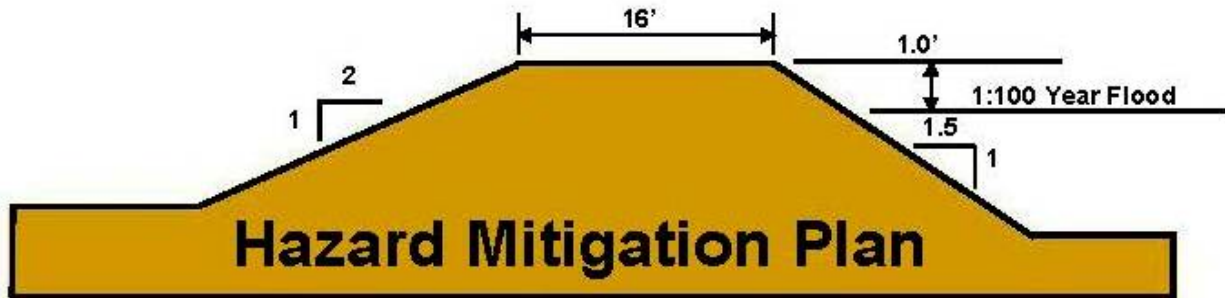


EXHIBIT C

Local Agency Benefit Assessment

I. OVERVIEW

This appendix describes the methodology for a Local Agency Benefit Assessment. Applicants must complete a Local Agency Benefit Assessment if they are requesting State cost sharing based on an Alternative State Cost Share rather than the Base State Cost Share. An Alternative State Cost Share is capped at 75 percent of eligible project costs.

The purpose of the Local Agency Benefit Assessment is to estimate local flood damage reduction benefits from implementing the projects contained in the Applicant's Five-Year Plan. The Alternative State Cost Share is computed as one minus the ratio of the present value of estimated local flood damage reduction benefits to the present value of the estimated costs of plan implementation. The Applicant may request an Alternative State Cost Share when this value is greater than the State Base Cost Share. For example, if the State Base Cost Share is 50 percent and the computed value is 70 percent, the Applicant could propose an Alternative State Cost Share of 70 percent (before cost-sharing enhancements).¹⁰

Calculation of an Alternative State Cost Share is not necessary for projects in the Primary Zone of the Delta, since the Base State Cost Share for projects in the Primary Zone is already set to the 75 percent maximum State share. Likewise, calculation of an Alternative State Cost Share is not necessary for an HMP project, regardless of which zone it occurs in, since the Base State Cost share for HMP projects is already set to the 90 percent maximum State share.

An Alternative State Cost Share can be applied against the first \$5 million of eligible project costs. State cost sharing of eligible project costs in excess of \$5 million is capped at 50 percent. This restriction establishes a maximum State cost share (before enhancements). For projects costing \$10 million or less, the maximum State share is 75 percent. For projects costing more than \$10 million, the maximum State share is 50 percent plus an additional percentage equal to \$2.5 million divided by the project's cost.

An Alternative State Cost Share is applicable to all (non-HMP) projects contained in the Applicant's Five-Year Plan. Thus, the Applicant only needs to complete a Local Agency Benefit Assessment once. The Applicant may use the results of the Local Agency Benefit Assessment on all funding applications pertaining to projects contained in its Five-Year Plan. The final State cost share on individual projects contained in the Applicant's Five-Year Plan may also include cost-sharing enhancements (see Section V of the Guidelines) and therefore may exceed the Alternative State Cost Share derived from the Local Agency Benefit Assessment.

¹⁰ Enhanced Cost Sharing is discussed in the Program Guidelines.

An example is used to illustrate the process just described. For simplicity, assume the Five-Year Plan contains just one proposed project. The project would upgrade certain levees in the Secondary Zone to the Delta specific P.L.84-99 standard and has a present value cost of \$20 million. A Base State Cost Share at the 50 percent level is \$10 million. The Local Agency Benefit Assessment concludes the project would result in local flood damage reduction benefits with a present value of \$7 million. In this case, the Alternative State Cost Share would equal 65 percent ($1 - 7/20$), or \$13 million. The maximum State share, however, is 62.5 percent ($0.5 + 2.5/20$), or \$12.5 million. Therefore, the final State cost sharing (before enhancements) would be reduced to \$12.5 million.

There are three possible outcomes of the Local Agency Benefit Assessment with regard to State cost-sharing, as follows:

1. The calculated Alternative State Cost Share is less than or equal to the State Base Cost Share. In this case, the Applicant would use the State Base Cost Share.
2. The calculated Alternative State Cost Share is greater than the State Base Cost Share and less than or equal to 75 percent. In this case, the Applicant would use the lesser of the Alternative State Cost Share and the maximum state share.¹¹
3. The calculated Alternative State Cost Share is greater than 75 percent. In this case, the Applicant would use the lesser of the 75 percent Alternative State Cost Share and the maximum state share.

The purpose of the Local Agency Benefit Assessment is not an overall benefit-cost assessment, but rather an assessment of the benefits of the projects in the Five-Year Plan to the Applicant and its ratepayers. The Base or Alternative State Cost Share is intended to cover the costs of broader public benefits of the projects.

¹¹ For projects costing \$10 million or less, the maximum state share is 75 percent. For projects costing more than \$10 million, the maximum state share is 50 percent plus an additional percentage equal to \$2.5 million divided by the project cost.

II. ESTIMATING FLOOD DAMAGE REDUCTION BENEFITS

A. Relationship to the Applicant's Five-Year Plan

Flood damage reduction benefits must be calculated in reference to the levee improvements and other flood risk mitigation actions specified in the Applicant's Five-Year Plan. The requirements for the Five-Year Plan are described in Exhibit D. This section discusses plan elements that pertain most directly to completion of a Local Agency Benefit Assessment. All discussion of benefits below refers only to the Local Agency benefits unless otherwise specified.

Information from the Five-Year Plan needed to complete the Local Agency Benefit Assessment includes the following:

- A quantitative assessment of the current and future level of flood protection provided by the levee system assuming the Five-Year Plan is not implemented;
- A quantitative assessment of the current and future level of flood protection provided by the levee system assuming the Five-Year Plan is implemented
- A description of the planned improvements, including estimates of when they will come on-line and their expected useful lives;
- A quantitative assessment of expected eligible costs of each planned improvement; and
- An inventory, valuation, and flood damage assessment of assessable structures and other property within the Applicant's service area.

A key aspect of determining flood damage reduction benefits is the specification of the *with-plan* and *without-plan conditions*.

Without-plan condition: The without-plan condition is a forecast of conditions over the period of analysis that describes the risks of flooding if the levee improvements contained in the Five-Year Plan are not implemented. The characterization of the without-plan condition is one of the most important tasks of a flood risk management study. Specification of the *without-project* condition is described further in the USACE's *National Economic Development Manual for Flood Damage Reduction Studies*.¹² ***With-plan condition:*** The with-plan condition is a forecast of conditions over the analysis period that describes the risks of flooding if the levee improvements contained in the Five-Year Plan are implemented. Any changes in future land use and development included in the without-plan condition should be reflected in the with-plan condition. However, no future development *induced by the improvements* should be reflected in the with-plan condition if they would stimulate population growth. The *with-plan* condition must also carefully consider how flood probabilities associated with hydrologic events would change *with* the projects in the Five-Year Plan compared to *without* them.

