



DELTA STEWARDSHIP COUNCIL
A California State Agency



RISK ANALYSIS METHODOLOGY

Delta Levees Investment Strategy

July 2016



DELTA LEVEES INVESTMENT STRATEGY PROJECT TEAM FIRMS

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RISK ANALYSIS METHODOLOGY

Delta Levees Investment Strategy

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ACRONYMS AND ABBREVIATIONS

AEP	annual exceedance probability
ALARP	as low as reasonably practicable
Arcadis	Arcadis U.S., Inc.
ASCE	American Society of Civil Engineers (ASCE)
ASFP	Association of State Floodplain Managers
BALMD	Brannan-Andrus Levee Maintenance District
BDCP	Bay Delta Conservation Plan
BIMID	Bethel Island Municipal Improvement District
CA OHP	California Office of Historic Preservation
Caltrans	California Department of Transportation
Cal OES	California Governor's Office of Emergency Services
CCED	California Conservation Easement Database
CCWD	Contra Costa Water District
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CHARG	San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group
cm	centimeters
Council	Delta Stewardship Council
CPAD	California Protected Areas Database
CPUC	California Public Utilities Commission
CRA	California Resources Agency
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVP	U.S. Bureau of Reclamation Central Valley Project
.csv file	comma separated value file
CWC	California Water Code

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CWSR	conceptual water supply risk
Delta	Sacramento-San Joaquin Delta
DFIRM	Digital Flood Insurance Rate Map
DLIS	Delta Levees Investment Strategy
DMP	Digital Map Products
DOC	California Department of Conservation
DOE	Department of Energy
DOF	California Department of Finance
DPC	Delta Protection Commission
DRA	Delta Reform Act
DRMS	Delta Risk Management Strategy
DPR	Department of Pesticide Regulation
DST	Decision Support Tool
DWR	California Department of Water Resources
EAD	expected annual damages
EAD _F	expected annual damage without rehabilitation
EAD _R	expected annual damage with rehabilitation
EAD _v	expected annual damage at plus or minus one standard deviation from an input mean value
EAF	expected annual fatalities
EBMUD	East Bay Municipal Utility District
EFH	Expected Flooding of High Value Non-Tidal Habitat
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESSRO	FloodSAFE Environmental Stewardship and Statewide Resources Office
FMMP	California Farmland Mapping and Monitoring Program
FOSM	first order, second moment
GIS	geographic information system
H&H	hydrologic and hydraulic
HSE	Health and Safety Executive
HMP	Hazard Mitigation Plan

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KSN	Kjeldsen, Sinnock, and Neudeck, Inc.
LiDAR	Light Detection and Ranging
LMA	Local Maintaining Agency
LOP	level of protection
MOU	Memorandum of Understanding
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NAVD	North American Vertical Datum
NAVD 88	North American Vertical Datum of 1988
NB	net benefit
NCLS	National Committee on Levee Safety
NGVD 29	National Geodetic Vertical Datum of 1929
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRC	National Research Council of the National Academies
NRCS	Natural Resources Conservation Service
NSHM	National Seismic Hazard Map
OMB	Office of Management and Budget
OMRR&R	operation, maintenance, repair, replacement, and rehabilitation
OPC	Ocean Protection Council
%	percent
PAR	population at risk
PCTL	Public, Conservation, and Trust Lands
PDF	probability density function
pe	probability of a flood event
pf	probability that coming in contact with flood water is fatal
PFP	probable failure point
pga	peak ground acceleration
PL 84-99	Public Law 84-99
PNP	probable non-failure point

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PPIC	Public Policy Institute of California
PSHA	probabilistic seismic hazard analysis
QA/QC	quality assurance/quality control
RCD	Resource Conservation District
RD	Reclamation District
RMS	root mean square
RWQCB	Regional Water Quality Control Board
SFMP	Statewide Flood Management Planning Program
SLR	sea level rise
SRDWSC	Sacramento River Deep Water Ship Channel
State	State of California
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TAF	thousand acre-feet
TRG	Tolerable Risk Guideline
ULE	Urban Levees Evaluation
USACE	U.S. Army Corps of Engineers
USBR	U.S. Department of the Interior Bureau of Reclamation
USDA	United States Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRDA	Water Resources Reform and Development Act

GLOSSARY/TERMINOLOGY

ALARP, As Low as Reasonably Practicable. ALARP is defined as what can reasonably be achieved without spending an inordinate amount of time, money, or resources relative to the risk reduction benefits that can be attained.

Asset. Property owned by a person or group—or any item that can be considered for the common good—that is regarded as having value.

Beneficiary. Any entity (individual, group, organization, agency, or community) that receives benefits or services (i.e., risk reduction to assets, to water supply disruption, or to the ecosystem) from the existing Delta levee system, or that would receive benefits or services from future investments in the Delta levee system. Direct beneficiaries are those whose property or assets are affected by flooding, and indirect beneficiaries are those who suffer from secondary effects of flooding, such as reduced access to shipped products if a highway is damaged.

Costs. Refers to cash payouts by insurers and governments to reimburse losses suffered by individuals and businesses.

Damages. Physical destruction, measured by physical indicators, such as the numbers of deaths and injuries, or the number of buildings destroyed. When valued in monetary terms, damages become direct losses.

Delta as Place. The evolving cultural, historical, recreational, agricultural, and economic values of the Delta that make it unique.

Direct Beneficiaries. See Beneficiary.

Direct Losses. See Losses.

Discharge-recurrence Curve. A graphical representation relating extreme or peak flow rate to annual probability of exceedance or return period. The data used to develop a discharge-recurrence curve are generally the annual peak flow rates for a single river for the period of record.

Ecosystem. All the organisms in a given area that interact with the physical environment. The biotic and physical components in an ecosystem are interdependent, frequently with complex feedback loops. Among the physical components that sustain the biota of an ecosystem are the soil or substrate, topographic relief and aspect, atmosphere, weather and climate hydrology, geomorphic processes, nutrient regime, and salinity regime.

Exit Gradient. The vertical hydraulic gradient of groundwater at or near the ground surface. An exit gradient of 1 is defined as the critical exit gradient because, at that gradient, the upward fluid (water) force on the material (soil) is equal to the submerged weight of the material, creating a buoyant condition and the potential for soil piping.

Expected Annual Damage. A risk-based calculation of the average expected annual damages in a region for a given set of potential flooding conditions.

Expected Annual Fatalities. A risk-based calculation of the average annual number of flood-related fatalities that would be anticipated in a region for a given set of potential flooding conditions.

Flood. High water levels in the channels and waterways of the Delta, which would be caused by upstream flooding in the Sacramento and San Joaquin rivers.

Floodway. The channel of a stream and the portion of the adjoining floodplain required to reasonably provide for the construction of a project allowing passage of the design flood.

Fragility Curve. A graphical representation that relates the magnitude of a hazard to the conditional probability of levee failure should that hazard occur. The joint probability of levee failure can be estimated by integrating, over all hazard levels, the probability of the hazard multiplied by the conditional probability of failure.

Hazard. A condition or circumstance that has the potential to cause harm to people or damage to assets.

Impacts. A broad term including both market-based and nonmarket effects of a disaster. For example, market-based impacts include destruction to property and a reduction in income and sales. Nonmarket effects include environmental consequences and psychological effects suffered by individuals involved in a disaster.

Indirect Beneficiaries. See Beneficiary.

Indirect Losses. See Losses.

Knowledge Uncertainty. Refers to the limitations of data and models; also known as epistemic uncertainty.

Level-of-Protection. The flood recurrence interval that a specific structure is designed to withstand.

Losses. Market-based negative economic impacts of a disaster. These consist of direct losses that result from the physical destruction of buildings, crops, and natural resources, and indirect losses that represent the consequences of that destruction, such as temporary unemployment and business interruption.

Metric. The means for measuring the extent to which objectives are (or can be) achieved. Some metrics are quantifiable, while others are qualitative in nature.

Natural variability. The natural randomness of a condition or event; also known as aleatory variability.

Nonproject levee. Any levee that is not part of the SPFC (California Water Code, Section 9602[c]) or other state-federal or local-federal flood protection facilities. Nonproject levees are typically privately owned or under the authority of a local levee district.

Net Benefit. The calculated value of a project's benefits after subtracting the project costs.

Project Levee. Any levee that is a facility of the State Plan of Flood Control (CWC 9602(c)).

Risk. The exposure someone or something valued has to danger, harm, or loss; risk is calculated as the probability of an event occurring times the consequences of that event.

Residual Risk. The risk that remains after considering the mitigating effects of structural, non-structural, and other risk reduction measures.

Seepage. Water flowing through or under a levee.

Stage-recurrence Curve. A graphical representation relating water elevation (stage) to annual probability of exceedance, or return period. A stage-recurrence curve for a specific location depends on the volume

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rate of flow, the hydraulic flow characteristics of the water channel at that location, and the magnitude of the tidal influence.

Tolerable Risk. The level of risk that society is willing to live with in order to secure certain benefits.

Urban Area. A developed area in which there are 10,000 residents or more (CGC 65007(j)).

Vulnerability. The likelihood of levee failure given conditions of the levees and the magnitude and frequency of current levee hazards.

EXECUTIVE SUMMARY

Introduction

Levees in California's Sacramento-San Joaquin Delta (Delta) reduce flood risk to people, property, natural resources, and infrastructure systems of statewide importance. Levee failure (such as a levee breach) could cause devastating flooding, potentially resulting in injury or loss of life, damage to property and infrastructure, disruption of water supply, and harm to environmental resources of statewide significance.

Currently, the State of California (State) does not have a long-term strategy to guide future investments of its limited funding for Delta levees. The 2009 Delta Reform Act directed the Delta Stewardship Council (Council) to lead the effort to develop and recommend priorities for State investments in Delta levees to reduce flood risks and to advance the coequal goals of water supply reliability and restoring the Delta ecosystem. Working closely with other agencies and the public, the Council is developing a Delta Levees Investment Strategy (DLIS) to establish priorities for State investments in the Delta levee system.

Risk, the potential for an unwanted outcome, is a principal factor in establishing priorities for State investments in levees. Specifically, risk is the probability that an adverse event (such as a flood or earthquake) will occur multiplied by the consequences of that event:

$$\text{Risk} = \text{Probability} \times \text{Consequences}$$

As presented in this report, the DLIS is based on a comprehensive methodology that quantifies risk by considering the threats to Delta levees and the assets protected by Delta levees. The DLIS also considers the multiple beneficiaries of Delta levee investments. Building on the results of previous Delta levee planning efforts, the DLIS collects and uses the best available existing data and information from numerous sources to evaluate risks to State interests in the Delta as defined by risk to public safety; property and infrastructure; water supply reliability; the Delta ecosystem; and the unique attributes of the Delta as an evolving place. The DLIS evaluates those risks under current and potential future conditions.

In early 2015, the DLIS team prepared an Interim Progress Report summarizing the work conducted during the first 9 months of the DLIS project. The report focused primarily on the methodologies planned for implementing the DLIS project to facilitate a "mid-course" review by an independent science panel, which completed its work in July 2015. Panel members offered comments for improvement and concluded that the "overall methodology of using existing data, identifying important metrics, aggregating results, and making comparisons across islands is conceptually sound" (Mitchell et al. 2015).

The DLIS project includes outreach to State and local agencies, concerned stakeholders in the Delta, knowledgeable technical resources, owners and operators of Delta infrastructure, and Delta leaders and residents. The final methodologies employed in the DLIS project are reported herein and incorporate the input from the independent science panel as well as feedback and comments resulting from the outreach efforts.

Tolerable Risk Approach

It is impossible to completely eliminate flood risk. Hence, the Council's Delta Plan calls for a risk-informed analysis to guide investments in the Delta levee system (Council 2013); as such, the DLIS methodology enables a risk-informed determination of investment priorities as well as evaluation of trade-offs (costs and benefits) among various potential investments. Because flood risk can never be eliminated, a critical step in prioritizing investments to reduce flood risk is to identify the level of risk that is tolerable to the State and to others who benefit from Delta levees. Tolerable risk is defined as the risk that society is willing to live with in order to secure certain benefits (Health and Safety Executive 2001). In contrast to "flood control" or "flood protection," which emphasize reducing the probability of floods, discussions of tolerable risk enable clear communication of risk by considering both the probabilities and the consequences of flooding.

Tolerable risk guidelines (TRGs), as discussed more fully in Section 2.0, can be a way to inform decisions through development of a comprehensive understanding of the probabilities and consequences of Delta levee failure. Where funding is limited, TRGs provide a way to allocate scarce resources, manage flood risk in the Delta with alternative options, and determine what actions should be taken first.

Assets and Beneficiaries

The geographic scope of the DLIS project includes areas within (1) the legal Delta (as defined in California Water Code section 85058); (2) the Suisun Marsh; and (3) the Federal Emergency Management Agency- (FEMA-) delineated 0.2 percent annual exceedance probability (AEP) floodplain boundary. The DLIS project team generated a list comprising 170 islands and tracts for the DLIS project area: 125 in the Delta and 45 in Suisun Marsh. Of these islands and tracts, 144 are leveed, 24 are unleveed or are higher ground, and two are managed floodways.

The final list of islands and tracts reflects input from Council staff, Reclamation District (RD) engineers, staff from the California Department of Water Resources (DWR), and staff from the Suisun Marsh Resource Conservation District (RCD). After establishing the list of islands and tracts, the DLIS project team delineated their extent in an ArcGIS-format geographic information system (GIS).

Subsequently, the project team used available data to identify the built and natural assets located on the 170 islands and tracts within the study area. Categories of assets inventoried include: aviation, agriculture, critical facilities (e.g., hospitals, police station, fire stations), commercial facilities, water conveyance facilities, cultural resources, navigation facilities, natural assets (ecosystem/habitat), recreational facilities, residential and commercial structures, transportation infrastructure, and utilities. Asset data were compiled in an ArcGIS-format GIS. In addition, the beneficiaries of potential future levee improvements were identified based on the array of asset types identified in the asset inventory. Information on assets and beneficiaries is presented in Section 3.0.

Levee Hazards and Vulnerabilities

After defining the islands, tracts, and assets potentially subject to flooding in the Delta, the DLIS project team evaluated the hazards that threaten levee performance and the vulnerabilities of those levees to the hazards they face.

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A hazard is a condition or circumstance that has the potential to cause harm to people or damage to assets. The DLIS levee hazards analysis comprises identification and evaluation of the conditions and circumstances that have the potential to damage the Delta and Suisun Marsh levees. The identification phase of the analysis consisted of cataloging the naturally occurring events and human actions that can lead to levee damages. The evaluation phase consisted of estimating the relative importance of the events and actions to potential levee damage and determining if sufficient data exist to develop relationships between an event or action and the level of potential levee damage.

Based on a review of the previous studies (DWR 2008b, 2012b; U.S. Army Corps of Engineers [USACE] 2013), the DLIS project team concluded that the most significant current hazards to the Delta and Suisun Marsh levees are hydrologic (e.g., river flooding), hydraulic (e.g., seepage), and seismic. The hydrologic and hydraulic hazards to the Delta and Suisun Marsh levees are related to the volume of water flowing into and out of the Delta. Increased inflow and higher tide levels result in higher water levels and greater hydraulic pressure on the Delta and Suisun Marsh levees. The DLIS project team used existing hydrologic data for the Sacramento, San Joaquin, Mokelumne, and Cosumnes rivers, and for Yolo Bypass to generate discharge-recurrence curves for the study area.

Levee hydrologic and hydraulic hazards are generally proportional to the surface elevation of the body of water retained by the levee relative to the elevation of the ground protected by the levee. Levee hydraulic hazards are typically expressed as stage-recurrence curves that relate water elevation (stage) to AEP. For the levee risk analysis undertaken in the DLIS study, the stage-recurrence equations presented in the Delta Risk Management Strategy (DRMS) study (DWR 2008b) were extended to develop stage-recurrence curves for each island and tract in the Delta and Suisun Marsh.

The annual probability of flooding is equal to the product of two factors: the probability of a hazardous event times the probability of a levee breach if that event occurs. The probability of a hazardous event is characterized by the stage-recurrence curve described above. The probability of a levee breach is characterized by a levee fragility curve.

Because hydrologic and hydraulic levee fragility curves are not available for every Delta and Suisun Marsh levee from previous studies, the DLIS team adopted a procedure for developing hydrologic and hydraulic levee fragility curves for islands and tracts where there are no existing curves. The procedure entails estimating a water level at which the probability of failure is expected to be zero (PNP, probable non-failure point), a water level at which the probability of failure is expected to be 1.0 (PFP, probable failure point at levee crest or above if overtopping is necessary for the levee to fail), and multiple assessment points at intermediate water levels with failure probabilities between 0.0 and 1.0.

The DLIS team calculated an annual probability of levee seismic failure based on the generally accepted engineering practice of representing seismic hazard by a range of peak ground acceleration (pga) values and representing seismic levee failure potential as a function of pga. Consistent with this approach, the DLIS project team obtained estimates of the probabilities of seismic recurrence over the anticipated range of pga. A seismic recurrence relationship describes the seismic hazard for a site in terms of the annual probability of a pga or greater occurring. The range and probability of pga values used in the DLIS were derived from the 2014 National Seismic Hazard Maps pga recurrence data published by the U.S. Geological Survey (2014).