¹² <http://www.pmcl.com/nedprototype/index.asp>

B. Dollar Base Year and Discount Rate

Express flood damages and eligible costs of the Five-Year Plan in current year dollars. In other words, if the Benefit Assessment is being conducted in, say, 2012, all benefits and costs shall be expressed in 2012 dollars. This will simplify the analysis and presentation of results. If dollar estimates are only available for prior years, these should be updated to current year dollars using an appropriate cost index. To update construction costs, appropriate indices include the US Bureau of Reclamation Construction Cost Indices¹³, the Engineering News-Record Construction Cost Index¹⁴, or the US Army Corps of Engineers' (USACE) Civil Works Construction Cost Index System.¹⁵ To update building stock construction costs, Marshall & Swift (or a similar appraisal services company) comparative cost multipliers can be used.¹⁶ Finally, a useful "all purpose" index is the Gross Domestic Product Implicit Price Deflator.¹⁷ The analysis should identify which cost indices are used to convert prior-year benefit or cost estimates to current year dollars.

Discounting of future benefits and costs to present value should be done using a real discount rate of 6 percent. As described above, the dollar value of benefits and costs should be expressed in current year dollars prior to discounting.¹⁸

C. Categories of Flood Damage Reduction Benefits

Levee projects funded by the Special Projects Program provide local inundation reduction benefits. Inundation reduction benefits consist of avoided (1) physical damages or losses, (2) loss-of-function costs, and (3) emergency management costs. Each land use affected by a flood may experience losses in one or more of these areas. The following definitions of flood damages are from DWR's *Economic Analysis Guidelines: Flood Risk Management*.

¹³ www.usbr.gov/pmts/estimate/cost_trend.html

¹⁴ www.enr.construction.com

¹⁵ www.usace.army.mil/inet/usace-docs/eng-manuals/em1110-2-1304/entire.pdf

¹⁶ <http://www.marshallswift.com>

¹⁷ www.research.stlouisfed.org/fred2/series/GDPDEF/21

¹⁸ The present value of D dollars received or spent n years in the future when the discount rate is i is given by the formula:

$$PV(D) = \frac{D}{(1+i)^n}$$

Physical damages: This category (also known as direct flood damage) is typically the most straightforward to estimate. Structures, contents, infrastructure (transportation systems, utilities, schools, hospitals, etc.), landscaping, vehicles, equipment, and crops can be damaged by flood events. The monetary damage is the cost to repair or replace the damaged property. If direct damage estimates are not available, then depth/damage curves can be used to estimate damage, at least for structures and their contents. Structures that are potentially inundated with floodwater should be valued using depreciated replacement cost rather than full replacement costs.¹⁹

Avoided loss-of-function costs: These costs (also known as indirect flood damage) occur when facilities are damaged thereby disrupting their normal functions. For example, occupants of residential, commercial, or public buildings may incur displacement costs for temporary quarters when flood damage makes buildings unsafe for occupation. Other costs include loss of business net income, loss of rental income, loss of wages, disruption time, and deterioration in the overall “quality of life.” In addition, flooding of some types of critical facilities may have negative impacts on the community as a whole. These types of impacts would include the loss of public facilities (e.g., schools, hospitals, police/fire stations, nursing homes), transportation systems (e.g., highways, airports, ports) and utilities (e.g., water, sewer, electricity).

Emergency management costs: These costs include disaster response and recovery costs that may be incurred by a community during and immediately following a flood. Examples include avoided emergency operations costs (e.g., personnel and equipment mobilization, materials purchases), evacuation and rescue costs, debris removal/cleanup, temporary security costs, and emergency repairs to flood management systems (such as levees, floodwalls, etc.).

D. Steps to Determine Flood Damage Reduction Benefits

The steps for determining the flood damage reduction benefits for levee improvements contained in an Applicant’s Five-Year Plan are outlined below.

1. Identify existing *without-plan* conditions:
 - i. Delineate the potential affected floodplain area;
 - ii. Determine floodplain characteristics (structures, infrastructure, etc.);
 - iii. Determine flood damages for existing floodplain conditions.

¹⁹ FEMA’s HAZUS model is one method by which structure depreciation can be estimated.

2. Identify future *without-plan* conditions:

- i. Estimate future activities, structures, and land uses in the affected floodplain area (these should be the same as existing without-plan conditions unless future development is reasonably certain);
- ii. Estimate annual (*without-plan*) flood-proofing costs incurred by individuals within the floodplain;
- iii. Estimate annual (*without-plan*) flood damages for each year of planned life of the levee improvements.

3. Identify future *with-plan* conditions:

- i. Forecast future with-plan activities, structures, and land uses in the affected floodplain area (these will usually be the same as the future without plan since population growth-inducing projects are excluded from state cost sharing consideration);
- ii. Estimate the change in annual flood-proofing costs (*with-plan*) incurred by individuals within the floodplain;
- iii. Estimate future (*with-plan*) flood damages for each year of planned life of the levee improvements.

4. Calculate expected annual damages as described in Section F of this appendix.

5. Calculate the expected annual flood damage reduction benefit as described in Section G of this appendix.

Chapter 6 of DWR's "Economic Analysis Guidelines: Flood Risk Management" provides sample tables for compiling and presenting the data required to calculate flood damage reduction benefits.

E. Exclusion of Non-Assessed Assets

Only include assets belonging to property owners subject to assessment by the Applicant when estimating avoided physical damage, avoided loss-of-function costs, and avoided emergency response costs. Exclude non-assessable property and assets from the analysis. For example, damage and loss-of-function costs for a state highway or county road would be excluded from a tally of flood damages unless this property was subject to assessment by the Applicant. The purpose of the analysis is not an overall benefit-cost assessment, but rather an assessment of the benefits of the projects in the Five-Year Plan to the Applicant and its ratepayers. The Base or Alternative State Cost Share is intended to cover the costs of broader public benefits of the projects.

F. Calculating Expected Annual Damage

Expected annual flood damage (EAD) is the amount of annual flood damage estimated to occur *on average*. EAD should be calculated for the without-plan and the with-plan conditions.

EAD can be determined from three variables:

1. The probability of an event occurring that could result in flooding;
2. The probability that the levee system fails given the event's occurrence; and
3. The resulting damage if the levee system fails.

Table I-1 and Figure I-1 below provide an example of how these three variables are combined to estimate EAD for the without-plan and with-plan conditions. The table identifies five hydrologic events that could result in flooding. These events are described in terms of their probability of occurrence, the probability of levee failure for each event, and the damage that would result if the levees failed.

The probability of an event resulting in flooding depends on the without- and with-plan level of protection. In the example table, there is a 25 percent chance a 10-Year event will result in flooding without the plan. With the plan, the flood risk for this event is zero.

Expected event damage equals the damage if the levees fail times the probability that the levees will fail for this event magnitude. In this example, expected event damage is greater for the without-plan condition than for the with-plan condition.

Frequency-damage curves are generated by plotting expected event damage against the corresponding event frequency, as in Figure II-1. The area under a frequency damage curve equals the expected annual damage (EAD) from flooding. In this example, EAD is greater for the without-plan condition than for the with-plan condition.