Similar to the calculation of the annual probability of flooding described above, the probability of levee failure due to a seismic event is equal to the product of two factors: the probability of a hazardous event (an earthquake in this case) times the probability of a levee breach if that event occurs. The probability of a hazardous event is characterized by the seismic recurrence curve, and the probability of a levee breach is characterized by a levee fragility curve specifically developed for seismic loading.

It is generally considered that the probability of a flood and an earthquake occurring simultaneously is exceedingly small. However, the annual probability of flooding from either a flood or a seismic event is the sum of the individual probabilities for flood and earthquake as determined above minus the product of those same probabilities.

The DLIS methodology provides an estimate of the probability of failure for an individual levee due to hydrologic, hydraulic, and seismic hazards. Because the occurrence of a flood or a seismic hazard event affects all Delta and Suisun Marsh levees approximately simultaneously, the DLIS team evaluated the potential for multiple, concurrent island failures using a Monte Carlo analysis (USACE 2015). An additional Monte Carlo analysis was performed for the leveed islands and tracts in the Delta that have been identified in this project as being critical to water supply and water quality.

The results of the identification and evaluation of hazards and levee fragility; the probability of failure of an individual island or tract; and the potential for multiple island failures during a single event are discussed in more detail in Section 4.0 of this report.

Risk Analysis

Evaluating risks to people, assets, water supply reliability, the Delta ecosystem, and the Delta as a place requires considering both the probability and the consequences of flooding. The data required to calculate the probability of flooding are the hazard recurrence curves (seismic and hydraulic) and fragility curves (as described above and in Section 4.0 of this report). These data were combined with consequences data to evaluate five risk metrics: expected annual fatalities (EAF), expected annual damages (EAD), potential for water supply disruption, harm to the ecosystem, and damage to the Delta as a place.

EAF is a risk-based calculation of the average annual number of flood-related fatalities that would be anticipated in the region for the full range of potential flooding conditions evaluated.

EAD is an average annual monetary value of current and future losses due to flooding Delta infrastructure and other assets. EAD includes flood damage to homes and commercial buildings, vehicles, transportation and energy infrastructure, agricultural infrastructure, and lost crops.

The potential for water supply disruption is based on the annual probability of flooding to those islands that: (1) represent a barrier to salinity entering the Delta from San Francisco Bay; (2) have important water supply infrastructure used by people outside the Delta (e.g., pump stations, pipelines, aqueducts); and/or (3) form the freshwater corridor through the Delta to the pumps for the U.S. Bureau of Reclamation Central Valley Project and the State Water Project near Tracy, California.

Risk to the Delta ecosystem is evaluated as the amount of high-value habitat that would be affected by island flooding. The DLIS team assessed a range of habitat types inside the levees (in acres), such as existing high-value natural communities, designated conservation areas, and seasonal floodplains. Because levee investments have the potential to preclude restoration of other habitats that depend on

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natural inundation, such as tidal marsh, the DLIS methodology also considers future potential habitat that could result from either restoration or levee failure, based on elevation and restoration priorities.

The Delta as a place metrics identify legacy towns, prime farmland (in acres), and Delta roadways that could be damaged or disrupted by floods. These metrics represent a proxy for the historical, cultural, and agricultural values in the Delta. Legacy towns include Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton, Knightsen, Rio Vista, Ryde, Locke, and Walnut Grove (Public Resources Code section 32301(f)).

The DLIS Decision Support Tool (DST) provides a visual display of the data that are used in these metrics and calculates risk under current and future conditions. The DST provides input to decision-makers and Delta stakeholders by: (1) assimilating and summarizing information about baseline risks to the Delta over time; (2) displaying the risk reduction that may be achieved by various levee investments; (3) evaluating portfolios of potential levee investments; (4) enabling comparison of trade-offs among the portfolios; and (5) identifying the near-term levee investments that are most robust and most consistent with reducing risk to State interests.

The risks to State interests in the Delta as defined by risk to public safety; property and infrastructure; water supply reliability; the Delta ecosystem; and the unique attributes of the Delta as an evolving place are described in more detail in Section 5.0 of this report.

The DST, as described in Section 6.0 of this report, uses the probability of flooding along with information on assets for each island and tract to calculate risks from flooding with and without investments in levee improvements. It enables decision-makers and Delta stakeholders to specify weights for different performance metrics to compare and evaluate risk, and to prioritize investments. It also enables the user to specify budgets and other planning constraints to guide the development of various investment portfolios.

The DST was developed to support the Council to better understand the range of possible risks facing the Delta, such as which islands are at highest risk for flood damage and, if flooded, which islands most threaten the State's water supply. It enables the Council and interested stakeholders to develop their own priorities of: (1) islands based on risk; (2) investments based on the estimated cost effectiveness; and (3) opportunities for habitat restoration. Through evaluation of priorities, the Council and stakeholders can use deliberation-with-analysis to identify common views of Delta risks as well as opportunities for achieving multiple risk reduction benefits.

The deliberation-with-analysis approach supported by the DST is grounded in decision theory. At its core, the DST is designed to support a deliberation-with-analysis process by which quantitative analysis is used not to provide a single answer but rather to frame and illuminate key policy trade-offs (National Research Council 2009). The output of the DST is a series of interactive visualizations in which the user can specify information of interest (e.g., risks with respect to a particular performance metric or time period), set metric weights for island rank and investment rankings, define portfolios of levee investments, and explore different trade-offs across the portfolios.

1.0 INTRODUCTION

1.1 Overview

California's Sacramento-San Joaquin Delta (the Delta) is the largest estuary on the West Coast and is the hub of the state's major water supply systems. The Delta receives the flow from two of the State of California's (the State's) major river systems, the Sacramento and San Joaquin rivers, and conveys water through San Pablo Bay to San Francisco Bay and ultimately to the Pacific Ocean. The Delta is an area of about 1,300 square miles that is characterized by low-lying, flood-prone lands bound by 1,100 miles of levees. These levees reduce flood risk to people, property, natural resources, and infrastructure systems of statewide importance. Within the Delta, about 380 miles are "project" levees that are part of the State Plan of Flood Control, whereas roughly 720 miles of the Delta levees are non-project levees, owned and maintained by local levee management agencies.

Levee failure (such as a levee breach) could cause devastating flooding, potentially causing injury or loss of life and possibly damaging property, water supply, infrastructure, and environmental resources of statewide significance. Levee maintenance and improvement over the past 30 years have helped strengthen the Delta levees. However, no comprehensive method exists to prioritize State investments in Delta levees operations, maintenance, and improvement projects. Without a prioritization methodology, investment of appropriate public resources into Delta levees may not occur in a manner that reflects a broader, long-term approach.

1.2 Purpose and Scope

The Delta Reform Act (DRA) (California Water Code [CWC] section 85306) requires the Delta Stewardship Council (Council), in consultation with the Central Valley Flood Protection Board (CVFPB), to recommend in the Delta Plan priorities for State investments in levee operation, maintenance, and improvements in the Delta, including levees that are part of the State Plan of Flood Control and non-project levees. The Delta Plan, adopted on May 16, 2013, contains a recommendation that directs the Council, in consultation with the California Department of Water Resources (DWR), the CVFPB, the Delta Protection Commission (DPC), local agencies, and the California Water Commission to implement CWC section 85306 by developing funding priorities for State investments in Delta levees (Delta Plan recommendation RR R4 Actions for the Prioritization of State Investments in Delta Levees). This recommendation provides guidance on the actions, analysis, and methodologies to be conducted to develop priorities.

The Council adopted interim priorities in 2013 (23 California Code of Regulations 5012), and is now engaged in updating these priorities through the development of a Delta Levees Investment Strategy (DLIS). The DLIS is being closely coordinated with State and local agencies, water supply contractors, non-governmental organizations, key Delta stakeholders, and the public.

The DLIS recognizes that a new approach for investing state funds in Delta levees must be developed that considers the assets protected by Delta levees, the threats to Delta levees, and the multiple beneficiaries of Delta levee investments. The work is building on the results of previous Delta levee

planning efforts and collects and uses the best available existing data and information from numerous existing federal, state, and local reports, plans, and analyses. To assist in developing the DLIS, the Council has retained a project team consisting of Arcadis U.S., Inc. (Arcadis) and Arcadis subcontractors: the Catalyst Group, Convey Inc., Environmental Science Associates, RAND Corporation, RiverSmith Engineering, and Shannon & Wilson.

This report presents the results of the DLIS risk analysis methodology, and provides technical details to ensure that there is transparency in the decision-making process on investments to evaluate alternatives to reduce flood risk in the Delta.

1.3 State Interests in the Delta

The DLIS project is in support of the requirements of the DRA, which states that “the ‘Delta Plan’ shall attempt to reduce risks to people, property, and State interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments” (CWC section 85305). In a region that is inherently flood-prone, located at the confluence of two major river systems, with natural ground that is close to or below sea level, it is clear that levees are and ought to be a key feature in reducing flood risk.

As established in the DRA, the basic goals of the State for the Delta are the following:

- Achieve the two coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem.
- Protect, maintain, and, where possible, enhance and restore the overall quality of the Delta environment, including, but not limited to, agriculture, wildlife habitat, and recreational activities.
- Ensure orderly, balanced conservation and development of Delta land resources.
- Reduce flood risk by structural and non-structural means to ensure an improved level of public health and safety.

These goals reflect the State’s interests in:

- Reducing risks to public safety, property, and infrastructure,
- Improving water supply reliability in the State,
- Preserving and enhancing the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem, and
- Preserving and enhancing the cultural, recreational, and agricultural values of the California Delta as an evolving place.

The following sections briefly describe the crucial role that levees play in achieving the coequal goals, preserving and enhancing the Delta as a place, and reducing risk to State interests.

1.3.1 People and Property

Reducing risk to people and property is important. The DRA notes that the Delta is home to more than 570,000 people and over 200,000 jobs, and the Delta contributes over \$35 billion to the state’s economy

(CWC section 32300(g)). Much of the Delta, however, is flood-prone, and therefore protected by levees. The Delta levees face many threats, most notably flooding caused by high water in the Sacramento and San Joaquin river systems and by ground shaking due to earthquakes. The DRA stipulates that the Delta Plan shall attempt to reduce risks to “people, property, and State interests in the Delta by effective emergency preparedness, appropriate land uses, and investments in flood protection” (CWC section 85305).

1.3.2 Coequal Goals

As established in the DRA, the goals of improving water supply reliability and protecting, restoring, and enhancing the Delta ecosystem are “coequal” and they are to be “achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place” (CWC section 85054).

1.3.3 Water Supply Reliability

Levees are critical to maintaining water quality in the Delta, which provides water for in-Delta users, including local municipalities such as Stockton, the Contra Costa Water District (CCWD), and Antioch; for in-Delta agricultural users; and for export through the State Water Project (SWP) and the Central Valley Project (CVP). Notably, if levees in the western Delta were to fail, saltwater could be drawn into the Delta causing water quality degradation. In addition, Delta levees form the corridor for conveyance of water from the Sacramento River through the Delta for export by the SWP and the CVP. Delta levees also protect water supply infrastructure; for example, levees in the southern Delta reduce risk to the East Bay Municipal Utility District’s (EBMUD’s) aqueduct.

1.3.4 Ecosystem Restoration

Delta levees influence ecosystem water quality in the same ways that levees affect municipal, agricultural, and export water supplies. The Delta’s aquatic ecosystem depends on the quality of Delta waters. In Suisun Marsh, the levee system, along with the Suisun Marsh Salinity Control Gates and leveed freshwater distribution systems, are crucial to maintaining water quality and controlling water levels for waterfowl habitats. Delta levees also reduce risk to terrestrial habitat for numerous listed and special status species. Some leveed floodways, such as the Yolo Bypass, provide habitats of special value to fish and wildlife.

The DRA also states that, “To promote the public safety, health, and welfare, and to protect public and private property, wildlife, fisheries, and the natural environment, it is necessary to protect and enhance the ecosystem of the Delta and prevent its further deterioration and destruction.” This includes direction to “develop new or improved aquatic and terrestrial habitat and protect existing habitats to advance the goal of restoring and enhancing the Delta ecosystem” (CWC section 85022). CWC section 85066 defines “restoration” as “the application of ecological principles to restore a degraded or fragmented ecosystem and return it to a condition in which its biological and structural components achieve a close approximation of its natural potential, taking into consideration the physical changes that have occurred in the past and the future impact of climate change and sea level rise.”

Restoring the Delta ecosystem will entail creating additional habitat, possibly by altering or removing levees. The Delta Plan calls for use of setback levees, where feasible, to improve migratory corridors for anadromous fish and songbirds along the Sacramento River. When levees cannot be set back, it may be possible to incorporate woody debris, vegetation, or other features in and adjoining levees to create more natural channel habitat. Restoring tidal marsh and freshwater marsh in the Delta will also entail altering or removing some levees within the designated restoration opportunity areas.

1.3.5 Delta as a Place

As noted, the State Legislature recognizes “the unique cultural, historical, recreational, agricultural, and economic values of the Delta as an evolving place” (CWC section 29702). Consequently, the DRA directs the Council to implement methods to protect, enhance, and sustain the unique cultural, historical, recreational, agricultural, and economic values of the Delta as an evolving place as it implements the Delta Plan.

Delta levees contribute to the character of the Delta as a place, which is defined by its geography of low-lying islands and tracts, shaped by rivers, sloughs, and shipping channels. Delta levees reduce risk to legacy communities and to the Delta’s agricultural lands, which are central to the region’s rural economy. In addition to reducing flood risk for farming, Delta levees enable drainage and incorporation of irrigation and water control facilities. Most levees directly support the Delta’s system of federal, state, and local roads, which are important for the farm to market movement of agricultural products, access in and out of the Delta, and emergency evacuation and response.

Delta levees also reduce risk to other infrastructure important to the Delta and to the State, which crisscrosses the Delta including water management facilities; railroads; deep-water navigation channels; energy facilities, including electric transmission lines, pipelines, gas storage facilities, and local distribution systems; and telecommunications infrastructure. Finally, Delta levees reduce risk to lands that are important for recreation or access to recreation, including hunting, riverside biking or walking, scenic roads and viewpoints, resorts and marinas, and bank-fishing access.

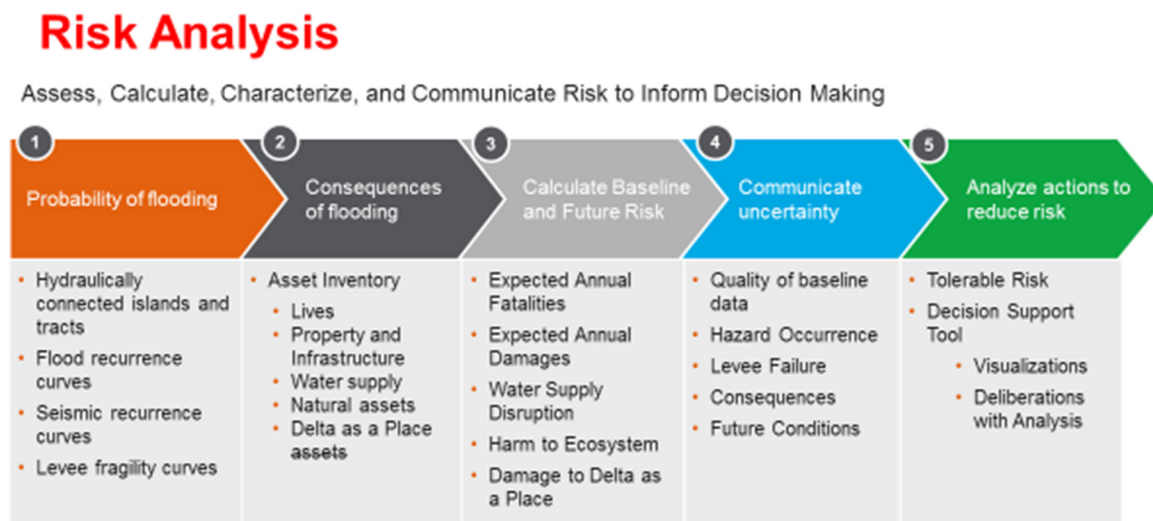
1.4 The DLIS Project and Scope

The DLIS project is being undertaken at the Council’s direction to develop a comprehensive methodology to enable prioritizing State investments in Delta levees’ operations, maintenance, and improvement projects. At the core of the DLIS is analysis of flood risks in the Delta. This report explains how flood risks were determined and how those flood risks will be used in a risk-informed analysis to guide investment decisions. Flood risk analysis includes identifying threats to the levees; understanding levee vulnerabilities and the mechanisms of levee failure; and estimating the consequences of levee failure to State interests (that is, the consequences of failure to people, property, infrastructure, water supply and water quality, ecosystem, and Delta as an evolving place).

This report also describes the development of a computer-based, interactive Decision Support Tool (DST) to summarize and visualize current risks, as well as the risk reduction achieved by potential future levee projects. The DST is able to display maps that highlight areas of concern, where flood probabilities or flood risks in the Delta are relatively high. The DST is also able to help assess risk reduction strategies to

reduce the risk of flooding to key resources in the Delta and Suisun Marsh. The risk analysis process used in the DLIS is illustrated on Figure 1-1.

Figure 1-1
Risk Analysis and DLIS Methodology



The DLIS project is strictly based on use of readily available, existing data. The data sources used are described in this report. The report also describes data gaps that were encountered and potential sources of uncertainty. Recognizing that the Delta and Suisun Marsh are dynamic environments, the DST has been designed so that it can be readily updated as new information and data become available. The scope of work that underlies preparation of this report includes:

Appropriate Level of Flood Protection. Because the Delta Plan (Council 2013) recommends using a risk-informed analysis to guide investments in the Delta levee system, DLIS was crafted to meet this recommendation by developing a risk-informed methodology that enables determining priorities and evaluating trade-offs (costs and benefits) among potential investments. The concept of Tolerable Risk Guidelines (TRGs), as described in Section 2.0, Tolerable Risk Approach, was adopted for assessing current flood risk as well as evaluating risk reduction to levels of risk that may be tolerable to State interests and to others who benefit from Delta levees.

Asset and Impact Exposure. As presented in Section 3.0, Assets and Beneficiaries, the following types of information were gathered for each leveed island and tract in the Delta and Suisun Marsh:

- Population
- Current land use (e.g., agricultural use and cropping patterns)
- Major assets: for example, critical infrastructure, railroads, highways, shipping channels, transmission lines, aqueducts, gas and petroleum pipelines, bridges, marinas, natural gas fields/storage areas, natural gas wells, commercial and industrial buildings, residences, and pump stations

- Major beneficiaries of flood risk reduction afforded by Delta levees: for example, water users and water supply contractors; land owners; transportation; oil/gas/pipelines, electric and telecommunication utilities; water conveyance; fish and wildlife habitat; water quality requirements
- Natural hazards that threaten Delta levees: for example, ground shaking, overtopping, seepage, subsidence, and sea level rise; human actions that directly or indirectly influence levee vulnerability (e.g., boat wakes, deferred maintenance); and other issues such as animal burrows, wave erosion
- Anticipated impacts associated with sea level rise due to climate change.

These data were used to develop a baseline of current information that could be extrapolated for future conditions, specifically 2030 and 2050.

Hazards. As described in Section 4.0, Levee Hazards and Vulnerabilities, natural hazards (river flooding and seismic activity) were assessed along with geotechnical conditions and levee vulnerability (as expressed by levee fragility curves) to characterize the probability of adverse events occurring that could cause levee failure in the Delta and Suisun Marsh. The analysis included assessment of multiple island failures during a single event. Uncertainties in the data and sensitivity of results to variations in data were also assessed.

Consequence Analysis. To determine the risk of levee failure to State interests as defined by the Council (e.g., loss of life, property damage, water supply disruption, harm to the ecosystem, and damage to the Delta as place), metrics were developed to assess the consequences of flooding. As described in Section 5.0, Risk Analysis, metrics for loss of life and property damage were developed using generally accepted practices. Unique metrics were developed for water supply disruption, the ecosystem, and the Delta as place. In addition, Section 5.0 discusses the uncertainty and sensitivity of the analysis: i.e., how uncertainty in input data and calculation models, and how small or large changes to input data affect the results.

Decision Support Tool. Section 6.0 describes the development of the DST, its components, and its functionality. The DST uses the probability of flooding along with information on assets for each island and tract to calculate risks from flooding with and without investments in levee improvements. The DST supports a deliberation-with-analysis approach to prioritize islands based on risk, rank investments, define portfolios of levee investments, and explore trade-offs between portfolios.

1.5 Independent Science Panel Review

Work on the DLIS project was initiated in June 2014. In early 2015, the DLIS project team prepared a series of technical memoranda summarizing the work conducted during the first 9 months of the project. Although some results and conclusions were included, the technical memoranda primarily presented the preliminary methodologies that were planned for use to complete the DLIS. The purpose of the technical memoranda was to facilitate an independent science panel review of the project. Conducting this review during the project implementation provided valuable “mid-course” input from the review team. This review strategy enabled the DLIS project team (including the Council and the DWR, working in consultation with the California Department of Fish and Wildlife [CDFW], the CVFPB, and the DPC) to incorporate external input into the DLIS while it was still being developed. This review strategy ensured that the review panel’s input had the maximum possible influence on the final work product, conclusions, and recommendations.

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This Risk Analysis Methodology report updates and finalizes the preliminary methodologies presented in the technical memoranda.

The independent science panel report was completed on July 2, 2015. The panel offered comments for improvement and concluded that the “overall methodology of using existing data, identifying important metrics, aggregating results, and making comparisons across islands is conceptually sound” (Mitchell et al. 2015). The categories of these comments, along with how the project team used the comments to adapt the proposed methodologies and complete the DLIS project, are summarized in Table 1-1.

In a few cases, the independent science panel made recommendations with which the project team disagreed. These included recommendations in the areas of tolerable risk, seismic hazards, non-breach seismic damage, relative risk, regional and national impacts, the use of best available information, datasets, and projections to 2030 and 2050. In each case, the rationale for applying the approach used by the DLIS project team was documented.

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Table 1-1
Summary of Independent Science Panel's Review Comments

Science Panel Comment Areas	Response by the DLIS Project Team
Need improved definitions and glossary	This report includes both expanded definitions within the text and a glossary.
Need improved documentation of rationale, methodology, and framework	The content of this report includes a full discussion of the methodology and choice of metrics.
Need to ensure there is appropriate quality assurance/quality control (QA/QC) for all data and metadata	As noted throughout this report, the DLIS project relied almost exclusively on existing data. This report includes detailed descriptions about the quality of these data, and verifies that, to our knowledge, the data are the most current and best available data.
Need improved transparency for metrics, including indices, aggregation, normalization, and weighting	The content of this report has been formulated to clearly communicate the metrics used for the DLIS analysis. These metrics, as described in Section 5.0, have been refined based on the specific input from the independent science panel.
Methodology focuses mainly on benefits and consequences on a local scale, which is particularly evident for water supply disruption	While indirect consequences from water supply disruption could be felt at a state or national scale, there is no existing methodology to monetize water supply disruption, which is directly dependent on highly variable conditions antecedent to any levee failure. Because indirect consequences could not be readily monetized, all metrics for risk to State interests are defined by direct consequences.
Need improved discussions on planning framework, characterization, uncertainty, sensitivity, and/or scenario analyses	Discussions of variability and uncertainty have been significantly expanded in this report, including estimating the magnitude of the variability and uncertainty in each component of the metrics.
Levee length effects	A length scaling approach has been adopted and incorporated into the levee fragility curves, as described in Section 4.0.
Revise the approach to estimating life safety risks	Newer flood-depth vs. loss-of-life curves have been incorporated into the analysis of flood-related loss of life in the Delta and Suisun Marsh.
Failures of multiple islands	This report includes an expanded discussion (Section 4.0) of the potential for multiple island failures during a single high-water or seismic event.

1.6 Organization of the Risk Analysis Methodology Report

Section 1.0 provides an introduction to the DLIS project; explains the relationship between the DLIS effort and State interests in the Delta; discusses the independent science panel review effort and how it influenced the content of this report; and summarizes the overall organization of the report.

Section 2.0 describes the framework for using TRGs through a comprehensive understanding of the probabilities and consequences of Delta levee failure. Evaluation of both the probabilities of adverse events and their consequences enables risk-informed policy setting and decision-making; informs decision-makers about ways to reduce both risk and the costs of implementation; and enables evaluation of trade-offs (e.g., structural solutions such as levee building and non-structural solutions such as improved evacuation procedures). TRGs enable evaluating risk reduction alternatives in a transparent and open manner, prioritizing actions to reduce risk, and applying available resources efficiently and effectively to maximize benefits.

Section 3.0 focuses on the assets and beneficiaries found in the Delta. This includes discussions of the islands and tracts included in the DLIS analysis; the physical assets located on these islands and tracts; and the beneficiaries who would benefit from future investments in Delta levees.

Having defined the islands, tracts, and associated assets potentially subject to flooding in the Delta, Section 4.0 discusses the hazards and vulnerabilities to which the levees protecting these islands, tracts, and assets are subject. This discussion includes addressing the nature of these hazards and vulnerabilities, and the methodologies for addressing them that have been incorporated into the DLIS study.

Section 5.0 discusses the risk metrics employed in the DLIS (expected annual damages [EAD], expected annual fatalities [EAF], water supply disruption, harm to the ecosystem, and damage to the Delta as place) and the methodology for integrating and analyzing information about assets, hazards, and vulnerabilities to estimate current and future risks to people and physical assets in the Delta. This section concludes with a discussion of uncertainty and sensitivity.

Section 6.0 describes the DST, which both performs the analysis and visually depicts the analytical results.

Section 7.0 provides the references cited in this report.

Lastly, Appendices A through E provide supporting information, as cited in the text of this report.

1.7 Limitations

The levees in the Delta and Suisun Marsh face many hazards from high water and earthquakes in a dynamic environment. As noted, the risk analysis methodology is based on compilation and use of readily available, existing data. These data vary in age and quality and are occasionally incomplete in some respects. As a consequence, the DLIS also relied on the expertise of agency personnel, local levee managers, and others with special knowledge and experience with Delta levees. In addition, completion of some analysis required use of simplifying assumptions. Nonetheless, the underlying risk analysis methodology, as described in this report, is considered robust and appropriate for describing relative risk throughout the legal Delta and Suisun Marsh; i.e., the data limitations and simplifying assumptions have

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similar effects throughout the study area, making it reasonable to compare risks to develop funding priorities for State investments in levee improvements. The risk analysis methodology and the DST developed by the DLIS team recognize these limitations and have been specifically designed to be continuously improved and updated as new and better data become available.

2.0 APPROACH TO TOLERABLE RISK

2.1 Introduction

Eliminating flood risk is not possible (National Academy of Sciences [NAS] 2013). The NAS defines residual risk as the risk that remains after considering the mitigating effects of structural, non-structural, and other risk reduction measures (NAS 2013); i.e., it is the risk that remains after all reasonable and practicable measures have been implemented. Levees reduce but cannot eliminate risk because the risk of an even greater level of flooding (the residual risk) is always present.

William Hammond Hall, California's first State engineer (circa 1880), is credited with saying, "there are two types of levees – those that have been overtopped by floodwaters, and those that will be overtopped by floodwaters." The risk is real whenever there are consequences from flooding. Risk is generally defined as the potential for loss or injury. To assess risk in the case of levees, we need to know:

- What is the hazard from river stage or earthquake, and how likely is the hazard to occur?
- How will the levee perform in the face of the hazard?
- Who and what are in harm's way?
- How much harm will be caused if the levee fails to perform adequately?

Put simply, risk is the probability of an event times the consequences of that event.

Since flood risk can never be eliminated, the question is "how safe is safe enough?" The concept of tolerable risk can help provide answers. Tolerable risk is defined as the level of risk that people are willing to live with in order to secure certain benefits (Health and Safety Executive [HSE] 2001). In contrast to "flood control" or "flood protection," which emphasize reducing the probability of floods, discussions of tolerable risk enable clear communication of risk by presenting both the probabilities and the consequences of flooding. TRGs are a way to inform decisions through development of a comprehensive understanding of the probabilities and consequences of Delta levee failure. Where funding is limited, TRGs provide a way to allocate scarce resources, to manage flood risk by evaluating and using alternative options, and to determine what actions should be taken first.

The Delta Plan recommends using a risk-informed analysis to guide investments in the Delta levee system (Council 2013, p. 272, Risk Reduction Recommendation 4). The DLIS is being crafted to meet this recommendation by developing a risk-informed methodology that enables determining priorities and evaluating trade-offs (costs and benefits) among potential investments. A critical step in DLIS methodology for assessing flood risk reduction is the application of TRGs to assess the level of risk that is tolerable for State interests as well as for others who benefit from Delta levees.

This section provides information on the application of TRGs in the DLIS for floods in the Delta and the risks to State interests so as to inform State policy decisions regarding investment options to reduce flood risk. Section 2.2 describes current approaches to flood risk management in the Delta, and TRGs are presented in Section 2.3. The application of the guidelines is described in Section 2.4, and Section 2.5 presents a summary of the discussion.

2.2 Current Approaches to Flood Risk Management

The National Research Council (NRC) report “Levees and the National Flood Insurance Program: Improving Practices and Policies” (2013) defines level-of-protection (LOP) as the flood recurrence interval that a specific structure is designed to withstand. Table 2-1 is a compilation of representative examples of existing standards, guidelines, and regulations associated with levee safety and land use in flood-prone areas in the U.S., Canada, and the Netherlands. These examples include regulations, standards, and guidelines promulgated by government entities and by professional organizations such as the American Society of Civil Engineers (ASCE) and the Association of State Floodplain Managers (ASFPM).

Reviewing these flood safety practices is a key step in framing a discussion regarding application of LOP methodology and the concepts of tolerable risk in the Delta. The information in Table 2-1 supports deliberations regarding current methods, and enables comparison of LOP and risk tolerance implemented elsewhere to those that might be considered for application to the Delta. It is noteworthy that the regulations, standards, and guidelines presented in Table 2-1 are based on LOP methodology, except for the Netherlands, which uses a tolerable risk standard.

Current flood management practice in the Delta is based on LOP standards or guidelines generally promulgated by federal or State agencies. Figure 2-1 illustrates levee guidance that is presented in the Delta Plan (Council 2013, p. 258) and discussed further below.

Guidance for the Hazard Mitigation Plan (HMP) LOP resulted from negotiations between the Federal Emergency Management Agency (FEMA), the DWR, the California Governor’s Office of Emergency Services (Cal OES), and Delta levee-maintaining agencies. The HMP was intended to serve as interim guidance to reduce the likelihood of flood damage in the Delta so that FEMA disaster assistance would not be sought repeatedly for the same islands after minor floods. The Memorandum of Understanding (MOU) documenting the interim guidance has expired and has not been renewed (DWR 2013d, p. B-3).

Public Law 84-99 (PL 84-99) guidance is a minimum requirement established by the U.S. Army Corps of Engineers (USACE) for levees in its Rehabilitation and Inspection Program (33 Code of Federal Regulations 701n) (69 Stat. 186). Delta islands or tracts that meet this standard and have levee-maintaining agencies that participate in the USACE’s program may be eligible for federal funding for levee rehabilitation, island restoration after flooding, and emergency assistance. The PL 84-99 standard for levee geometry defines a minimum levee height and a factor of safety for slope stability, but is not associated with a flood recurrence interval or LOP (such as a 1 percent annual exceedance probability [AEP] flood).¹ In 1987, the USACE developed a Delta-specific standard based on the Delta’s soil and levee foundation conditions (Council 2013).

¹ The 1 percent AEP flood is shown on Figure 2-1 for illustrative purposes, but is not tied to the PL 84-99 standard.

Table 2-1
Representative Examples of Standards, Guidelines, and Regulations Associated with Levee Safety and Land Use in Flood-Prone Areas
United States, Canada, and the Netherlands