G. Calculating Expected Annual Benefit

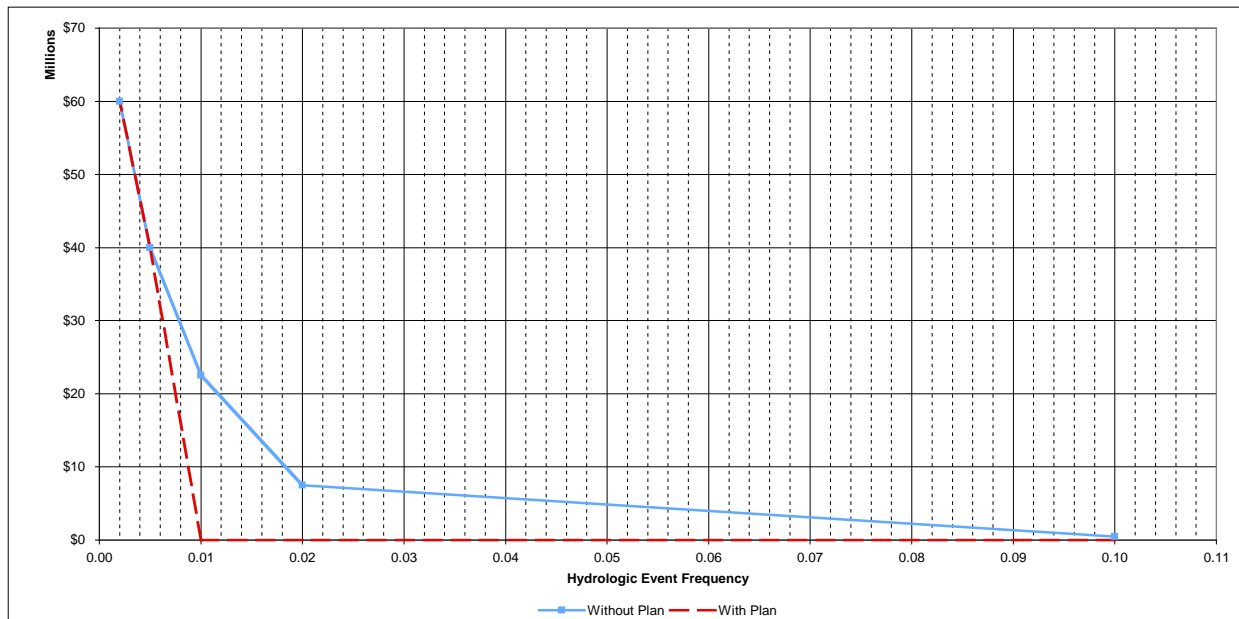
The expected annual benefit (EAB) of the Five-Year Plan equals the difference between EAD without the plan and EAD with the plan. In the example in Table II-1, EAD without the plan is \$0.9 million and with the plan is \$0.37 million. Plan EAB is therefore \$0.53 million.

Table I-1. Expected Annual Damage of Flood Events

Hydrologic Event	Event Frequency	Damage if Levees Fail (Million \$)	Probability Levees Fail		Expected Event Damage (Million \$)		Expected Event Benefit (Million \$)
			Without Plan	With Plan	Without Plan	With Plan	
10-Year	0.100	\$2.0	0.250	0.00	\$0.5	\$0.0	\$0.50
50-Year	0.020	\$15.0	0.500	0.00	\$7.5	\$0.0	\$7.50
100-Year	0.010	\$30.0	0.750	0.00	\$22.5	\$0.0	\$22.50
200-Year	0.005	\$40.0	1.000	1.00	\$40.0	\$40.0	\$0.00
500-Year	0.002	\$60.0	1.000	1.00	\$60.0	\$60.0	\$0.00
Expected Annual Damage (EAD)					\$0.90	\$0.37	EAB: \$0.53

Note: EAD and EAB are determined by integrating the areas under the curves shown in Figure II-1.

Figure I-1. Frequency-Damage Curve



III. DETERMINING THE ALTERNATIVE STATE COST SHARE

Use the following steps to determine the Alternative State Cost Share:

1. Calculate the present value of 30 years of expected annual benefits by multiplying EAB (as determined in Section II.G) by 13.765.²⁰
2. Divide Step 1's result by the present value cost of the levee improvements contained in the Five-Year Plan.
3. Subtract Step 2's result from one (1.0).²¹
4. If the value from Step 3 is less than 0.75, set the Alternative State Cost Share to this value. Otherwise, set the Alternative State Cost Share to 0.75.

Example: Taking EAB from Table II-1, Step 1 results in a value of \$7.3 million ($\0.53×13.765). Assume the present value cost of the plan is \$24.0 million. The result of Step 2 is thus 0.304 ($\$7.3 \div \24.0). Step 3 subtracts this value from 1.0, which equals 0.696, or 69.6%. Since this value is less than 0.75, the Alternative State Cost Share in this example is 69.6%, or \$16.7 million. However, the maximum State share would be limited to \$14.5 million (\$5 million plus 50% of \$19 million).

²⁰ The present value of 30 years of a constant annual benefit is found by multiplying the annual benefit by the factor

$$\frac{(1+r)^{30} - 1}{r(1+r)^{30}}$$

where r is the real discount rate. Setting r to 6% yields a factor equal to 13.765. While levee improvements may have useful lives longer than 30 years, a 30-year period is used to reflect the typical period for long-term debt financing.

²¹ Note that in cases where local benefits exceed project costs, the result will be negative, implying an Alternative State Cost Share of 0 percent.

IV. TOOLS FOR ESTIMATING FLOOD DAMAGE REDUCTION BENEFITS

A. Manuals and Guidelines for Estimating Flood Damages

The USACE has prepared a new *NED Flood Damage Reduction Manual* that provides a detailed discussion on calculating non-farm flood damages and EAD.²² Likewise, the U.S. Water Resources Council's *Principles & Guidelines* describe the procedures for estimating crop flood damage reduction benefits.²³ Additional guidance on the estimation of flood protection benefits is available from DWR's *Economic Analysis Guidelines: Flood Risk Management*. These manuals and guidelines should be consulted prior to estimating flood hazard reduction benefits of the proposed levee improvement projects in the Applicant's Five-Year Plan.

B. Data and Models for Estimating Flood Damages

Flood damage reduction benefits should be estimated using the best information available at the time the analysis is conducted. Many of the steps described for estimating physical damages of flooding can be implemented with data and models developed for the Delta Risk Management Strategy (DRMS), as discussed in the next section.²⁴ The U.S. Army Corps of Engineers and FEMA also have developed analytical software and data that can be used to compute flood hazard reduction benefits. These tools are described in Chapter 5 of DWR's *Economic Analysis Guidelines: Flood Risk Management*. Although tools such as these can facilitate the computation of flood protection benefits, use of them is not a requirement of the Special Projects Program.

C. DRMS Data and Models

DRMS developed a variety of data sets and models that can facilitate the calculation of avoided physical damages, loss-of-function costs, and emergency response costs of a levee improvement project. This section briefly describes these tools and data sets.

1. Flood Rapid Assessment Model (F-RAM)

F-RAM is an Excel-based spreadsheet model designed to calculate with- and without-project EAD and to assess the benefits and costs of flood protection projects. F-RAM was originally developed to determine levee rehabilitation priorities within the San Joaquin River Basin, but it is also suited to evaluating projects located throughout the Delta. The model and user documentation are available from DWR upon request.

²² <http://www.pmcl.com/nedprototype/index.asp>

²³ <http://www.usace.army.mil/cw/cecw-cp/library/planlib.html>.

²⁴ <http://www.water.ca.gov/floodmgmt/dsmo/sab/drmosp/>

2. Delta Asset Inventory and Damage Tables

Calculation of physical damages to infrastructure requires an inventory of existing and projected structures and infrastructure at risk for the with- and without-project conditions. The inventory should show the following: (1) number of existing and projected structures and other point and linear assets at risk, such as residential, commercial, industrial, public facilities, etc., for without- and with-project conditions; (2) value of inventoried assets; (3) value of structure contents. DRMS compiled structure and infrastructure inventories and flood damage tables by Delta Island and land tract. Damages were estimated for two levels of inundation: (1) 100-year flood event inundation and (2) Mean-Highest-High inundation.²⁵ These tables are contained in the DRMS document *Delta Risk Management Strategy: Impact to Infrastructure Technical Memorandum*.²⁶ Prior to using a DRMS asset inventory, it should be compared to actual on-the-ground conditions to verify the accuracy and completeness of the inventory. Note that it may be necessary to update or supplement the DRMS inventory with additional information.