		FEDERAL REGULATION	FEDERAL REGULATION	FEDERAL REGULATION	STATE REGULATION	FEDERAL GUIDANCE	FEDERAL GUIDANCE	FEDERAL GUIDANCE	FEDERAL GUIDANCE	FEDERAL-STATE GUIDANCE	FEDERAL-STATE GUIDANCE	STATE GUIDANCE	STATE GUIDANCE	STATE GUIDANCE	STATE GUIDANCE	PROFESSIONAL ORGANIZATION	INTERNATIONAL	INTERNATIONAL	US-OTHER REGULATION	U.S.-OTHER GUIDANCE			
		44 CFR60.3/9.11	44 CFR65.10	EO 11988/EO 13690	Senate Bill 5	USACE Levee Guidance	USACE (Public Law 84-99) (33 United States Code 701n) (69 Statute 186)	United States Bureau of Reclamation/USACE Dams (USACE 2011)	FEMA: Hazard Mitigation Plan Levees (Delta Stewardship Council 2013)	CALFED Bay Delta Program: Levee Stability Program (USACE 2006)	California Department of Water Resources Bulletin 198-82 (DWR 1982)	Central Valley Flood Protection Plan (CVFPP) (DWR 2012)	Delta Plan (Delta Stewardship Council 2013)	Economic Sustainability Plan (Delta Protection Commission 2012)	Association of State Floodplain Managers (ASFPM 2011)	Netherlands (Delta Programme 2015)	Red River Basin Commission (Canada and United States) (RRBC 2011)	Charlotte-Mecklenburg County, North Carolina (2015)	New York City, Office of Long Term Sustainability (2013)				
LAND USE OR ASSET TYPE	Urban	1/100 year WSE or insurance	Riverine: 3' above WSE of base flood; an additional 1' within 100' of structures riverward of the levee or wherever flow is constricted; an additional 1/2' above minimum at upstream end of levee, tapering to not less than minimum at downstream end.	1/100 year + 2 feet, 1/500 year, and action cannot increase risk in floodplain.	1/200 year WSE, seismic, seepage criteria, etc.	No minimum standard level of safety recommended based on life and economic risk, cost-benefit analysis, and national economic development index.	1/50 year WSE + 1.5-foot freeboard	1/1,000 year probability of failure applies to all dams where life safety is concerned. Does not specifically address each of these land uses.	Geometric configuration (no recurrence interval or WSE) + 1-foot freeboard, although does not specifically address all these land uses.	Public Law 84-99	1/300 year WSE + 3-foot freeboard	1/200 year WSE, seismic	1/200 year WSE, seismic	1/200 year WSE, seismic	No minimum standard; however, objective is reducing flood losses and no adverse impact (NAI).	Varies based on risk (high hazard, damage potential, life loss). Ranges from 1/300 year to 1 /100,000 year probability of failure, with additional "safety layers" required (i.e., non-structural) in deep floodplains (where evacuation is not possible). Technical Memorandum Revision will provide more detail/separation.	1/200 to 1/250 year	Required to consider Community Base Flood Elevation (which is 1/100 year WSE that accounts for watershed buildout and future hydrology conditions). Floodplain maps and mitigation requirements exist even with a levee in place.	Not specifically addressed				
	Rural / Agricultural				CWC 9601 (c) The level of flood protection afforded rural and agricultural lands by the original flood control system would not be adequate to protect those lands if they are developed for urban uses.						1/300 year WSE + 1.5-foot freeboard	Site-specific improvements, based on levee inspections and other critical levee integrity needs. Levee based on Non Urban Levee Evaluation (NULE). All-weather access roads to facilitate flood fighting/inspection.	Protect agriculture and local working landscapes, and cultural, historic, aesthetic, and recreational resources (Delta as a Place).	PL 84-99 recommended for non-project levees.			For Cropland: 1/10 to 1/25 year summer flood; Residences and Farmsteads: 1/100 to 1/200 year						
	Small Communities				Not specifically addressed						1/300 year WSE + 3-foot freeboard for urban areas	Target 1/100 year WSE. Additional investment prioritized based on relative flood threat, population, likelihood of flooding, proximity to flooding, depth of flooding, financial feasibility, and multiple benefits.	"Protect small communities and critical infrastructure of statewide importance that are located outside of urban areas."	"New Delta standard" - (greater than 1/300 year WSE, but also PL 84-99)			100 to 200 year (although not specifically addressed in this category)						
	Critical Infrastructure			1/500 year WSE + 1 foot							1/500 year WSE	1/500 year WSE due to EO 11988.	Not addressed but implied	Not addressed			State Systemwide Investment Approach says to prioritize critical infrastructure of statewide importance, but offers no specific standard.		"Protect small communities and critical infrastructure of statewide importance that are located outside of urban areas."	"Higher Delta levees standard... [for] lowland levees [which are the most] critical to salinity intrusion."	1/500 year WSE	1/500 to 1/700 year	1/500 year WSE or Community Base Flood Elevation
	Deep Floodplains			Not specifically addressed, 1/100 year WSE or insurance would apply.	Not specifically addressed, 1/100 year + 2 feet, 1/500 year, and action cannot increase risk in floodplain requirement would apply.						Not specifically addressed	No minimum standard level of safety recommended based on life and economic risk, cost-benefit analysis, and national economic development index.		Not suitable for urbanization			Greater than 200 year WSE for urban areas in deep floodplains (flood depth greater than 3 feet in 200 year flood).		Not addressed	Not specifically addressed. Assume that as minimum, PL 84-99 would apply.	Not specifically addressed (but 1/200 to 1/700 year likely applies)	Community Base Flood Elevation	Not applicable
	Ecosystem	Minimize destruction, loss, or degradation of wetlands; restore and preserve natural and beneficial floodplain and wetland values.	Not applicable	Preserve the natural and beneficial values served by floodplains.	CWC 9616. "Increase and improve the quantity, diversity, and connectivity of riparian, wetland, flood plain, and shaded riverine aquatic habitats, including the agricultural and ecological values of these lands. (11) Promote the recovery and stability of native species populations and overall biotic community diversity." (specific to the plan's requirements)	Not addressed	Not applicable	Not applicable	Promote and support ecosystem restoration and protection of the Delta's environmental assets, water quality, and critical habitat of special status species.	Not addressed (except in vegetation on levees issue)	Supported by the conservation strategy document. Preference for multi-benefit projects.	Protect existing and provide for net increase in channel margin, floodplain, and wetland habitat.	Restore Franks Tract and Western Sherman, restore mid-channel berms, encourage growth on waterside of levee, restore complexity of waterways, and modify channel geometry.	Restore and preserve natural coastal and riverine dynamics (natural and beneficial functions of floodplains).	Not applicable	Not addressed	Control the alternation of natural floodplains, stream channels, and natural protective barriers.	Not addressed					
	Flood Proofing or Mitigation	1/100 year WSE + 1 foot, insurance	Not applicable	1/100 year + 2 feet, and action cannot increase risk in floodplain.	Notification in levee-protected areas of State Plan of Flood Control. Voluntary building code updates (Health and Safety Code 50465).	No minimum standard, life safety paramount, based on cost-benefit analysis and national economic development index.	Not applicable		Not addressed		Not addressed	Recommended. (To be filled in)	(Risk Reduction Policy 2): 1/100 year WSE + 1 foot, + SLR (55 inches at Golden Gate) except for specific communities.	Not addressed	Recommend mitigation and insurance behind levees.	Multi-layered safety recommended in areas with reduced levee standards, high consequence rate, deep floodplains, etc.	Mitigation and insurance required behind all (and accredited) levees.						
	Bypasses	Not specifically addressed, although levees adjacent to bypasses would need to meet 1/100 year WSE + 1-foot freeboard plus all other criteria.	Not specifically addressed, 1/100 year + 2 feet, 1/500 year, and action cannot increase risk in floodplain requirement would apply.	CWC 9613 (c) Investigate/evaluate feasibility of bypass expansion to reduce flood stage upstream and south of Paradise Cut.	Not specifically addressed, but geometric and freeboard considerations would likely be required.	Not applicable	Selected levee setback locations.					(Risk Reduction Policy 3 and Risk Reduction Recommendation 5): Protect floodways and fund and implement San Joaquin River flood bypass.	Construct new and improve existing floodplains upstream of the Delta.		Room for the river, expanding floodplains in 39 locations to increase conveyance capacity of riverine system by up to 18,000 public meters per second for climate change.	No new development in areas of high risk of flooding unless elevated/flood-proofed.	Not applicable						
	Emergency Preparedness	Not applicable	Not applicable	Not applicable	CWC 8201 (b)(6) Emergency response plan required (within local plans of flood control).	Not applicable	Requires Emergency Action Plans.		Improve joint Delta emergency response and coordination, update and clarify roles and responsibilities, and enhance communications and public education.			Recommended	(Risk Reduction Recommendation 1): Implement emergency preparedness and response; emergency stockpiles; and plans to reduce long-term outage of utilities and infrastructure.	Flood contingency maps, stockpile systems, etc.	Not addressed	In deep floodplain polders (higher population), requires emergency response plan.		Critical transportation preservation including road elevations above 1/100, 1/200, and 1/500 year events.	Not addressed specifically in floodplain ordinance.	Other means			
	Life Safety Guideline				Not applicable	Under development	Hazard-based - 1/1,000 year likelihood of failure.		Not addressed		Not addressed	Not addressed	Not addressed	Not addressed	1/100,000 likelihood of dying (individual); even lesser likelihood than 1/100,000 likelihood of dying if societal risk (large groups of victims, serious damage).				Not addressed				
REMARKS			If a levee is to be accredited to remove the insurance requirement, it must meet 1/100 year WSE, + 1-foot freeboard, plus seepage criteria, etc. However, FEMA does not specify that a levee has to be used for any type of land use.			USACE has different authorities for emergency response and ecosystem restoration. This column is specific to levee safety and standards.			For disaster rehabilitation. Memorandum of Understanding (MOU) is currently expired. Delta Protection Commission is quoted as saying "No engineer familiar with the Delta considers the HMP geometry to be adequate for even basic flood protection."	Levees of particular importance are those that protect water quality, lives, and critical infrastructure.		Preference allocated toward multi-benefit projects. CVFPP allocates a \$100,000 threshold per household in small community. Where cost of levee/improvements exceeds threshold, non-structural means will be considered.		All risk reduction should apply No Adverse Impact (i.e., no transfer of risk to others).	Use flood probability standards, not flood overtopping standards.	(Red River Basin Commission 2011)	Community Base Flood Elevation is determined using future land use conditions having a 1% annual exceedance probability (AEP). (FEMA base flood is smaller, does not use future conditions.)						

Notes:
CFR = Code of Federal Regulations
DWR = California Department of Water Resources
EO = Executive Order
FEMA = Federal Emergency Management Agency
HMP = Hazard Mitigation Plan
PL = Public Law
SLR = sea level rise
USACE = U.S. Army Corps of Engineers
CWC = California Water Code
WSE = water surface elevation

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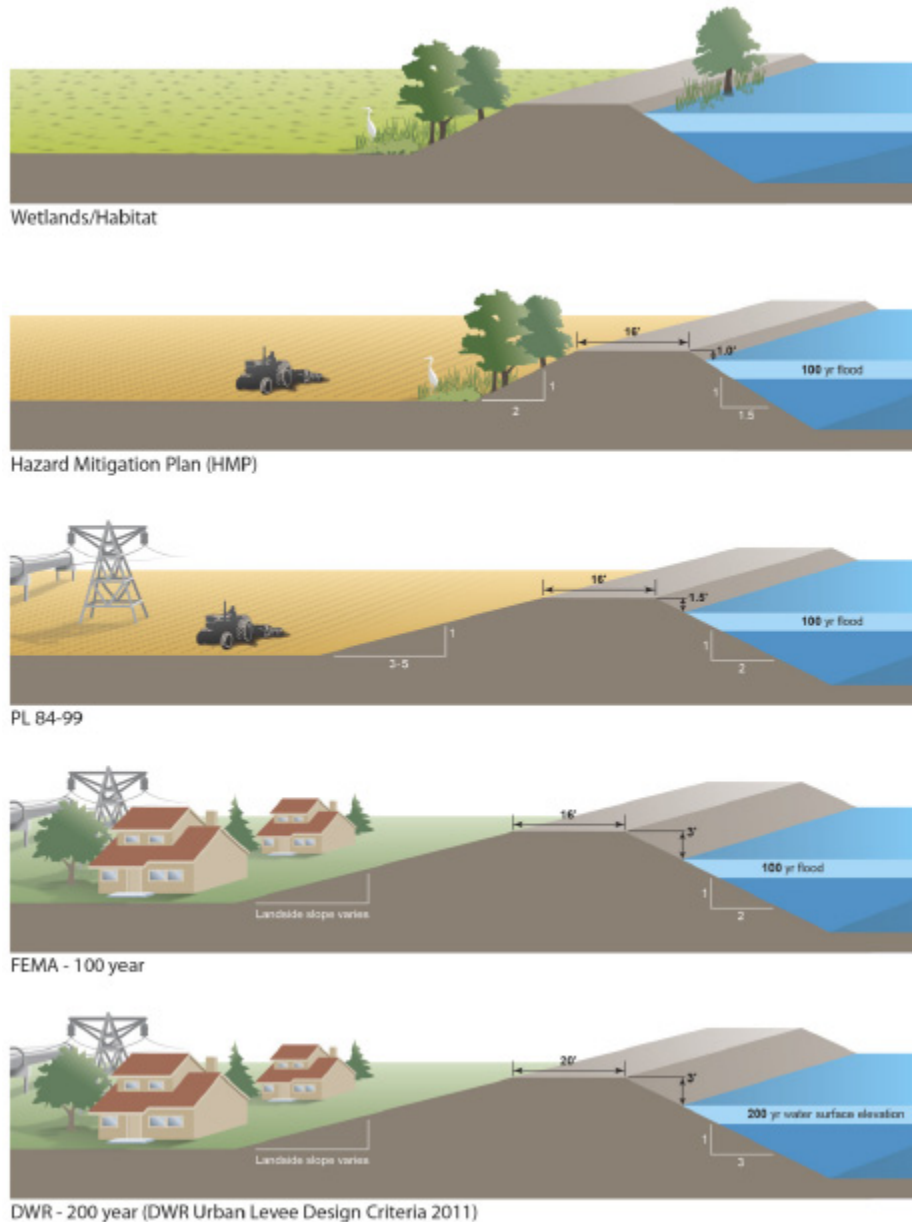
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The FEMA “100-year” standard is intended to reduce the frequency of flooding of low-lying land by providing a 1 percent AEP LOP. This standard, often referred to as the insurance standard, provides criteria that levees must meet to protect against flooding that is the basis for FEMA’s flood insurance rate maps (44 Code of Federal Regulations 65.10). Levees must meet prescribed requirements for levee freeboard, slope stability, seepage, erosion, and settlement. In communities where levees meet these requirements, property owners on the protected (land) side of the levee are not required to meet federal flood-proofing standards and are able to obtain federally guaranteed mortgages without purchasing flood insurance.

The DWR Urban Levee Design Criteria establishes criteria for levee height and geometric design, and includes requirements for freeboard, slope stability, seepage, erosion, settlement, and seismic stability (DWR 2012a). These criteria are intended to provide protection against a flood that has a 0.5 percent chance of being equaled or exceeded in any given year (a “200-year” LOP). Flood-prone urban or urbanizing areas with 10,000 or more residents must meet this standard by 2025 (Government Code 65865.5(a) (3)).

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Figure 2-1
Levee Guidance in the Delta Plan (Council 2013)



Depending on the circumstances, each of these standards or guidelines has been considered for use in the Delta as an LOP to be attained or sustained. The HMP and PL 84-99 criteria, however, are disaster rehabilitation guidelines based primarily on levee geometry with little or no consideration of performance of either the levee or its foundation. The FEMA 100-year criterion is an insurance standard that includes levee performance requirements. The DWR Urban Levee Design Criteria is a levee design standard that must be used for urban areas by 2025.

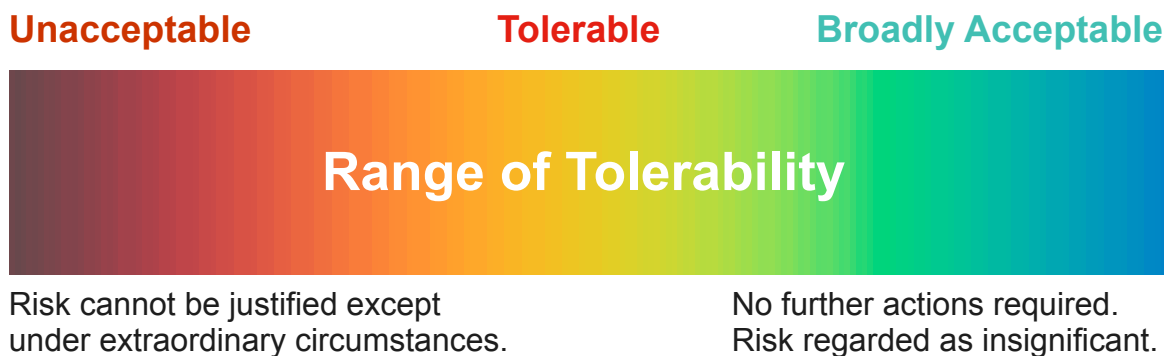
These standards and guidelines do not, however, represent flood safety standards. Use of any of them as an “appropriate level of protection” creates the false impression that the risk of flooding can be eliminated. The standards or guidelines are generally not performance based, nor do they account for the probability of floods larger than those prescribed by their water surface metric. LOP standards and guidelines are not developed after meaningful discussions between decision-makers, stakeholders, and the public on safety. In addition, LOP standards and guidelines do not address residual risk or the consequences of flooding on life loss, property damage, water supply disruption, the ecosystem, or on the Delta as a place.

Often overlooked in the consideration of residual risk is a disaster of epic proportions that is completely unexpected, sometimes termed a Black Swan (Taleb 2007). Black Swans (1) are outliers, outside normal expectations; (2) carry extreme impacts; and (3) lead people to concoct explanations for their occurrence after the fact, trying to make them explainable or predictable. LOP standards and guidelines typically exclude the consideration of a Black Swan. In the context of flood risk, for example, the nation might have been better prepared if hurricanes of the magnitude of Katrina and Sandy had been more widely anticipated. The concept of tolerable risk, which includes consideration of both the probabilities and the consequences of flooding, enables accounting for the possibility of a Black Swan in the evaluation of residual risk. Specifically for the Delta, the possibility of a rare, but very large earthquake, or the possibility of massive flooding caused by a rare, but plausible atmospheric river precipitation event cannot be discounted.

2.3 Tolerable Risk Guidelines

Because risk cannot be eliminated, it is useful to consider risk on a continuum ranging from those risks that are unacceptable, where risk cannot be justified except under extraordinary circumstances, to risks that are broadly acceptable, where risk is regarded as negligible (USACE 2011). As illustrated on Figure 2-2, in between there is a range of risks that can be tolerable – risks that are not negligible but are risks that people are willing to accept in order to secure certain benefits (HSE 2001; USACE 2010b).

Figure 2-2
Range of Tolerable Risks (Roth and Ludy 2016)



As recommended in the Delta Plan (Council 2013), TRGs enable a risk-informed analysis with which to formulate flood risk management policy and to prioritize and allocate scarce resources for flood risk reduction. Application of TRGs forms a sound basis for (1) a better understanding of risk; (2) improved

communications of risk and risk-related issues; (3) transparency in risk decision-making; and (4) overall enhanced management of risk. In addition, TRGs make it clear who is responsible for identifying, managing, and communicating risk.

The concept of tolerable risk enables consideration of residual risk and the consequences of flooding on loss of life, property damage, water supply disruption, the ecosystem, and the Delta as a place. Tolerable risk is based on judgment regarding the probability of an adverse event occurring, and, if an event does occur, the consequences that event may cause. Decisions informed by tolerable risk avoid the need to define what appropriate means in the term “appropriate level of protection” – i.e., appropriate for what and to whom? Instead, tolerable risk enables analysis and deliberation of the question “how safe is safe enough?” Tolerable risk represents a global shift in thinking from flood control management to flood risk management (Sayers et al. 2013).

TRGs are based on comprehensive evaluation of both the probabilities of adverse events that may occur and their consequences if and when they do occur. This evaluation:

- Demonstrates that risks are neither negligible nor something to be ignored.
- Supports risk-informed policy setting and decision-making.
- Informs decisions about ways to reduce risk and the costs of implementation.
- Enables quantitative evaluation of trade-offs (e.g., structural solutions such as levee building and non-structural solutions such as improved evacuation procedures).
- Proves useful in allocating scarce resources.
- Enables regular review to respond to changing conditions.

Because absolute protection is not attainable, evaluation of tolerable risk provides a rational basis for making decisions on reducing risks to as low as reasonably practicable, or ALARP. ALARP is defined as what can reasonably be achieved without spending an inordinate amount of time, money, or resources relative to the risk reduction benefits that can be attained (HSE 2001). Application of the concept of tolerable risk to decision-making on flood risk reduction in the DLIS methodology offers many advantages. As adopted from the USACE (2011), tolerable risk:

- Enables the decision-making process to focus on the most serious risks first, and to prioritize actions accordingly.
- Enables taking actions commensurate with risks, which improves efficiency.
- Enables rational consideration of both structural and non-structural options to reduce risk as well as consideration of benefits that cannot be readily monetized.
- Promotes equity in that everyone’s interests and safety can be treated with fairness.
- Promotes efficiency by using available resources to achieve the greatest benefit.
- Provides transparency in the decision-making process.
- Enables clear communication of the risks and risk-based decisions to those most affected.
- Provides clarity on who is responsible for identifying, managing, and communicating risk.

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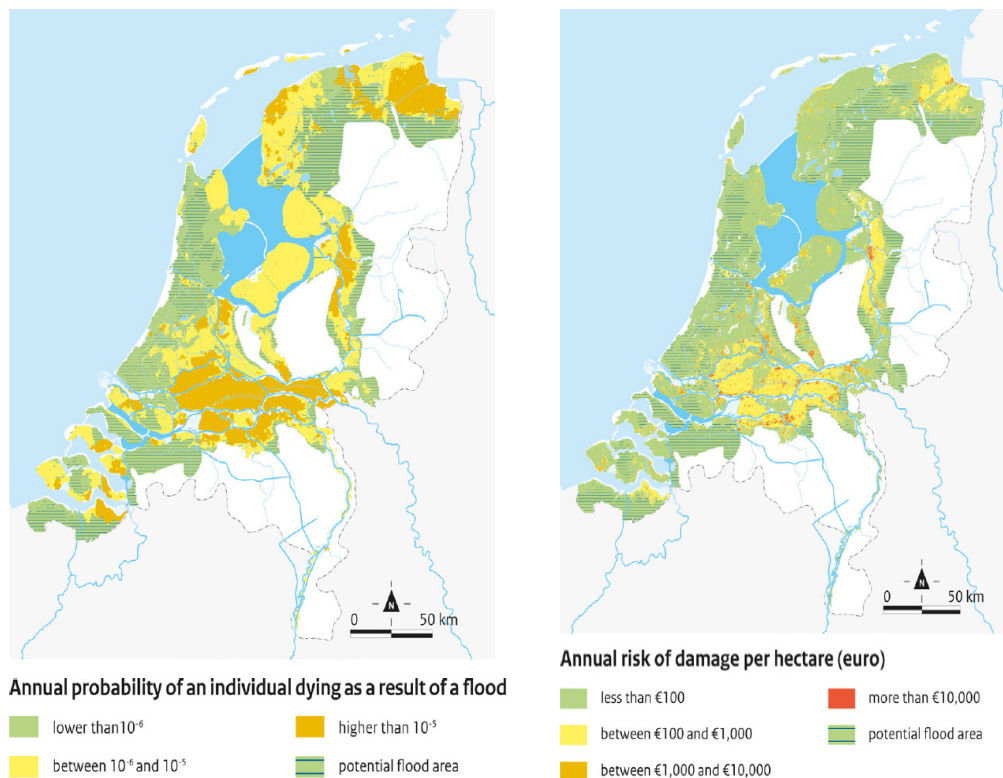
Application of TRGs is consistent with application of the best available science and practice in risk management. For example, the USACE and the U.S. Department of the Interior Bureau of Reclamation (USBR) apply tolerable risk principles to manage dam safety and to aid in determining how to prioritize spending maintenance and improvement funds (USACE 2011; USBR/USACE 2015).

Following Hurricane Katrina, the National Committee on Levee Safety (NCLS) recommended that life safety be paramount when considering actions to reduce risk, and that TRGs be used to inform decisions on levee safety (NCLS 2009). The Water Resources Reform and Development Act (WRDA) of 2014 requires that levees managed in the federal system use the levee safety action classification to stipulate actions to reduce risk (WRDA 2014 Sec. 9005 (d)). This action classification system, used by the USACE for its levees, is guided by principles of tolerable risk. Specifically, levee systems that pose unacceptable risks to life safety are classified as needing urgent action to reduce risks to tolerable levels. Draft guidance by the USACE for applying TRGs to levees is currently circulating for federal agency review.

In the Netherlands, the Dutch flood investment priorities and flood safety standards are risk-informed (Eigenraam et al. 2014). Recent national policy in the Netherlands establishes a maximum flood-safety life-risk guideline that limits the risk to which both individuals and society as a whole can be exposed. This guideline states that no person shall face more than a one in 100,000 chance per year of dying in a flood (Delta Programme 2015). It is also recommended that a higher standard be implemented in areas where societal risk is high, such as locations with the potential for a large number of victims, serious economic damage, and/or where there is critical infrastructure of national importance. Risk maps like those shown for the Netherlands (Figure 2-3) can be informative in communicating risk to those most affected, such as those in the dark orange areas (the map on the left on Figure 2-3) where the target safety standard is not yet met but is expected to be met before 2050.

Figure 2-3

Flood Risk Map of Expected Annual Fatalities (EAF) and Expected Annual Damages (EAD) in the Netherlands in 2020, the Beginning of the New Guideline's Implementation (Delta Programme 2015)²



Maps such as these can help distinguish between individual risks and societal risks. Specifically, areas where there is higher relative risk (for example, areas where mass casualties or widespread damages could be high) can be a proxy for societal risk. In contrast, areas with lower life safety or flood damage risk are likely more important for individual risk than societal risk. In the Delta, residents are concerned with life safety and property damage for their own homes and families. Societal risks, on the other hand, include the State's interests in life safety and property damage, water supply reliability, and ecosystem enhancement.

2.4 Application of Tolerable Risk Guidelines

Policymakers, decision-makers, and stakeholders most affected by a particular risk must enter into meaningful discussions on the limits of tolerable risk, which are most often unique to a given situation and a given set of conditions. The deliberation must be informed by risk assessment, the range of options available to reduce risk, and the acceptability of the residual risk as a level of risk that is tolerable for the

² The legend on Figure 2-3 identifies all areas that could potentially be flooded in green with blue stripes. It should be clear that everything in color on the map could be flooded.

benefits secured. The goal should be to reduce residual risk to ALARP while fully considering (HSE 2001):

- Individual Risk: The probability of harm to individuals and the things they value.
- Societal Risk: The probability of adverse consequences that impact society as a whole. Society is increasingly averse to risk as the scale of consequences increases.
- Efficiency: The need for society to use available resources to achieve the greatest benefit.
- Equity: The right of individuals to be protected, and the right that the interests of all are treated with fairness.

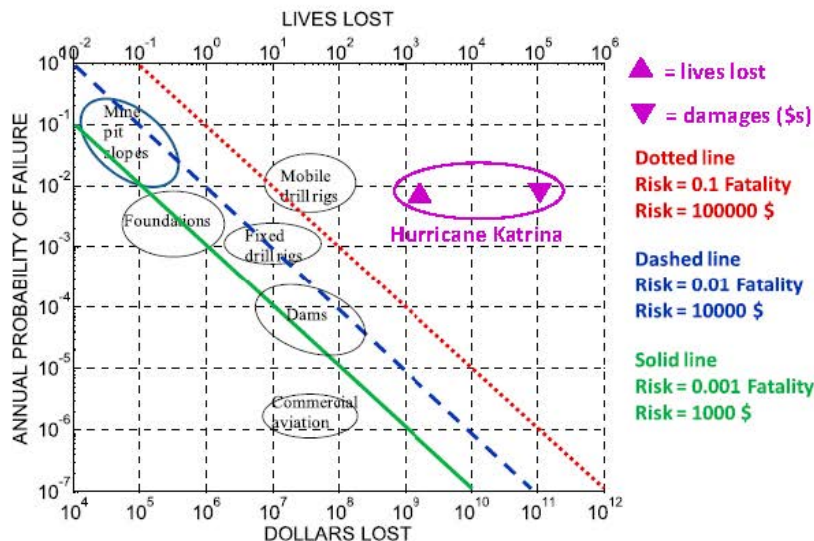
As defined in Section 2.1, risk is the product of the probability of an event times the consequences of that event. The probability of exceedance is the probability that an event will be exceeded in any one year. As applied to flood risk, if the probability of exceedance is 1 percent, or one chance in 100, and the value of damages is \$100 million, then the risk from flooding is 0.01 times \$100 million, or \$1 million per year, which is the EAD. Similarly, if flood risk is estimated at 10 fatalities, then the EAF is 0.1 fatality per year.

It is often useful to view the results of risk calculations on an F-N chart, an example of which is shown on Figure 2-4 (Briaud et al. 2013). An F-N chart relates F, the probability of failure on the y-axis, to N consequences on the x-axis, which is most often displayed as fatalities, but can also be shown in dollars of damage. The ellipses on the chart illustrate ranges of risk commonly associated with other settings, for example the risk of accidents in commercial aviation, or occupational hazards such as those faced in open pit mining.

The diagonal solid, dashed, and dotted lines shown on Figure 2-4 represent lines of equal risk. For example, the solid green line corresponds to an EAD of \$1,000 and an EAF of 0.001. Similarly, the dotted blue line corresponds to an EAD of \$100,000 and an EAF of 0.1. It is generally considered that risks that plot to the left and below the lines are more tolerable than risks that plot above and to the right of these lines. Hence, the diagonal lines can be thought of as limits of tolerable risk, at least for the risks illustrated by ellipses on the chart.

Briaud et al. (2013) also demonstrated the use of F-N charts by plotting fatalities and damages resulting from Hurricane Katrina, which have been superimposed on Figure 2-4. The estimated annual probability of occurrence for a hurricane like Katrina ranges from 100 to 300 years. The disaster resulted in about 1,500 lives lost and about \$100 billion in damages, which are plotted as shown on Figure 2-4. The F-N chart also demonstrates that lives could have been saved by (1) moving people from harm's way (e.g., by improved evacuation), or (2) by reducing the probability of failure (e.g., by building taller and more robust levees). Both techniques were implemented in the aftermath of Katrina.

Figure 2-4
F-N Chart (Briaud et al. 2013)



Consider two levee sections (1) that have similar geometry; (2) that are built of similar materials that were placed using similar construction methods; and (3) that have similar foundation conditions in terms of strength and deformation, except that the foundation of one levee is more susceptible to failure by underseepage than the other. Using basic LOP methodology (e.g., HMP), both levees could be judged as adequate if they both provide sufficient freeboard above their prescribed water surface metric. This highlights a shortcoming of simplified LOP approaches: levees with latent defects may be presumed to be adequate, resulting in a false sense of security.

On the other hand, if performance criteria are included (e.g., FEMA 100-year and California urban 200-year), then a deterministic geotechnical engineering analysis could identify the levee susceptible to underseepage failure as a concern. All other things being equal, this analysis would inform decision-makers of defects to be remedied to ensure adequate levee performance up to its specified LOP.

Now, expand this consideration to 1,100 miles of levees in the Delta. If the prescribed water surface metric is being met, and the levee sections conform to the specified LOP geometry, then the levees may meet LOP criteria. This conclusion would be premised on the assumption that there are no latent defects (e.g., potential for underseepage failure) that need to be remedied. But, in 1,100 miles of levees, many of which are a century old, there are latent flaws that need to be fixed. If the levees all satisfy the prescribed LOP water surface metric, which levee with a latent flaw needs to be fixed first?

As discussed, LOP methodology focuses on the hazard, most often expressed as the prescribed water surface metric, without adequate consideration of the consequences. Using LOP, there is no rational decision-making process to focus on the most serious risks first, and to prioritize actions accordingly if the cost of levee construction or improvement exceeds available funds. On the other hand, if the risks are known (based on the probability of an adverse event and the consequences if that event occurs), the amount of risk reduction required to achieve a level of risk deemed tolerable can be determined. TRGs

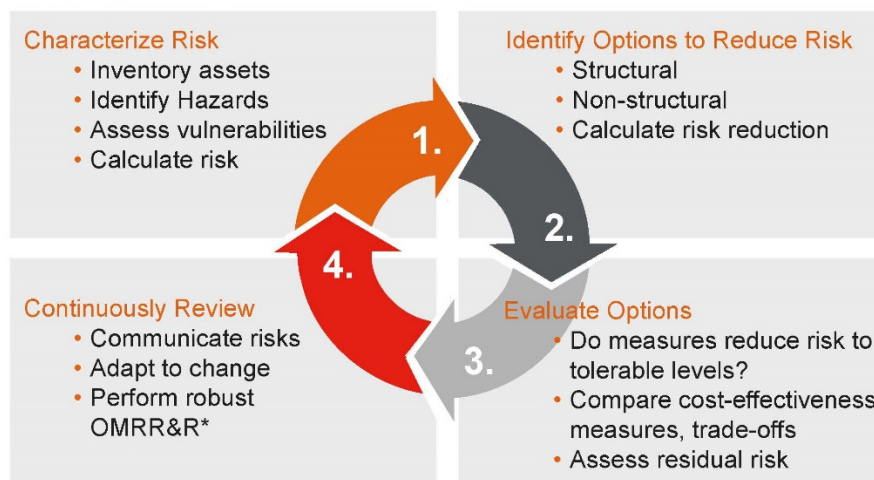
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enable the costs of risk reduction to be compared and evaluated in a transparent and open manner that provides for:

- Prioritizing risk reduction alternatives to better allocate scarce resources by identifying the most serious risks and where risk reduction is needed first.
- Quantitative comparison of alternative means of risk reduction (including both structural and non-structural options) to identify the most cost-effective solutions.
- Efficient application of available resources to maximize benefits.

Figure 2-5 illustrates application of TRGs to flood risk reduction.

Figure 2-5
Applying Tolerable Risk Guidelines



*Operations, maintenance, repair, replacement, and rehabilitation

2.5 Summary

The DLIS methodology enables comparison of actions to reduce risk of life loss and property damage, and risks of water supply disruption, harm to ecosystem habitat, and damage to the Delta as place. For example, if life safety is given the highest priority, then reducing risks to the islands showing the highest EAF would be the logical choice on which to focus investments. On the other hand, if life safety and reducing risk of water supply disruption are both high priorities, the DLIS methodology can show where to make investments that maximize risk reduction for both life safety and water supply reliability.

The DLIS methodology enables characterizing risk behind levees and can be used to compare trade-offs among potential investments. Areas with greater risk tend to be areas with greater consequences, and the use of TRGs encourages taking actions that will reduce risks to tolerable levels. The DLIS methodology enables a focus on life safety while also considering additional metrics (see Section 5.0) to further characterize risk to other State interests, including water supply, ecosystem, and the Delta as a place.

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Flood risk in the Delta cannot be eliminated. TRGs recognize that society is willing to live with some risk in order to secure certain benefits. The DLIS methodology identifies current levels of risk in the Delta and application of the principles of tolerable risk in the DLIS:

- Supports policy formulation for reducing risk.
- Informs risk management decisions.
- Enables evaluation of trade-offs.
- Promotes clear and transparent risk communications.

In addition, using the TRG process in DLIS can be useful in allocating scarce resources, achieving equity, and promoting efficiency. The DLIS recognizes that the Delta is complex, the future is uncertain, and absolute protection is not possible. Application of the DLIS methodology can, however, enable reducing risk in the Delta to tolerable levels through prudent levee investments.

3.0 ASSETS AND BENEFICIARIES

This section describes the baseline information related to the islands and tracts within the geographic scope of the DLIS analysis (Section 3.1), the assets protected by the Delta levee system that could be exposed to flooding (Section 3.2), and the categories of beneficiaries of the Delta levee system (Section 3.3). As applicable, these subsections discuss the technical approach, findings, and possible data gaps and uncertainties.

Assessing the vulnerability of the Delta levees, identifying beneficiaries of the Delta levee system, and assessing the overall exposure of the Delta to flood and earthquake hazards will lead to a better understanding of the baseline risk, which helps identify initial areas of concern prior to identifying specific investments. This baseline information will be used to develop the information needed to identify options to reduce flood risk, evaluate trade-offs, and develop an investment strategy.

As described in the following subsections, the DLIS project relied completely on existing data; no new data were generated. Though much data have been collected over the years for a variety of Delta planning efforts and studies, the dataset used in some cases may be incomplete and dated; as such, it may pose some limitations. For example, land use and cropping patterns change. If actual land use on the ground is inconsistent with the land use reported in the project dataset and analysis, the value of what could be lost due to flooding and the baseline risk could be affected.

The approach in the DLIS is designed to accommodate new and improved data as they become available in the future and to update the analyses as new data are obtained.

3.1 Islands and Tracts

3.1.1 Identifying Islands and Tracts

One of the first tasks of the DLIS project was to identify the islands and tracts within the Delta and Suisun Marsh that may be candidates for future investment. Islands and tracts were deemed candidates for future investment if the investment would have potential to:

- Reduce risk to people, property, or other State interests
- Reduce risk to water supply
- Maintain or enhance ecosystem function.