3. Farmland Damage Tables

Scour and inundation can damage farmland and result in the destruction of permanent crops. DRMS estimated farmland damages by Delta island and land tract for 100-year and Mean-Highest-High flood events. The estimates are presented in farmland damage lookup tables. Each table includes several examples demonstrating how to use the tables to look up farmland damage estimates. The data, assumptions, and methodology are presented in the DRMS document *Delta Risk Management Strategy: Economic Consequences Technical Memorandum*.²⁷ These tables are available upon request from DWR.

4. Non-Farm Loss-of-Function Costs

Loss-of-function costs from a flood event include: lost use of residential structures; disruption of non-farm commercial enterprises; disruption of public services; and disruption of farm commercial enterprises. DRMS developed data and models to estimate loss-of-function costs by Delta island or land tract. Loss of function cost estimates by Delta island and land tract are presented in Appendix A of the DRMS document *Delta Risk Management Strategy: Economic Consequences Technical Memorandum*.

²⁵ The 100-year flood level is the level of inundation that is expected to occur following a levee breach during 100-year storm event. The Mean-Highest-High flood level is the level of inundation expected to occur following a seismic event or some other "sunny day" cause of levee failure. For many interior Delta islands, the area and depth of inundation is the same for the two flood types because of their bowl-shaped topography.

²⁶ http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/Infrastructure_TM-updated07.pdf. This memorandum also documents the data, assumptions, and methodology used to construct the inventory and damage tables.

²⁷ http://www.water.ca.gov/floodmgmt/dsmo/sab/drmsp/docs/Economic_TM-updated07.pdf.

5. Farm Loss-of-Function Costs

Income losses for Farm Commercial Enterprises from a flood event depend on the time of year the flood event occurs, the time until the flooded area is dewatered, and the mix of crops affected. DRMS estimated farm income losses by Delta island and land tract for 100-year and Mean-Highest-High flood events. The estimates are presented in farm income loss lookup tables. Each table includes several examples demonstrating how to use the tables to estimate farm income losses. The data, assumptions, and methodology are presented in the DRMS document *Delta Risk Management Strategy: Economic Consequences Technical Memorandum*. The tables are available from DWR. These tables are available upon request from DWR.

6. Emergency Response Costs

Emergency costs include emergency sheltering and other public services, levee stabilization and repair, and island dewatering. DRMS estimated the costs of levee stabilization, repair, and dewatering by Delta island and land tract. These estimates are presented in the DRMS document *Delta Risk Management Strategy: Emergency Response & Repair Technical Memorandum*.²⁸

²⁸ http://www.water.ca.gov/floodmgmt/dsmo/sab/drmisp/docs/ER&R_TM-updated07.pdf.

V. EXAMPLE LOCAL AGENCY BENEFIT ASSESSMENTS

This section provides an example that demonstrates the application of the foregoing methodology. The example considers a plan to upgrade Reclamation District No. 2029's (Empire Tract) levees to the PL84-99 standard.

RD 2029 EXAMPLE ANALYSIS

The RD 2029 example analysis consisted of applying the methodology for determining an Alternative State Cost Share for a hypothetical upgrade of RD 2029 existing levees to a 1-in-100 year level of protection consistent with the PL84-99 standard. The analysis of flood damage reduction benefits was based on existing land uses within RD 2029. No foreseeable changes in current land uses were identified, with or without the levee upgrade.

1. Overview of RD 2029 Land Uses

RD 2029, also known as Empire Tract, is located on the eastern side of the Delta close to the middle of the Delta's north-south axis (Figure V-1). Eight Mile Road bisects the district from east to west and terminates on the western edge of the island. The district comprises a total of 3,677 acres.

Most of this acreage is used for agricultural production (Figure V-2). Some acreage on the northern side of the district has been converted to hunting and wildlife habitat. A large parcel in the center of the island and just south of the existing hunting and wildlife acreage is being converted into a duck club (Figure V-2). There are currently no structures on this parcel and it is unknown whether this land will be used for commercial hunting purposes. It is also unclear whether this acreage will continue to be farmed as well. For the analysis of flood damage reduction benefits, it was assumed 50% of this acreage (about 260 acres) would remain in farming. About 350 acres of farmland on the southern side of Eight Mile Road has recently been planted to blueberries, a high-valued perennial crop (Figure V-2).²⁹ On the western edge of the district, adjacent to Eight Mile Road is a marina complex and ferry to Venice Island. There are few other structures within RD 2029 besides a small number of residences and farm buildings.

The marina complex on the district's western border is not subject to assessment by RD 2029, and therefore is excluded from the calculation of flood damage reduction benefits. Likewise, the county road bisecting the island is not subject to district assessment. Therefore, it also is excluded from the analysis.

The Delta Risk Management Strategy (DRMS) project identified six manufactured housing units (mobile homes) and three single-family residential structures. Table V-1 provides a summary of non-farm assets inventoried by DRMS. This inventory included the marina complex and county road, but did not include non-residential farm structures. Satellite imagery of RD 2029 shows what appear to be three farm-related structures. These structures were not included in the calculation of flood damage reduction benefits due to lack of information on their value.

Crop acreage for RD 2029 is shown in Table V-2. Field and grain crops account for approximately 85% of farmed acreage. Corn is the primary crop grown on the island. Higher valued truck crops and the new blueberry acreage account for about 15 percent of farmed acreage on the island.

²⁹ Established blueberries can produce for 20 to 25 years.

Figure V-1. Empire Tract (RD 2029)