The project team used the best available data, derived from the following maps and documents, to compile a preliminary list of islands and tracts located within the Delta and Suisun Marsh:

- Sacramento-San Joaquin Delta Atlas (DWR 1995)
- Delta Risk Management Strategy, Phase 1. Risk Report: Section 2 (DWR 2009a, p. 17)
- Map of the Sacramento-San Joaquin Delta and Suisun Marsh Region, prepared by the FloodSAFE Environmental Stewardship and Statewide Resources Office (FESSRO) (DWR 2013d)

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- Inspection and Local Maintaining Agency Report of the Central Valley State-Federal Flood Protection System (DWR 2013c)
- Economic Sustainability Plan for the Sacramento-San Joaquin Delta (Economic Sustainability Plan) (DPC 2012, pp. 61-62)
- Suisun Marsh Properties Map (Suisun Marsh Resource Conservation District [RCD] 2015)
- Map of the Sacramento-San Joaquin Delta (Council 2014).

The preliminary list of islands and tracts developed from these sources was subsequently reviewed and refined with input from Council staff, Reclamation District (RD) engineers, DWR staff, Suisun Marsh RCD, and local floodplain managers.

The list was also refined to reflect the geographic scope of the DLIS analysis, which is limited to areas within (1) the legal Delta (as defined in CWC section 85058); (2) Suisun Marsh; and (3) the FEMA-delineated 0.2 percent AEP floodplain boundary, sometimes referred to as the “500-year” floodplain boundary. Figure 3-1 shows the FEMA 0.2 percent AEP floodplain (in blue) used to select the area of analysis within the legal Delta and Suisun Marsh.

Because this analysis is focused on an investment strategy for the Delta levee system, the area of analysis is limited to those islands and tracts that would be exposed to flood waters from a failure of the Delta's Project and non-Project Levees; i.e., the associated inland waterways and the main rivers that drain into the Delta, including the Sacramento, San Joaquin, Stanislaus, Cosumnes, Mokelumne, and Calaveras rivers. Furthermore, the DLIS analyzes flood risks only from a failure of the Delta's Project and non-Project levees; it does not consider flood risks from upstream levee breaches, from rivers and creeks, or from interior drainage or stormwater.

In addition, it is possible that floodwaters may spread beyond the boundaries of the legal Delta because of a levee failure near the perimeter of the Delta. The DLIS project does not include risk to people, property, infrastructure, and habitat located outside of the legal Delta, even if that risk arises from flooding caused by failures of levees in the Delta. Risk calculations in the DLIS project are limited to (1) levee failures and (2) the consequences of flooding within the legal Delta and Suisun Marsh.

Figure 3-2 shows the 0.2 percent AEP floodplain with the smaller tributaries (in yellow) “removed.” On Figure 3-2, the “modified 0.2 percent AEP floodplain” (in blue) is used to form the outer edge of the area of analysis for the DLIS. White areas on Figure 3-1 indicate land within the legal Delta that was not within the FEMA 0.2 percent AEP floodplain (mostly because it is higher ground) and was therefore not considered in the DLIS analysis.

After considering input on the preliminary list and considering the geographic scope of the project, the project team generated a final list consisting of 170 islands and tracts to be included in the DLIS project, including 125 in the Delta and 45 in Suisun Marsh. After the final list of islands and tracts was generated, the extent of each island and tract was delineated in ArcGIS-format GIS shapefiles. The following sources of information were used to develop the shapefiles.

- Areas marked as Local Maintaining Agencies (LMA) in the DWR report titled *Asset Exposure Information to Support Delta Levee Improvement Prioritization* (Asset Exposure) (DWR 2013a) were used as a baseline dataset. The island and tract boundaries were then adjusted based on input from

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RD engineers (DCC Engineering 2014; Kjeldsen, Sinnock, and Neudeck, Inc. 2014; MBK Engineers 2014) and DWR. It is important to note that the DLIS islands and tracts represent approximate boundaries for planning purposes only, and do not represent legislative, jurisdictional, or property boundaries.

- Because the LMA outlines from the Asset Exposure report did not include all of the flood-prone areas within the legal Delta, islands were added and “new” tracts of land (those tracts that were not explicitly identified in previous Delta studies) were delineated to ensure that all flood-prone assets and population within the DLIS boundary would be considered in the analysis. These include flooded islands and tracts, such as Frank’s Tract; tracts used as floodways in the State Plan of Flood Control, such as the Yolo Bypass and Paradise Cut; and unleveed, in-channel islands, such as Donlon and Ida Islands. Although many flooded and in-channel islands have few assets, they may be candidates for future investment because they meet the criteria listed above, particularly if future scenarios lead to reclamation or alteration of these islands affecting the ecosystem benefits they currently provide. Most of the islands and tracts have clear boundaries and those that do not generally lie at the edge of the DLIS boundary. All Delta islands and tracts from all sources were truncated at the edge of the 500-year floodplain within the legal Delta.
- Most of the DLIS islands and tracts within Suisun Marsh were delineated specifically for the DLIS based on discussions in November 2014 with Suisun Marsh RCD staff. The delineated Suisun Marsh islands and tracts generally represent hydraulically connected regions.
- The shapefiles of the legal Delta and the FEMA floodplain boundaries were acquired from DWR, and were used in addition to the sources listed above to develop the GIS outlines for the islands and tracts of the Delta and Suisun Marsh.

Figure 3-3 shows the islands and tracts defined for the DLIS project. The boundaries of islands and tracts within the area of analysis are generally consistent with those in prior studies and maps, with a few exceptions as follows. In many cases, island or tract boundaries follow those of an RD. However, there are also tracts of land that are not currently part of an RD. Therefore, as noted previously, “new” tracts were delineated for the purpose of this analysis. In some cases, the extent of a tract may be slightly larger than the RD boundaries.

Table 3-1 lists the name of each island and tract defined for the DLIS project; indicates the relevant RD (where applicable); notes whether the tract of land has levees, no levees, or is currently flooded; and identifies the location as either in the primary or secondary zones of the legal Delta or in Suisun Marsh. Because previous studies were completed by different agencies and for different purposes, the existing inventories have differences in the number and naming of the islands and tracts. Nevertheless, the names of islands and tracts within the area of analysis are generally consistent with those in prior studies and maps, with the exceptions as discussed above.

Island and tract names in Table 3-1 beginning with “DLIS” indicate that a particular unit of analysis previously had no island or tract name (or associated RD), or that the tract was especially delineated for this study. The associated RD is included in the inventory because RDs were used as the baseline starting geography for the boundaries of islands and tracts, as described above. However, this list does not identify the entities responsible for flood management or levee maintenance of islands and tracts; those will likely be identified in a future detailed identification of beneficiaries and cost allocation.

3.1.2 Data Gaps and Uncertainties

As all modeling contains uncertainty, the extent of FEMA's 0.2 percent AEP floodplain boundary, based on hydraulic and hydrologic models, also contains uncertainty. It is therefore possible that the extent of a 0.2 percent AEP flood in the Delta and Suisun Marsh would be larger or smaller than that shown on Figure 3-1. However, this data layer has been used to support previous DWR studies, and it can be accepted as a representation of flood-prone areas within the geographic scope of the DLIS.

No further data gaps or uncertainties associated with the delineation of islands and tracts in the DLIS have been identified.

3.2 Assets

To begin identifying assets, the project team developed a list of asset categories that generally align with those in prior asset exposure analyses completed by the DWR, including the Asset Exposure report (DWR 2013a) and the report titled *California's Flood Future: Recommendations for Managing the State's Flood Risk. Attachment F: Flood Hazard Exposure Analysis (Flood Futures)* (DWR 2014f). The asset categories include:

- Aviation: air strips
- Agriculture: cropping patterns
- Critical facilities: hospitals, police stations, cell towers, fire stations, oil pipelines and gas fields, wastewater treatment plants, natural gas wells, transmission lines and towers, private schools, public schools, and evacuation routes (where available), emergency flood fight, and emergency response material stockpiles
- Commercial: mines
- Conveyance infrastructure: aqueducts; intakes; canals
- Cultural resources: legacy towns, historic places, landmarks
- Delta levees: centerlines and HMP status as related to guidelines for federal rehabilitation assistance (explained in Council 2013, pp. 257-259)
- Land use: agriculture, urban, natural
- Ecosystem assets: non-tidal high value habitat
- Navigation: deep water shipping channels and ports
- Parcel inventory: residential and commercial
- Recreation: marinas, parks, scenic highways
- Transportation: roads (and highways), railroads
- Utilities.

3.2.1 Major Assets by Island and Tract

Based on the asset categories, the project team compiled an inventory of the built and natural assets.

With three exceptions, all assets accounted for in the DLIS are assets on the landward side of the levee. Waterside assets in the asset inventory include deepwater shipping channels, water supply intakes, and marinas. Water intakes and the land-side of marinas are accounted for in the EAD calculations (Section 5.0). However, shipping channels are not included in EAD calculations because navigation channels themselves are not expected to be damaged in the event of a levee failure.

Data for built assets came from a variety of sources (Table 3-2), and most data were previously used to support the Asset Exposure analysis (DWR 2013a), though evacuation routes were collected from various county offices of emergency services, as well as some RDs. Where gaps in the data or the need for additional information to complete the inventory were identified, the DWR Asset Exposure analysis data were supplemented (where possible) with asset data from other sources such as those collected and generated for the Delta Risk Management Strategy (DRMS) (DWR 2015b) and the DPC *Economic Sustainability Plan* (2012).

After the assets were identified, ArcGIS was then used to inventory and organize the asset data on each island and tract. For this analysis, only asset exposure within the geographic scope of the project is considered. For example, for the asset type, natural gas wells in California, the GIS data layer was acquired and its geographic extent was clipped to the boundary of the shapefile developed for the islands and tracts. Natural gas wells located completely outside the islands and tracts boundaries were then removed, providing the inventory of natural gas wells located within the geographic scope of analysis. The islands and tracts shapefile was then overlain onto the natural gas wells shapefile to count the number of natural gas wells that were located partly or entirely within each island and tract.

This process was repeated for each asset and for land use. For assets that are point features, such as natural gas wells or hospitals, the number of assets present on each island and tract were counted. For linear assets such as levees, highways, and railroads, the length of the asset on the island was determined. For area features such as State parks or land use, the total area of the asset on the island was determined. When applicable, counted assets were then classified. For example, land use areas were categorized according to the DWR land use classifications, which include natural areas and urban areas.

To support calculating EAD (explained further in Section 5.0), it is necessary to know the replacement value of each asset that was inventoried. Values were obtained from a variety of sources, most of which were used to support the Asset Exposure report (DWR 2013a). These include replacement costs used in the Central Valley Flood Protection Plan (CVFPP), FEMA's Hazus program, and the DRMS. One exception, the agricultural land crop value data, came from the California Pesticide Regulation Database (as noted in Table 3-2), which was used to support the DPC's *Economic Sustainability Plan* (2012).

The results from the ArcGIS-based asset inventory are summarized in Appendix A, Asset Exposure on Islands and Tracts. Appendix A provides one spreadsheet per island or tract, and includes an inventory of the assets present on the island or tract that would be exposed to flooding. The spreadsheets are organized according to island or tract name, and each spreadsheet includes the island or tract area, the mean elevation of the island or tract, whether or not an island or tract has levees that are part of the State Plan of Flood Control (also called project levees), the total length of all levees on the island or tract, the

land use, and the total amount of agricultural land. For informational purposes only, the spreadsheets also include the length of levees that meet the HMP or PL 84-99 standard based on the most recent assessment provided to DWR in 2011 (definitions of HMP and PL 84-99 are in Council 2013, pp. 257-259). Land use values are approximate and may not always sum to the total area of an island.

Asset replacement values and their source information are provided in the table in Appendix B, Asset Replacement Values. Appendix B lists the replacement cost per unit, or shows that it is a varied cost (for example, crop values vary based on crop type). Detailed information on how these values factor into estimated flood damages is provided in Section 5.0.

3.2.2 Data Gaps and Uncertainties

As noted in Table 3-2, most data were provided by DWR and have been used in prior flood asset exposure analyses. However, in some cases, descriptions in the metadata are lacking, likely because the data have been processed for prior projects by multiple consultants and some original source data may not have been carried over. Therefore, it is not always possible to tell when or how the data obtained were originally collected. The compilation assembled for DLIS is considered generally complete and accurate, and any differences between the compilation and raw source data are believed to be minor. Given the scale of the overall DLIS analysis, however, it is unlikely that minor differences between datasets would affect the outcomes or the investment priorities.

The following layers lack original source data: active (gas) wells; airstrips; communications facilities; confined animal facilities (dairy farms); county highways, highways, and scenic highways; drinking water intakes; fire stations; gas storage; historic places, landmarks, and legacy towns; power plants; prisons; schools; railroads; substations and terminals; transmission towers; and wastewater treatment plants.

The population on Kings Island in the southern Delta as presented in the spreadsheets (Appendix A) is likely incorrect. This is because, while the 2010 Census tract data indicate the population is zero, there are houses present but there is currently no way to count the population. Though the population is likely not large, this error may skew a baseline risk assessment or the possible effects of investments on life safety because the baseline input would be zero population.

Information on evacuation routes in the Delta is incomplete. Details were found regarding the areas with established evacuation routes in Sacramento, San Joaquin, and Contra Costa counties. The maps generated for San Joaquin and Sacramento counties are descriptive, thereby providing a thorough understanding of where evacuation routes are located. On the other hand, Contra Costa County provided narrative general descriptions of the evacuation routes rather than delineated maps. Locations of evacuation routes for Solano and Yolo counties were not found in initial inquiries. It is our understanding at the time of this study that Contra Costa, Solano, and Yolo counties are currently in the process of developing evacuation plans and routes.

3.2.3 Ecosystem Assets

While many elements can factor into ecosystem value, the basic metric used was habitat area. Because levee investments have the potential to protect certain terrestrial habitats and/or to preclude restoration of tidal habitats, the project team considered both existing habitat and potential habitat.

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Information on the amount and distribution of existing habitats (natural communities or vegetation types) was obtained from Delta Plan habitat mapping completed for the Delta Plan Environmental Impact Report (EIR) (Council 2011). Certain habitat types were identified as high-value based on their importance to recovering species, historical losses, and priorities from existing conservation plans, such as the Delta Plan (Council 2013) and the Ecosystem Restoration Program's Delta Conservation Strategy (California Department of Fish and Game [CDFG] 2011; CDFW 2014). High-value habitats were categorized as either tidal (tidal marsh) and able to occur on unleveed islands, or non-tidal (riparian, seasonal floodplain, managed wetlands, vernal pools, alkaline seasonal wetlands) and thus typically associated with leveed islands.

The DLIS project team also inventoried protected and managed lands ("conserved lands"), as mapped by the California Protected Areas Database (CPAD) (GreenInfo Network [GreenInfo] 2015a); Public, Conservation, and Trust Lands (PCTL) (California Resources Agency [CRA] 2005); state and federal easements (CRA 2003); and California Conservation Easement Database (Greeninfo 2015b). Areas mapped in CPAD took precedence, and were then supplemented by PCTL data. These areas were filtered using attribute information to limit the data to applicable protected, managed, conserved, or easement lands. Examples include Stone Lakes National Wildlife Refuge (Maintenance Area 9), Yolo Bypass Wildlife Area, Grizzly Island Wildlife Management Area, Natural Resource Conservation Service's Wetland Reserve Program easements, Rush Ranch land trust, and the Nature Conservancy's Staten Island. Other public lands deemed not having protected or conservation status, such as the Department of Defense, water supply infrastructure, ports, and city parks, were excluded. Easements with a private or unknown ownership status were excluded from the data.

Thus, the total existing high-value habitat for each island equals conserved lands plus any additional high-value habitat areas not already protected.

Two approaches were used to identify and inventory potential habitat. First, the DLIS project team identified proposed restoration projects, as compiled under EcoRestore (CRA 2015). Further information about the proposed habitats was gleaned from project documents and expert knowledge, if available. Potential non-tidal habitat restoration includes Sherman Island, Twitchell Island emergent wetlands for subsidence reversal, Staten Island sandhill crane habitat enhancement, and Yolo Bypass floodplain restoration. For the Yolo Bypass, the project team estimated the amount of floodplain that would be seasonally inundated for at least 2 weeks (a duration associated with food web benefits for juvenile salmonids) from preliminary modeling conducted for the Fishery Enhancement Planning Team (California Department of Water Resources and U.S. Department of the Interior Bureau of Reclamation [DWR and USBR] 2015). Examples of potential tidal restoration projects include McCormack-Williamson Tract, Prospect Island, Lower Yolo Ranch, and Tule Red.

Second, the project team used elevations to predict potential high-value habitat types that would form on an unreclaimed flooded island. The Ecosystem Restoration Program's Delta Conservation Strategy map (CDFG 2011; CDFW 2014), which is incorporated into the Delta Plan, identifies broad areas appropriate for habitat restoration within the Delta, primarily based on land elevations, excluding areas with current urban constraints. In accordance with the Delta Vision Strategic Plan and in light of expected sea level rise, the areas of the Delta that are of highest priority for restoration include lands that are in the existing intertidal range, floodplain areas that can be seasonally inundated, transitional and upland habitats, which in future would become shallow subtidal, floodplain, and intertidal habitats, respectively (CDFW 2014).