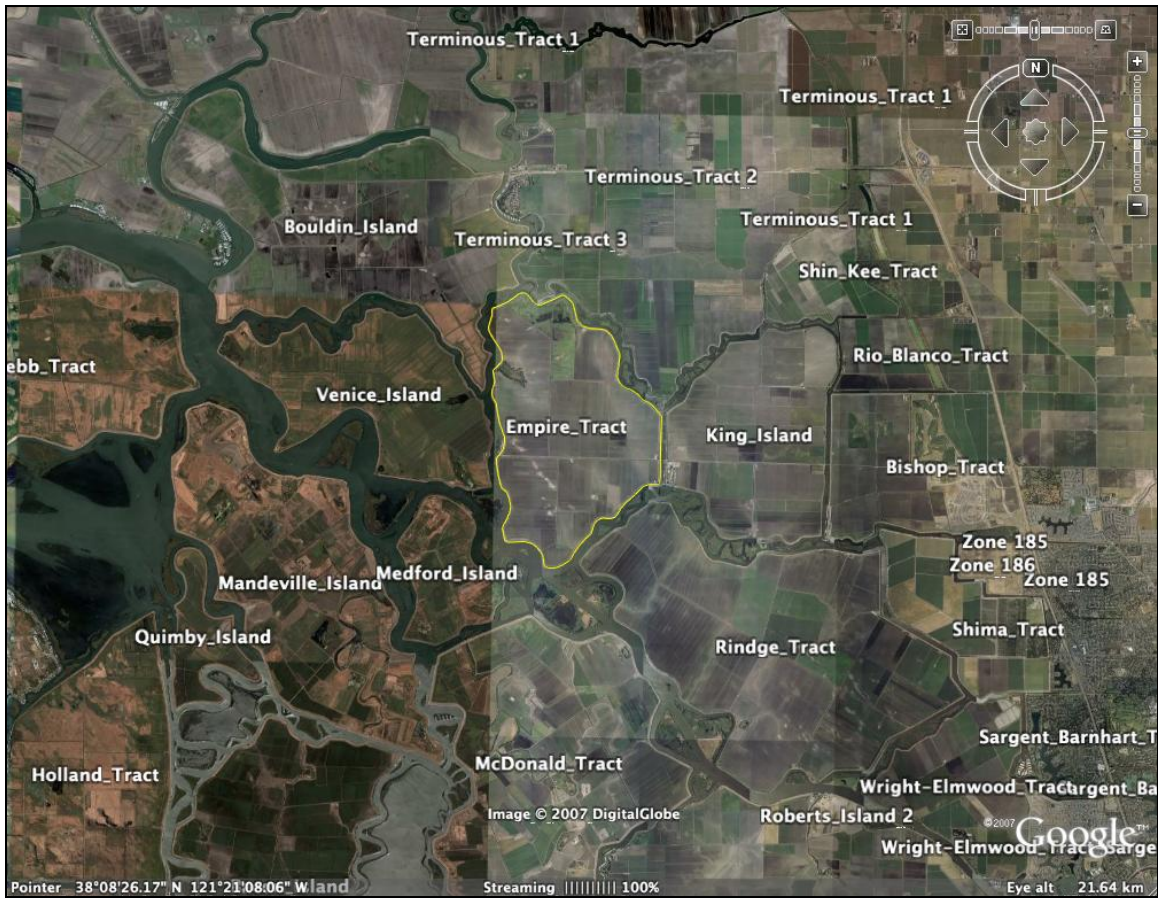


Table V-1. RD 2029 Non-Farm Asset Inventory

Asset Type	Unit	GIS Qty	Avg. Flood Depth	Total Asset Value (Thou. \$)
Boat Launch, Marina*	Count	1	22	100
Delta Roads, PBSJ Minor Roads*	Length (ft)	44263	21	8853
PBSJ Gas-Oil Wells – non operational	Count	5	18	0
Residential - Manufactured Housing**	Count	6	21	326
Residential - Single Family Dwelling**	Count	3	21	512

* These assets are not subject to district assessment and therefore are not included in the calculation of flood damage reduction benefits.

**Includes value of structure contents.

Source: Numbers in Table V-1 are from Tables 7-1a and 7-1b. Delta Risk Management Strategy (Phase 1), Technical Memorandum: Impact to Infrastructure, Draft 2, June 2007.

Table V-2. Empire Tract Crop Acreage

Crop	Acreage
Field crops (a)	1,981
Grain other than corn	666
Blueberries	350
Other Truck (b)	140
Total	3,138

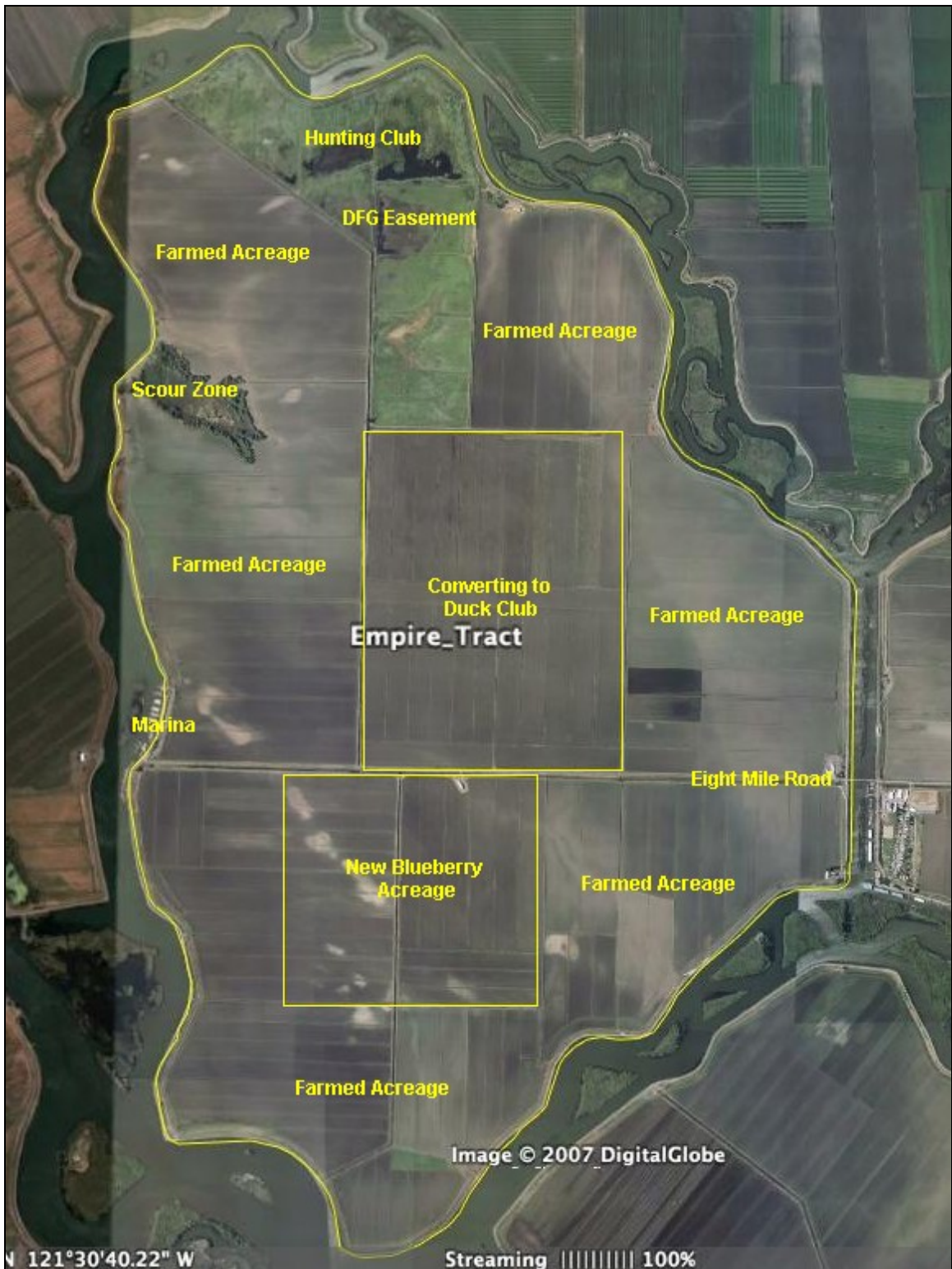
Notes:

(a) Field crop acreage includes corn, the primary crop grown on Empire Tract.

(b) DWR/UC Davis acreage data for Empire Tract identified 490 acres of truck crop acreage.

For the benefit assessment, we assume the new blueberry acreage came from this truck acreage.

Figure V-2. RD 2029 Current Land Uses



2. RD 2029 Flood Damage Estimation

a. Flood Depth

Flood damage to RD 2029 land, structures and improvements following a levee breach primarily depends on depth of inundation. Because of the island's bowl-shaped geography, depth of inundation will be the same regardless of whether a levee breach occurs during a sunny day event (e.g. a seismic event) or a flood event. All of RD 2029 is below sea level. DRMS estimated an average inundation depth of about 20 to 22 feet (Table V-1). At this level of inundation, all structures and improvements within the levees would be inundated and expected to incur significant flood damage.

b. Damage to Structures and Infrastructure

The DRMS analysis estimated the percent of damage to structures and infrastructure for each Delta tract following a flood event. The estimates for RD 2029 are shown in Table V-3. DRMS used the FEMA HAZUS method to calculate the cost of structure damages.³⁰ This method multiplies the percent of structure damage by the structure replacement cost. Damage estimates in Table V-3 include damages to structure contents, as well as cleanup costs. Estimation of structure contents and cleanup costs are discussed in subsequent sections.

Damages to the marina and county road are excluded from the calculation of the Alternative State Cost Share because they are not assessable properties. They are therefore not listed in Table V-3.

c. Damage to Structure Contents

Damage to structure contents is included in the DRMS structure damage estimates shown in Table V-3. DRMS used the FEMA HAZUS approach to calculating damages to structure contents. This method estimates structure contents as a percentage of the structural replacement value and multiplies this estimate by the percentage of structural damage based on HAZUS depth-damage relationships for different building types. HAZUS provides the following building content values as percentages of structural replacement values:

Residential	-	50%
Commercial	-	100%
Industrial	-	150%
Government	-	100%

³⁰ HAZUS is a flood damage estimation software package developed by FEMA. More information on HAZUS is available at <http://www.fema.gov/plan/prevent/hazus/>.

d. Debris Removal and Cleanup Costs

Debris removal and cleanup costs are included in the DRMS structure damage repair estimates shown in Table V-3. Debris removal costs are a substantial cost immediately following a flood event. After a review of the literature, DRMS concluded that these costs are highly variable, but typically constitute about 10% of total damages. In its analysis of flood damages, DRMS estimated debris removal and cleanup costs at 10% of structural and content damages.

Table V-3. DRMS Structure/Infrastructure Damage Estimates for Empire Tract

Asset Type	Inventory Unit	GIS Qty	% Damage	Total Asset Value (Thou. \$)	Repair Costs (Thou. \$)	Repair Time (months)
Levee Roads, Scour Damage (2)	Length (ft)	750	100	150	154	6
PBSJ Gas-Oil Wells – Non Operational	Count	5	NA	0	0	0
Residential - Manufactured Housing	Count	6	100	326	338	24
Residential - Single Family Dwelling	Count	3	100	512	544	24
Total (excludes marina and county road):				988	1,036	

Notes:

(1) County assessor’s value for Boat Launch/Marina was used instead of DRMS estimate. Total asset value includes structure contents, estimated at 100% of the structure replacement value, per the HAZUS method.

(2) Assume road destroyed at breach site. Road repair cost estimate at breach site equals length of road damaged by scour divided by total road length times road asset value times 1.025 (cost escalator). Length of road damaged by scour equals breach width (500 ft) plus 50% of breach width (250 ft).

Source: Numbers in Table V-3 are from Tables 7-1a and 7-1b. Delta Risk Management Strategy (Phase 1), Technical Memorandum: Impact to Infrastructure, Draft 2, June 2007.

e. Damage Cost and Repair Time Scaling Factors

The damage and repair time estimates in Table V-3 are applicable for simultaneous flooding of up to five Delta islands. The cost and time required for repairs in the case of a larger number of simultaneous island failures is expected to be higher. DRMS used the cost and repair time scaling factors shown in Table V-4 to adjust damage cost estimates for flood events involving a large number of islands. The insurance industry refers to these scaling factors as “post event inflation” or “demand surge”. The scaling factors apply to total flood damages (structure + contents + cleanup). To support the use of scaling factors, DRMS reviewed the literature from a variety of post-catastrophic events. The scaling factors shown in Table V-4 were used to estimate structure damages on RD 2029 in the case of a large number of simultaneous flood events.

Table V-4. DRMS Repair Cost and Time Scaling Factors

Number of Island Failures	Repair Cost Scaling Factors	Repair Time Scaling Factors
1 to 5	1.0	1.0
10	1.2	1.4
20	1.6	2.2
30	2.0	3.0

Source: Tables 7-7. Delta Risk Management Strategy (Phase 1), Technical Memorandum: Impact to Infrastructure, Draft 2, June 2007.

f. Residential and Commercial Displacement

A flood event would displace RD 2029 residents and businesses. Residents would need to secure temporary shelter during the period of dewatering and rebuilding. Businesses would likely be closed during the dewatering and repair period.³¹ Like rebuilding costs, the period of displacement is a function of the number of structures damaged and requiring repair and the number of other islands and tracts flooded. DRMS used the FEMA HAZUS method for estimating residential displacement costs. This method assumes a one-time cost of \$500 per flooded household, plus \$500 per month per flooded household, plus a monthly cost based on local rental rates. DRMS estimated average monthly rental rates for typical housing of \$747 for the Delta region. Residential displacement costs for a 1-to-5 flooded tract scenario are summarized in Table V-5.

Commercial displacement costs are equal to the revenues net of variable expenses businesses forgo by having to shutdown during the dewatering and repair period. The DRMS estimates for non-agricultural commercial displacement costs for a Tract 1-to-5 flooded tract scenario are shown in Table V-5. While not explicitly stated in DRMS documents, it was assumed estimated business income losses pertained to the marina complex, which is the only commercial enterprise on the island other than farming. Since the marina is not subject to district assessment, its business losses were not included in the calculation of flood damage reduction benefits.

Table V-5. RD 2029 Residential and Commercial Displacement Costs (Thou. \$)

Residential*	190
Businesses (other than agriculture)**	40
Total	230
Total, excluding marina losses	190

* Based on 1-to-5 flooded tracts. Residential lost use costs based on 24 month repair time for single family dwelling units.

** These assets are not subject to district assessment and therefore are not included in the calculation of flood damage reduction benefits.

Source: LostUseCost033007.xls; Delta Risk Management Strategy (Phase 1), Technical Memorandum: Economic Consequences, Draft 2, June 2007.

³¹ The only non-agricultural commercial operations on the island are the marina and ferry. These facilities are not assessable by the reclamation district and therefore are not included in the benefit assessment.

g. Agricultural Disruption Costs

DRMS estimated agricultural disruption costs for each Delta island/tract. Total costs comprised four components: (1) destruction of or damage to permanent crops, (2) loss of productive land due to scour, (3) field cleanup costs, and (4) loss of crop revenue net of variable production expenses. Agricultural losses for RD 2029 are summarized in Table V-6. The original estimates prepared by DRMS have been updated to account for the new blueberry acreage. The costs in Table V-6 assume levee repair and dewatering would be completed within four months of the breach. In the event of a large scale disaster with multiple island failures, dewatering and repair could be substantially delayed and agricultural disruption costs would be higher than shown in Table V-6. The agricultural loss estimate also assumes a flood event would result in the total loss of the blueberry investment, valued at 1/2 of the establishment cost.³² The blueberry acreage accounts for approximately 78% of the estimated agricultural losses.

Table V-6. Empire Tract Agricultural Disruption Costs (Thou. \$)

	Perm Crops	Scour Damage	Field Cleanup	Income Losses	Total
Fall/Winter Flood	\$2,868	\$85	\$600	\$3,321	\$6,874
Spring/Summer Flood	\$2,868	\$85	\$600	\$3,027	\$6,580
Annual Average	\$2,868	\$85	\$600	\$3,174	\$6,727

Sources: Delta_Flooded_Island_Ag_Impacts_MHH.xls; Delta Risk Management Strategy (Phase 1), Technical Memorandum: Economic Consequences, Draft 2, June 2007.

UC Cooperative Extension (2002). Sample Costs to Produce Fresh Market Blueberries, San Joaquin Valley, Tulare County.

h. Levee Repair and Dewatering Costs

DRMS estimated levee repair and dewatering costs for single breach events for each island/tract in the Delta. For RD 2029, DRMS estimated a cost of \$3.4 million to repair a single levee breach and dewater the tract.³³ DRMS assumed the same cost scaling factors previously discussed would apply to levee repair and dewatering.

i. Summary of RD 2029 Flood Damages

Table V-7 summarizes the flood damage estimates. For purposes of this example analysis, it is assumed that the district or its landowners would incur the costs of levee repair and dewatering.

³² The loss could occur at any time during the useful life of the blueberry bushes, so on average, the loss will occur at the midpoint of the useful life.

³³ The source of the repair cost estimate is Table 12-1 of the Delta Risk Management Strategy Phase 1 Draft Report, June 2007. Repair and dewatering time is from Table 5-4 of the DRMS Emergency Response and Repair Technical Memorandum, draft 2, June 2007. Repair costs assume a single, 500 ft wide breach with a 500 x 2000 square foot scour zone. Fill material is assumed to cost \$55/ton; dewatering costs \$35/AF pumped.