The project team mapped acres of high value habitat (intertidal, seasonal floodplain, transitional) that could result if tracts were unleveed, under different scenarios of sea level rise (nominal and high sea level rise projection) for different years (2012 base case, 2030, 2050). Finally, the data were filtered to show only those acres within a priority habitat restoration area, as defined in the Delta Plan.

In sum, the potential high-value habitat that could result from restoration or levee failure was calculated as the maximum of either known proposed restoration (tidal or leveed non-tidal) or elevation-based mapping of habitat potential.

3.3 Beneficiaries

For the DLIS project, a beneficiary is defined as any entity (individual, group, organization, agency, or community) that receives benefits or services (i.e., asset protection, protection from water supply disruption, or ecosystem enhancements) from the existing Delta levee system, or that would receive benefits or services from future investments in the Delta levee system.

The first step to identify beneficiaries was to define categories of beneficiaries based on the type of benefit provided. The GIS data used in the asset inventory (see Section 2.0) provide the array of asset types protected by levees and supported a general categorization of beneficiaries. Typically, beneficiaries were further categorized as either “direct” or “indirect.” Direct beneficiaries are those whose property or assets are affected in the case of flooding, and indirect beneficiaries are those who suffer from secondary effects of flooding, such as reduced access to shipped products if a highway is damaged. Section 5.0 discusses the methodology used to calculate direct damages (using EAD); however, indirect damage assessment is not part of this phase of the DLIS.

The GIS data on assets also contains ownership information to support identifying the direct beneficiaries. Indirect beneficiaries were also identified. The DWR Asset Exposure report (2013a), the DRMS (DWR 2015b), and the DPC’s Economic Sustainability Plan (DPC 2012) were reviewed to prepare a list of all categories of beneficiaries and to consider beneficiaries broadly. The preliminary categories were shared with Council staff, and the list presented in this report reflects the Council’s input.

Some beneficiaries receive more than one type of benefit from the levee system—for example, in-Delta residents benefit from flood protection for their property as well as protection from disruption to water supply caused by salination of irrigation systems. Meanwhile, some beneficiaries and benefits are provided by protection of multiple islands or tracts—for example, south of Delta water users benefit from the integrity of a through-Delta conveyance corridor, and the California Department of Transportation (Caltrans) benefits from protection of highways that span multiple islands. This report identifies direct and indirect beneficiaries, and further development will involve working closely with the DPC in development of its Delta Flood Risk Management Assessment District Feasibility Study to refine the list of beneficiaries.

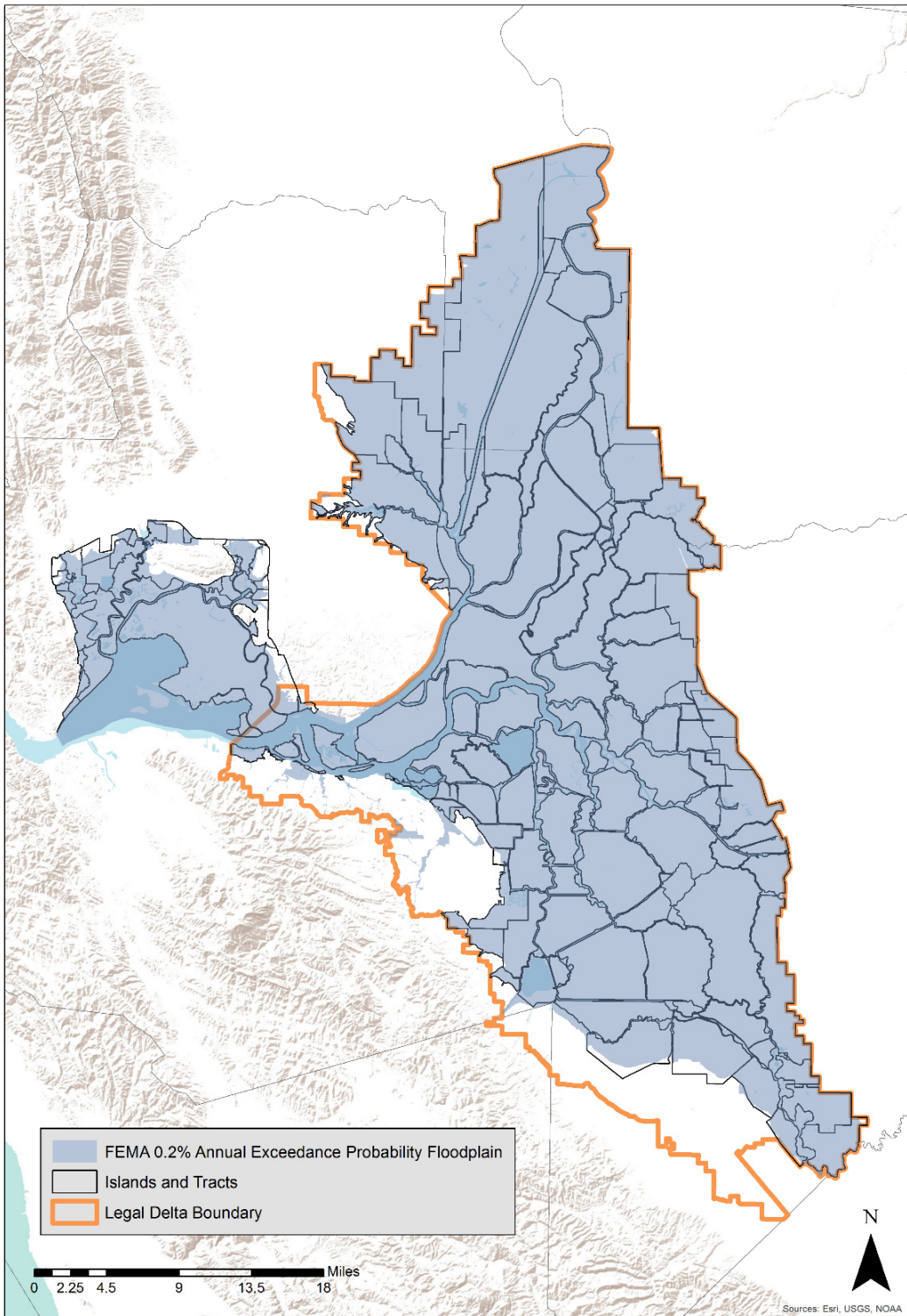
Table 3-3 provides broad categories of beneficiaries of the Delta levee system by associating beneficiaries with each asset type. First, the assets and benefits were organized according to public resources, infrastructure systems, and public safety. Then, the agency associated with the governance of each class of asset or benefit was identified and the classes were grouped according to governance (federal, state, and local jurisdictions). Third, the parties responsible for maintenance of each asset and the end users of each asset were considered. Finally, the primary (direct) and secondary (indirect) beneficiaries of each asset and benefit category were identified.

3.3.1 Data Gaps and Uncertainties

The beneficiaries identified in Table 3-3 are mostly the direct beneficiaries from assets on each island and tract protected by the levees. Ownership information is available for much of the GIS asset data and can be used in identifying some direct beneficiaries of the assets and in supporting the future tasks of cost allocation. Ownership information may be out of date.

Though indirect beneficiaries are listed in Table 3-3, Section 5.2.2 explains that the DLIS will not calculate indirect flood consequences in the EAD metric.

Figure 3-1
FEMA 0.2% AEP Floodplain Boundary within the Legal Delta and Suisun Marsh



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Figure 3-2
FEMA 0.2% AEP Floodplain Boundary with Non-Delta Waterway Flood Source Floodplain Segments Removed

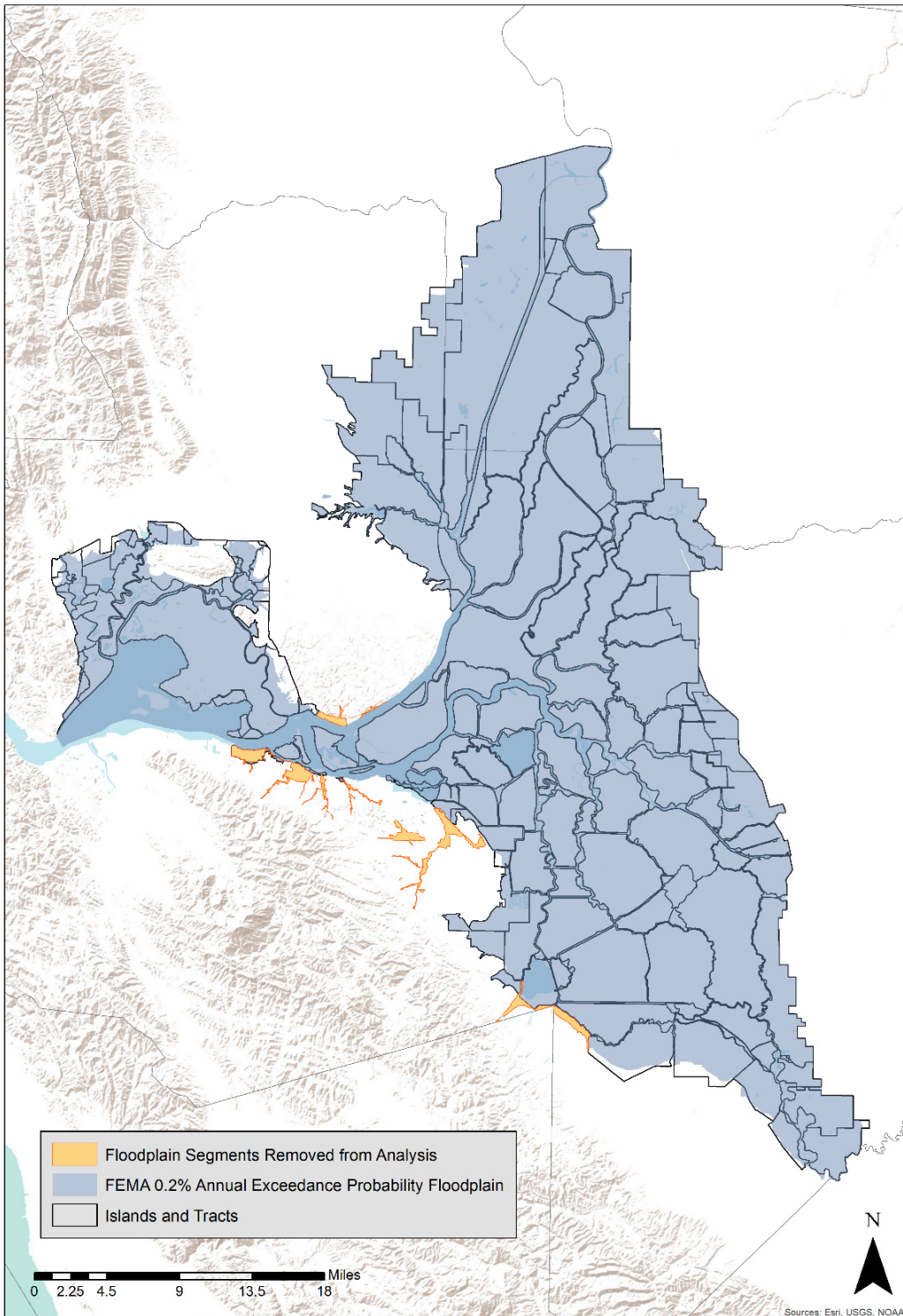
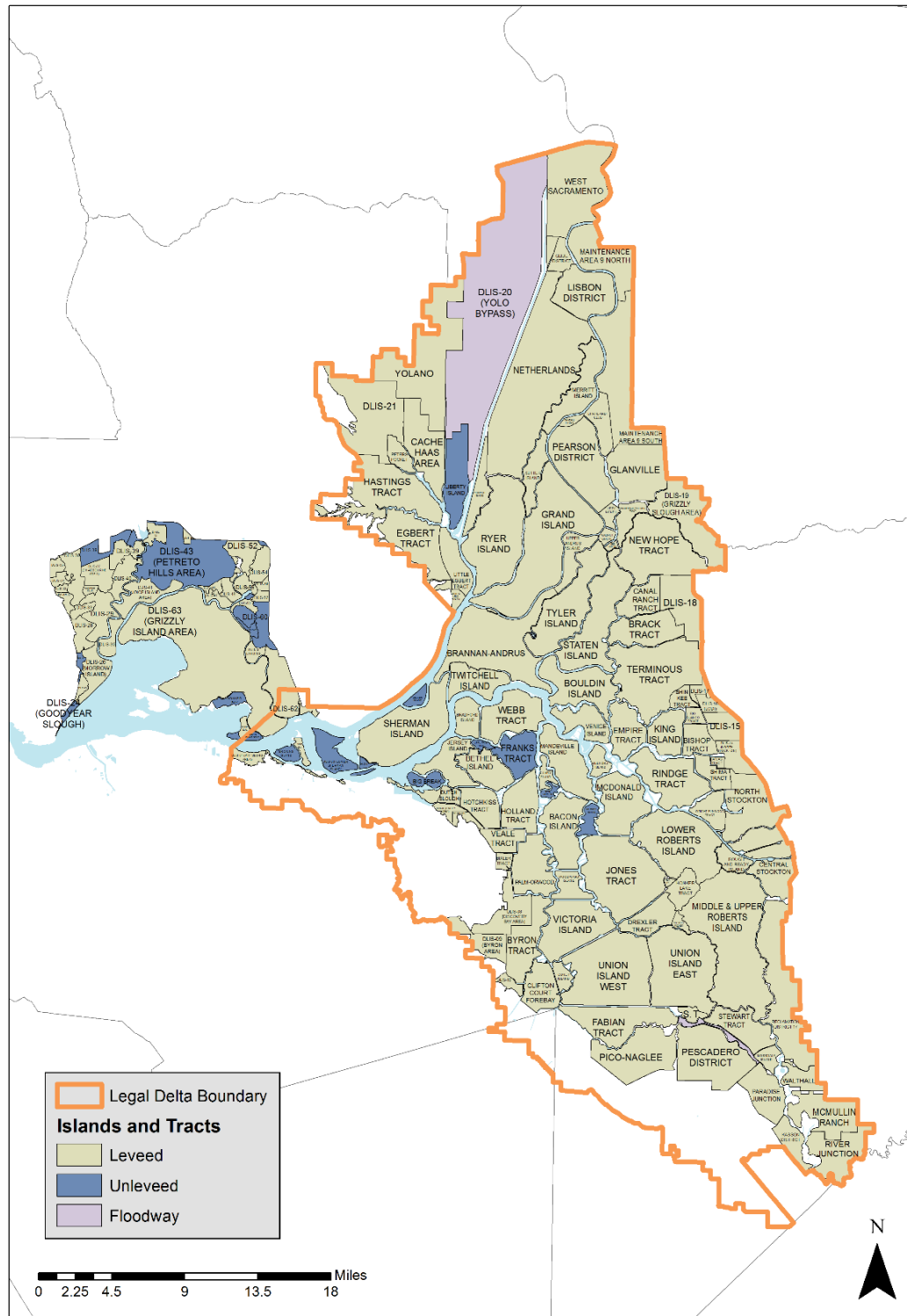


Figure 3-3
DLIS Islands and Tracts Inventory for Geographic Scope of Analysis



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Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
1	Atlas Tract	Secondary Zone	2126	
2	Bacon Island	Primary Zone	2028	
3	Bethel Island	Primary Zone	BIMID	
4	Big Break	Primary Zone		Unleveed, Currently Flooded
5	Bishop Tract	Secondary Zone	2042	
6	Bixler Tract	Primary Zone	2121	
7	Bouldin Island	Primary Zone	756	
8	Brack Tract	Primary Zone	2033	
9	Bradford Island	Primary Zone	2059	
10	Brannan-Andrus Island	Primary Zone	BALMD	
11	Browns Island	Primary Zone		Unleveed, In-Channel Island
12	Byron Tract	Secondary Zone	800	
13	Cache Haas Area	Primary Zone	2098	
14	Canal Ranch Tract	Primary Zone	2086	
15	Central Stockton	Secondary Zone	404, 1614, 828	
16	Chippis Island	Secondary Zone		
17	Chippis Island South	Secondary Zone		Unleveed
18	Clifton Court Forebay	Primary Zone		
19	Coney Island	Primary Zone	2117	
20	Dead Horse Island	Primary Zone	2111	
21	Decker Island	Primary Zone		Unleveed, In-Channel Island
22	DLIS-01 (Pittsburg Area)	Secondary Zone		
23	DLIS-02 (Antioch Area)	Secondary Zone		
24	DLIS-03 (Lower Sherman Island)	Primary Zone		Unleveed
25	DLIS-04 (West Island)	Primary Zone		Unleveed, In-Channel Island

RISK ANALYSIS METHODOLOGY

Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
26	DLIS-05 (Donlon Island)	Primary Zone		Unleveed, In-Channel Island
27	DLIS-06 (Oakley Area)	Secondary Zone		
28	DLIS-07 (Knightsen Area)	Secondary Zone		
29	DLIS-08 (Discovery Bay Area)	Secondary Zone		
30	DLIS-09 (Byron Area)	Secondary Zone		
31	DLIS-10	Suisun	None	
32	DLIS-12 (Paradise Cut)	Secondary Zone		Floodway, Inundated during High Water
33	DLIS-14 (North Stockton)	Secondary Zone		
34	DLIS-15	Secondary Zone	None	
35	DLIS-16 (Lodi)	Secondary Zone		
36	DLIS-17	Secondary Zone	None	
37	DLIS-18	Primary Zone	None	
38	DLIS-19 (Grizzly Slough Area)	Secondary Zone	None	
39	DLIS-20 (Yolo Bypass)	Primary Zone		Floodway, Inundated during High Water
40	DLIS-21	Secondary Zone	None	
41	DLIS-22 (Rio Vista)	Primary Zone	None	
42	DLIS-23 (Georgiana Oxbow)	Primary Zone		Unleveed
43	DLIS-24 (Goodyear Slough)	Suisun		Unleveed
44	DLIS-25	Suisun		
45	DLIS-26 (Morrow Island)	Suisun	2138	
46	DLIS-27	Suisun		Unleveed
47	DLIS-28	Suisun		
48	DLIS-29	Suisun		
49	DLIS-30	Suisun		