Table V-7. Empire Tract Flood Damage Costs (Million \$)

Island Failures	Up to 5	Up to 10	Up to 20	Up to 30
Structures (1)	\$1.04	\$1.25	\$1.66	\$2.08
Res. & Comm. Displace. (2)	\$0.19	\$0.27	\$0.42	\$0.57
Ag. Disrupt. (3)	\$6.73	\$6.73	\$10.30	\$10.30
Levee Repair (1)	\$3.40	\$4.20	\$5.44	\$6.80
Total	\$11.36	\$12.45	\$17.82	\$19.75

Notes:

(1) Damage costs for more than 5 flooded islands based on cost scaling factors from Table V-4.

(2) Lost use costs for more than 5 flooded islands based on repair time scaling factors from Table V-4.

(3) Assumes one year of production is lost for 10 or fewer flooded islands; two years for more than 10 flooded islands. Field clean up cost for more than 10 flooded islands is multiplied by a scaling factor of 1.4. The second year of agricultural income loss is based on the value for a fall/winter flood event.

The calculation is: $6.727+0.240+3.321 = 10.288$, which is rounded to 10.3 in the table.

3. Expected Annual Flood Damage Without the Plan

Expected annual flood damage (EAD) is equal to the estimated damages from a flood event times the probability of occurrence. Estimated flood damages shown in Table V-7 are based on the number of islands and tracts flooded in an event. DRMS estimated the probabilities for simultaneous island flooding. These probabilities were used to estimate the average damage for an RD 2029 flood event. Sunny day and hydrologic events were considered.

Sunny day events can be divided into two categories: seismic and non-seismic. For non-seismic sunny day events, DRMS concluded that the probability of more than one simultaneous island/tract failure is negligible.³⁴ Therefore, the expected annual flood damage for a non-seismic sunny day event is equal to the probability of occurrence times the damage for 1 to 5 failures.³⁵ For RD 2029, DRMS estimated a 0.11% annual probability of a non-seismic sunny day failure, such as the Jones Tract failure in 2004.³⁶ This is approximately a 1-in-1000 year flood risk of a sunny day failure. The expected annual damage from a non-seismic sunny day event given current land uses is therefore approximately \$12,500 ($0.0011 \times \11.36 million).

The same seismic risks were assumed with and without the hypothetical levee improvement.³⁷ Thus, expected damages from sunny day seismic events would be the same with and without the plan and therefore do not need to be calculated.

³⁴ Section 13.2.1, Delta Risk Management Strategy (Phase 1) Draft Report, June 2007.

³⁵ Sunny day flood depths are determined by tidal level, and therefore damages for MHHW flood depths rather than hydrologic event flood depths are relevant.

³⁶ See Table 13-1, Delta Risk Management Strategy (Phase 1) Draft Report, June 2007.

³⁷ The hypothetical levee improvement did not include seismic upgrading to enable the levees to survive large seismic events

For flood events, DRMS estimated the probabilities of multiple island/tract failures shown in Table V-8. These probability estimates were combined with the damage estimates in Table V-7 to calculate the expected damage of a hydrologic flood event, as shown in Table V-9. The expected damage from a hydrologic flood event is \$11.65 million.

Table V-8. DRMS Probability Estimates of Multiple Island/Tract Failures

Number of Island/Tract Failures	Probability of Exceedance
1	60.5%
3	28.1%
10	3.4%
20	0.9%
30	0.4%

Source: Table 13-5, Delta Risk Management Strategy (Phase 1) Draft Report, June 2007.

DRMS estimated a 4.41% annual probability (a 1-in-23 chance) of a flood-related failure under the *without plan condition*.³⁸ EAD for hydrologic events for the without plan condition is equal to the expected damages shown in Table V-9 times this probability, or approximately \$514,000.

The total EAD for the *without plan condition* is equal to EAD for sunny day events and EAD for hydrologic events, which equals \$526,500 (\$514,000 + \$12,500).

³⁸ Table 13-6. Delta Risk Management Strategy (Phase 1) Draft Report. June 2007.

Table V-9. RD 2029 Expected Flood Damage from Hydrologic Flood Events

(1)	(2)	(3)	(4)	(5)	(6)
Flooded Islands	DRMS Exceedance Probability [From Table V-8*]	Probability flooded islands less than or equal to Col. (1) [1-Col. (2)]	Probability flooded islands equals Col. (1) [Row n – Row n-1]	RD 2029 Damages (million \$) [From Table V-7*]	[Col. (4) x Col. (5)]
1	0.6050	0.395	0.3950	11.36	4.487
2	<i>0.4430</i>	0.557	0.1620	11.36	1.840
3	0.2810	0.719	0.1620	11.36	1.840
4	<i>0.2457</i>	0.754	0.0353	11.36	0.401
5	<i>0.2104</i>	0.790	0.0353	11.36	0.401
6	<i>0.1751</i>	0.825	0.0353	<i>11.58</i>	0.409
7	<i>0.1399</i>	0.860	0.0353	<i>11.80</i>	0.416
8	<i>0.1046</i>	0.895	0.0353	<i>12.01</i>	0.424
9	<i>0.0693</i>	0.931	0.0353	<i>12.23</i>	0.432
10	0.0340	0.966	0.0353	12.45	0.439
11	<i>0.0315</i>	0.969	0.0025	<i>12.99</i>	0.032
12	<i>0.0290</i>	0.971	0.0025	<i>13.52</i>	0.034
13	<i>0.0265</i>	0.974	0.0025	<i>14.06</i>	0.035
14	<i>0.0240</i>	0.976	0.0025	<i>14.60</i>	0.036
15	<i>0.0215</i>	0.979	0.0025	<i>15.14</i>	0.038
16	<i>0.0190</i>	0.981	0.0025	<i>15.67</i>	0.039
17	<i>0.0165</i>	0.984	0.0025	<i>16.21</i>	0.041
18	<i>0.0140</i>	0.986	0.0025	<i>16.75</i>	0.042
19	<i>0.0115</i>	0.988	0.0025	<i>17.28</i>	0.043
20	0.0090	0.991	0.0025	17.82	0.045
21	<i>0.0085</i>	0.992	0.0005	<i>18.01</i>	0.009
22	<i>0.0080</i>	0.992	0.0005	<i>18.21</i>	0.009
23	<i>0.0075</i>	0.993	0.0005	<i>18.40</i>	0.009
24	<i>0.0070</i>	0.993	0.0005	<i>18.59</i>	0.009
25	<i>0.0065</i>	0.994	0.0005	<i>18.79</i>	0.009
26	<i>0.0060</i>	0.994	0.0005	<i>18.98</i>	0.009
27	<i>0.0055</i>	0.995	0.0005	<i>19.17</i>	0.010
28	<i>0.0050</i>	0.995	0.0005	<i>19.36</i>	0.010
29	<i>0.0045</i>	0.996	0.0005	<i>19.56</i>	0.010
30	0.0040	0.996	0.0005	19.75	0.010
31	<i>0.0036</i>	0.996	0.0004	19.75	0.008
32	<i>0.0032</i>	0.997	0.0004	19.75	0.008
33	<i>0.0028</i>	0.997	0.0004	19.75	0.008
34	<i>0.0024</i>	0.998	0.0004	19.75	0.008
35	<i>0.0020</i>	0.998	0.0004	19.75	0.008
36	<i>0.0016</i>	0.998	0.0004	19.75	0.008
37	<i>0.0012</i>	0.999	0.0004	19.75	0.008
38	<i>0.0008</i>	0.999	0.0004	19.75	0.008
39	<i>0.0004</i>	1.000	0.0004	19.75	0.008
40	<i>0.0000</i>	1.000	0.0004	19.75	0.008
				Expected Damages	\$11.648
* Bold values are from Table V-7 or V-8. Italic values are linearly interpolated.					

4. Expected Annual Flood Damage With the Plan

The hypothetical levee improvement would reduce the risk of levee failure from hydrologic events from 1-in-23 years to 1-in-100 years. The hypothetical improvement would not appreciably change the risk of non-seismic sunny day events. Therefore, EAD for the *with-plan condition* is equal to the previously calculated EAD for sunny day events and EAD for hydrologic events based on the lower flood risk. EAD for hydrologic events is equal to the expected damages shown in Table V-9 times the 1 percent probability of failure, or approximately \$116,500.

The total EAD for the *with-plan condition* is equal to EAD for sunny day events and EAD for hydrologic events, which equals \$129,000 (\$116,500 + \$12,500).

5. Expected Annual Benefit for RD 2029

The expected annual flood damage reduction benefit (EAB) of the plan is equal to the difference between EAD *without the plan* and EAD *with the plan*. This amount is \$397,500. Multiplying this amount by 13.765 gives the present value of EAB.³⁹ This amount is approximately \$5.5 million.

6. Determining the Alternative State Cost Share for RD 2029

DRMS estimated it would cost approximately \$49 million to improve RD 2029's levees to meet PL84-99 standards and provide 1-in-100 year flood protection from hydrologic events.⁴⁰

The ratio of the present value of EAB to the present value of the project cost (\$5.5 million ÷ \$49 million) is equal to 0.112. Subtracting this amount from 1 yields 0.888. Because this value is greater than 0.75, the Alternative State Cost Share (before cost sharing enhancements) would be 0.75, or \$36.75 million. However, the maximum State share on this project would be limited to \$27 million (\$5 million plus 50% of \$44 million).

³⁹ Based on a real discount rate of 6% over 30 years.

⁴⁰ DRMS did not provide a numeric estimate of the reduction in seismic risk from improving the levees to PL84-99 other than to indicate the risk reduction would be small to negligible.

EXHIBIT D

Requirements for the Five-Year Plan

1. **Assessment of the status of existing levee system and future goals**

The Plan should provide a clear description of the following:

- a. *Describe historical flood problems, including:*
 - ◇ *Dates of events*
 - ◇ *Estimated flood frequencies of events*
 - ◇ *Levee performance during these events,*
 - ◇ *Consequences of events*
- b. *What is the existing level of protection provided by the levee system? Include the source of this information. Specifically,*
 - ◇ *What portion of the levee is below or at HMP Standard?*
 - ◇ *What portion of the levee is at PL84-99?*
 - ◇ *What portion of the levee is above PL84-99?*
- c. *What level of protection is expected to be achieved at the end of the five years? Provide justifications in support of the anticipated outcomes.*

2. **Strategy to meet desired level of protection**

The Plan should elaborate on the desired level of protection at the end of five years (item "c" above) and discuss the following:

- a. *A complete description of the desired level of protection as a goal to achieve in the next five years.*
- b. *Phasing of the work, including a description of recommended projects needed to achieve the five year goal.*
- c. *Total estimated cost of the work and its distribution on a project-by-project basis over the five years.*
- d. *Potential cost sharing with other partners.*
- e. *Schedule of work.*
- f. *Discussion of potential obstacles to meet the desired goal.*

3. **Identification of need for improvements to alleviate or minimize existing hazards**

The Plan should provide an inventory of the local and non-local assets/critical infrastructures, both public and private, being protected by the levees. Local assets are those for which the Local Agency can levy assessments for flood protection; non-local assets are those the Local Agency cannot levy assessments for. The Local Agency should identify public benefits where applicable, such as:

- ◇ *Water quality*
- ◇ *Recreation*
- ◇ *Navigation*
- ◇ *Fish and wildlife*
- ◇ *Protection of State Infrastructure*
- ◇ *Other*

4. Identification of the risks for current land use based on the existing assets
The Plan needs to discuss risks associated with levee failure. In particular:
 - ◇ *Consequences of levee failure or breach*
 - ◇ *Existing deficiencies in the system, including existing seepage, boils, or voids under the levee*
 - ◇ *Urgency of repair work*

5. Identification of opportunities for multi-objective projects
The Plan should, at a minimum, describe opportunities and significant constraints for achieving the following objectives:
 - ◇ *Ecosystem restoration and habitat enhancement component*
 - ◇ *Reversing land subsidence.*
 - ◇ *Ensuring adequate and effective emergency response plans*
 - ◇ *Benefitting water quality*
 - ◇ *Improving water supply reliability*

6. Habitat Mitigation and Enhancement
The Plan should describe how work to be carried out under the plan will meet the requirements of Water Code Sections 12314 which require no net loss of habitat and consistency with net habitat improvement. The plan should describe the following:
 - a. *Baseline habitat conditions prior to the plan.*
 - b. *The anticipated impact to habitats and anticipated extent of the impact based on the identified needs for levee repair and other work outlined in the plan.*
 - c. *How the requirements for no net loss of habitat, and net habitat enhancement will be met.*

7. Compliance with CEQA and obtaining required permits
The Plan should describe all of the following:
 - a. *Types of permits and environmental compliance documents required.*
 - b. *Status of the environmental documentation.*
 - c. *Status of the permit process.*

EXHIBIT E

Definition of Delta Levees Habitat Types

Channel Margin Habitat (Delta Specific) or Fish Friendly Levee Habitat (FFLH) – features a complex of aquatic, wetland, and riparian habitats at the edge of watercourses often associated with rip-rapped levees. FFLH provides sandy or muddy substrate at a range of elevations that include tidally submerged or shallow benches to seasonally-inundated riparian habitat (aka Shaded Riverine Aquatic). FFLH provides diversity in structure, topography, vegetation, and hydrology, with shallower depths and slower velocities than in the adjacent channel, which combine to dissipate the energy of moving water. The creation of FFLH also provides built-in accommodation for anticipated sea level rise and increased intensity of freshwater flows due to climate change.

Shaded Riverine Aquatic (SRA) Habitat – is characterized by woody shoreline vegetation which overhangs the water's edge. Within the Delta, the woody vegetation component of SRA is most often provided by willows, alders, box elders, and cottonwoods. Shade provides cover for fish and wildlife and moderates high temperatures.

Riparian Forest (RF) Habitat – is characterized by woody vegetation (trees greater than 20 feet in height) that may or may not overhang the water's edge. The most common trees in the Delta included cottonwood, sycamore, alder, Oregon ash, willows, box elder, black walnut and various oaks. RF habitat provides food, cover, nesting, and roosting places for many birds, including hawks, owls, herons, egrets, wood ducks, woodpeckers, flickers, and numerous passerine species and can provide an important movement corridor for wildlife.

Scrub-shrub (SS) Habitat – is a stand of woody vegetation less than 20 feet in height. The various tree species that make up SS are generally the same as for RF, although in most instances alders and or willows are the dominant plants. SS also include such species as California blackberry, California wild rose, and coyote brush. Habitat value for fish and wildlife tends to increase with density and diversity of vegetative structure.

Freshwater Marsh (FM) Habitat – is a relatively shallow aquatic area, usually less than about 4.5 feet deep, where emergent plants are growing. In the Delta, freshwater marsh occurs in non-tidal or tidal regimes. The most common plants are tules, bulrushes, and cattails. Plant biomass and productivity is frequently high in freshwater marshes. Many resident and freshwater fish (e.g., various minnows including Sacramento Splittail and juvenile salmonids) use tidally-influenced FM for cover from predators and feeding areas.