RISK ANALYSIS METHODOLOGY

Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
50	DLIS-31 (Garabaldi Unit)	Suisun		
51	DLIS-32	Suisun		
52	DLIS-33	Suisun		
53	DLIS-34	Suisun		
54	DLIS-35	Suisun		
55	DLIS-36	Suisun		
56	DLIS-37 (Chadbourn Area)	Suisun	2034	
57	DLIS-38	Suisun		Unleaved
58	DLIS-39	Suisun		
59	DLIS-40	Suisun		
60	DLIS-41 (Joice Island Area)	Suisun		
61	DLIS-42 (Peyronia Ecological Preserve)	Suisun		Unleaved
62	DLIS-43 (Petreto Hills Area)	Suisun		Unleaved
63	DLIS-44 (Hill Slough Unit)	Suisun		
64	DLIS-45	Suisun		
65	DLIS-46	Suisun	2139	
66	DLIS-47	Suisun	2139	
67	DLIS-48	Suisun	2139	
68	DLIS-49	Suisun		
69	DLIS-50	Suisun		
70	DLIS-51	Suisun		
71	DLIS-52	Suisun	2134	Unleaved
72	DLIS-53	Suisun		Unleaved
73	DLIS-54	Suisun		
74	DLIS-55	Suisun		
75	DLIS-56	Suisun		
76	DLIS-57	Suisun		
77	DLIS-58	Suisun		Unleaved

RISK ANALYSIS METHODOLOGY

Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
78	DLIS-59	Suisun		
79	DLIS-60	Suisun		Unleveed
80	DLIS-61	Suisun		Unleveed
81	DLIS-62	Secondary Zone		
82	DLIS-63 (Grizzly Island Area)	Suisun	2136	
83	Drexler Pocket	Primary Zone		
84	Drexler Tract	Primary Zone	Drexler	
85	Dutch Slough	Secondary Zone	2137	
86	Egbert Tract	Primary Zone	536	
87	Ehrhardt Club	Primary Zone	813	
88	Empire Tract	Primary Zone	2029	
89	Fabian Tract	Primary Zone	773	
90	Fay Island	Primary Zone	2113	
91	Frank's Tract	Primary Zone		Unleveed, Currently Flooded
92	Glanville Tract	Primary Zone	1002	
93	Glide District	Primary Zone	765	
94	Grand Island	Primary Zone	3	
95	Hastings Tract	Primary Zone	2060	
96	Holland Tract	Primary Zone	2025	
97	Holt Station	Primary Zone	2116	
98	Honker Bay Club	Suisun	2130	Unleveed
99	Honker Lake Tract	Primary Zone		
100	Hotchkiss Tract	Secondary Zone	799	
101	Ida Island	Primary Zone		In-Channel Island
102	Jersey Island	Primary Zone	830	
103	Jones Tract	Primary Zone	2038, 2039	
104	Kasson District	Secondary Zone	2085	

RISK ANALYSIS METHODOLOGY

Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
105	King Island	Primary Zone	2044	Unleveed, High Elevation
106	Kings Island	Primary Zone		
107	Libby McNeil	Primary Zone	369	
108	Liberty Island	Primary Zone	2093	Unleveed, Currently Flooded
109	Lisbon District	Primary Zone	307	
110	Little Egbert Tract	Primary Zone	2084	
111	Little Frank's Tract	Primary Zone		Unleveed, Currently Flooded
112	Little Mandeville Island	Primary Zone		Unleveed, Currently Flooded
113	Long Island	Primary Zone		In-Channel Island
114	Lower Roberts Island	Primary Zone	684	
115	Maintenance Area 9 North	Secondary Zone	0	
116	Maintenance Area 9 South	Secondary Zone	0	
117	Mandeville Island	Primary Zone	2027	
118	Mccormack-Williamson Tract	Primary Zone	2110	In design for restoration
119	McDonald Island	Primary Zone	2030	
120	Mcmullin Ranch	Secondary Zone	2075	
121	Medford Island	Primary Zone	2041	
122	Mein's Landing	Suisun		
123	Merritt Island	Primary Zone	150	
124	Middle & Upper Roberts Island	Primary Zone	524, 544	
125	Mildred Island	Primary Zone		Unleveed, Currently Flooded
126	Mossdale Island	Secondary Zone	2107	
127	Netherlands	Primary Zone	999	
128	New Hope Tract	Primary Zone	348	

RISK ANALYSIS METHODOLOGY

Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
129	North Stockton	Secondary Zone	2074, 1608	
130	Palm-Orwood Tract	Primary Zone	2024	
131	Paradise Junction	Secondary Zone	2095	
132	Pearson District	Primary Zone	551	
133	Pescadero District	Secondary Zone	2058	
134	Peters Pocket	Primary Zone	2104	
135	Pico-Naglee Tract	Secondary Zone	1007	
136	Prospect Island	Primary Zone	1667	
137	Quimby Island	Primary Zone	2090	
138	Randall Island	Primary Zone	755	
139	Reclamation District 17	Secondary Zone	17	
140	Rindge Tract	Primary Zone	2037	
141	Rio Blanco Tract	Secondary Zone	2114	
142	River Junction	Secondary Zone	2064	
143	Rough And Ready Island	Secondary Zone	403	
144	Ryer Island	Primary Zone	501	
145	Sherman Island	Primary Zone	341	
146	Shima Tract	Secondary Zone	2115	
147	Shin Kee Tract	Primary Zone		
148	Stark Tract	Primary Zone	2089	
149	Staten Island	Primary Zone	38	
150	Stewart Tract	Secondary Zone	2062	
151	Sunrise Club	Suisun	2135	
152	Sutter Island	Primary Zone	349	
153	Terminus Tract	Primary Zone	548	
154	Twitchell Island	Primary Zone	1601	
155	Tyler Island	Primary Zone	563	
156	Union Island East	Primary Zone	1	

RISK ANALYSIS METHODOLOGY

Table 3-1
DLIS Island and Tracts Inventory

Number	Name	Region	Reclamation District	Notes
157	Union Island West	Primary Zone	2	
158	Upper Andrus Island	Primary Zone	556	
159	Veale Tract	Primary Zone	2065	
160	Venice Island	Primary Zone	2023	
161	Victoria Island	Primary Zone	2040	
162	Walnut Grove	Primary Zone	554	
163	Walthall	Secondary Zone	2094	
164	Webb Tract	Primary Zone	2026	
165	West Sacramento	Secondary Zone	900	
166	Wetherbee Lake	Secondary Zone	2096	
167	Winter Island	Primary Zone	2122	
168	Woodward Island	Primary Zone	2072	
169	Wright-Elmwood Tract	Secondary Zone	2119	
170	Yolano	Primary Zone	2068	

Table Notes:

BALMD = Brannan-Andrus Levee Maintenance District

BIMID = Bethel Island Municipal Improvement District

RISK ANALYSIS METHODOLOGY

Table 3-2
Data Categories and Sources

Data Category/ Asset Type	Example	Data Source	Notes
Aviation	Air Strips	DWR	Edited 2012
Agriculture	Coverage and cropping patterns for Sacramento, San Joaquin, Yolo, and Solano counties	California Pesticide Regulation database	Provided by University of the Pacific, in support of DPC's Economic Sustainability Plan.
Agriculture	Coverage and cropping patterns for Contra Costa County	DWR County Land Use Files	This information was obtained for the Statewide Flood Management Planning Program (SFMP) in 2011.
Boundaries of Legal Delta: Primary and Secondary Zones		DWR as defined in CWC section 85058	Drawn by Mr. Joel Dudas on November 27, 2002. Secondary zone was drawn for Delta Vision in 2007 and modified / corrected in 2009.
Boundary and tracts / divisions of Suisun Marsh		DWR	Boundary digitized in 2012. Detail and divisions added based on personal communications with Suisun RCD staff (2014).
Commercial	Mines	DWR	2012
Conveyance	Intakes, Mokelumne Aqueduct	DWR	
Cultural resources	Legacy towns, historic places, landmarks, scenic highways	DWR	
Critical facilities and infrastructure	Hospitals, police stations, cell towers, air strips, fire stations, oil pipelines and gas fields, wastewater treatment plants, wells, transmission lines and towers, private schools, public schools	DWR	From a number of State agencies: Natural Resources Agency, State Board of Food and Agriculture, Office of the State Fire Marshall, California Energy Commission, State Water Resources Control Board; and federal agencies: U.S. Army Corps of Engineers (USACE), FEMA Hazus, and Federal Communications Commission.
Elevation		DWR	NAVD 88. Digital Elevation Model of the Sacramento-San Joaquin Delta and San Francisco Bay compiled by Wang and Ateljevich (DWR 2012a).

RISK ANALYSIS METHODOLOGY

Table 3-2
Data Categories and Sources

Data Category/ Asset Type	Example	Data Source	Notes
Evacuation Routes	Roads or levee crests that are used in evacuation	San Joaquin County (2005, 2013), Sacramento County (2006), and Contra Costa County (2015)	Reports or websites identify either maps of evacuation routes or descriptions of the routes. Information is not spatially correlated or available in the GIS to date.
Floodplain	FEMA 0.5% Annual exceedance probability (AEP) floodplain	DWR	Compilation of individual county FEMA digital flood insurance rate maps (DFIRMs), Alameda DFIRM not available. Compiled by DWR FESSRO June 2012. These were truncated to the boundary of the legal Delta, including primary and secondary zones.
Land use	All land use other than agricultural land (see agriculture above)	DWR, compiled from county land use data collected over a range of time	This information was obtained from DWR county land use files that were obtained for the SFMP in 2011.
Delta Levees	Centerlines and HMP / PL 84-99 status	DWR	Analysis of Delta Levees Compliance of HMP and PL 84-99 Design Geometry. Shapefile composed by FESSRO in 2011 to support 2012 Council memorandum.
Navigation	Ports, deepwater ship channel, and bounding levees	USACE ports database from National Waterway Network database.	Original source is the Bureau of Transportation Statistics National Transportation Atlas database.
Population		U.S. Census data 2010	.
Recreation	Marinas, parks, etc.	DWR, Delta Vision / DWR, California Resources Agency, aerial imagery and Delta boating websites	
Parcel Inventory	Residential, commercial parcels	Digital Map Products (DMP), April 2013.	DMP compiles the dataset from county assessor data. Residential and commercial parcels were divided based on the field "DataQuick's Standard Use Code."
Transportation	Railroads, Roads	DWR	
Utilities		DWR	

Table 3-3
Beneficiaries of the Delta Levees

Asset Category	Examples	Ownership/ Maintenance	Users/Beneficiaries		Governance		
			Direct	Indirect	Federal	State	Local
Public Resources							
Ecosystem	Species, habitat, corridors	Public Trust	Species	General Public, Commercial and sport fishing	USFWS, NMFS	CDFW	
Water Quality	Ecosystem, water supply	Public Trust	Beneficial uses: Water users Fishing, swimming, boating Waste dischargers Ecosystem	General public	USEPA	SWRCB Central Valley RWQCB	
Cultural Resources	Historic landmarks, legacy towns, scenic highways	Various	General public			Council, Caltrans, DPC, CA OHP	
Public Lands/Recreation	Parks, open space	Federal State Local	General public		NPS, USFWS	DPR, CDFW	Counties
Infrastructure Systems							
Surface Transportation, Public	Highways, roads	Federal State Local	General public		FHWA	Caltrans	County / local
Surface Transportation, Private	Railroads	Railroads	Railroads	Shippers / customers		CPUC	
Water Transportation	Navigation corridors	USACE	Ports	Shippers / customers		USACE	
Energy and Telecommunications	Pipelines, transmission, wells, storage, power plants, substations	Public Utilities Private Utilities	Utilities	Customers / ratepayers		DOE	CPUC, CEC
Water Supply	Conveyance, pipelines, intakes	Federal State Regional	Water contractors, water agencies	Customers / ratepayers		USBR	DWR

Asset Category	Examples	Ownership/ Maintenance	Users/Beneficiaries		Governance		
			Direct	Indirect	Federal	State	Local
Public Safety							
Population		RDs	General Public		FEMA, USACE	OES	RDs County / local
Public facilities	Police, fire, schools, hospitals, treatment plants	County/local	Public facility owners	General public		Council, DPC, OES	RDs County / local
Private property	Houses, commercial facilities, agricultural land	Property owners	Property owners			Council, DPC	RDs County / local

Table Notes:

CEC = California Energy Commission

CPUC = California Public Utilities Commission

DOE = Department of Energy

FHWA = Federal Highway Administration

NMFS = National Marine Fisheries Service

OES = California Office of Emergency Services

RWQCB = Regional Water Quality Control Board

SWRCB = State Water Resources Control Board

USEPA = U.S. Environmental Protection Agency

USFWS = U.S. Fish and Wildlife Service

4.0 LEVEE HAZARDS AND VULNERABILITIES

4.1 Introduction

This report section presents the general assumptions used in the DLIS analysis of levee hazards and vulnerabilities (Section 4.2), a summary of the natural hazards and human actions that threaten Delta levees (Section 4.3), an assessment of Delta levee vulnerability and performance (Section 4.4), the consequences of levee failure (Section 4.5), and an evaluation of changed future conditions that could affect levee hazards and vulnerabilities (Section 4.6). A discussion and analysis of the uncertainty and sensitivity associated with levee hazards and vulnerabilities is provided in Section 5.3. Assumptions and data gaps specific to each of these areas are generally addressed in each subsection.

An understanding of the levee hazards and vulnerabilities of the Delta levees and their role in providing acceptable protection to people and assets is necessary to evaluate risks within the Delta levee system and, subsequently, the consideration of appropriate investments to reduce that risk. The levee hazards and vulnerabilities evaluated by the DLIS project team include those associated with levees in general, as well as those hazards and vulnerabilities specific to Delta levees.

To conduct this evaluation, the project team gathered the best available existing data for levee hazards and vulnerabilities. The primary sources of existing data are studies completed by the DWR, the USACE, the DPC, the CVFPB, and the Delta RDs. The studies performed by these agencies were initiated for somewhat different purposes, but the study reports are valuable sources for data on levee conditions, history of levee performance, and catalogs of island assets that can be cross-checked from study to study. The study reports used as data sources for the analyses are listed in the references section (Section 7.0) and are cited throughout the text. The previous studies, selected national and international journal articles, conference proceedings, reference works, and academic research were reviewed to evaluate the current practice and alternative levee hazard and performance analysis methodologies.

4.2 General Assumptions

In Table 3-1, 170 distinct islands and tracts have been identified in the Delta and Suisun Marsh. Six of the islands or tracts are currently flooded, 144 are protected by one or more levees, and 24 have no levee protection. Among the 168 leveed and unprotected islands and tracts, 121 have populations ranging from a few people to more than 50,000, and 150 of these islands and tracts have physical assets, crops, or infrastructure (Appendix A).

Because of the large number of islands and tracts included in the analysis, a generalized analytical approach was taken. Furthermore, the level of detail in the information that is available for the islands and tracts varies considerably. Some islands and tracts have been studied in detail (DWR 2008b, 2012b; USACE 2013) while others have relatively little information available. The assumptions and generalizations that were applied to all islands and tracts when evaluating levee hazards and vulnerabilities include:

- Each island and tract is assumed to have a level interior elevation equal to the island or tract average interior elevation.

- All island or tract levee segments are assumed to have a crest elevation equal to the average levee crest elevation for the island or tract.
- The levee(s) are assumed to fail at the weakest levee among all levee segments protecting the island or tract.
- A levee failure is defined as a breach sufficiently large to inundate the entire island or tract.
- Should a levee breach occur, inundation depth is assumed to be the river stage causing a breach minus the island or tract average interior elevation and the entire island or tract is assumed to be inundated to that depth.
- For an island or tract without levee protection, flooding is assumed to occur when the river stage exceeds the island or tract average interior elevation.
- For an island or tract without levee protection that floods, inundation depth is assumed to be the river stage minus the island or tract average interior elevation and the entire island or tract is assumed to be inundated to that depth.
- The likelihood and consequence of island or tract flooding are based on annualized probabilities and consequences; therefore, the DLIS assumes that an island or tract can experience at most one flood event per year.
- The time of year that a flood occurs and the duration of flooding are generally not considered.
- The analysis of multiple island failures is based on the assumption that the islands survive or fail independently.

Island and tract interior elevations and levee crest elevations were determined from the available DWR survey and Light Detection and Ranging (LiDAR) data. When necessary, elevation data were converted to the North American Vertical Datum of 1988 (NAVD 88). All elevations in this report are referenced to NAVD 88.

4.3 Levee Hazards

4.3.1 Hazard Definition

A hazard is a condition or circumstance that has the potential to cause harm to people or damage to assets. Thus, a levee hazards analysis consists of identifying and evaluating the conditions and circumstances that have the potential to damage the Delta and Suisun Marsh levees. The identification phase of the analysis consists of cataloging the naturally occurring events and human actions that can lead to levee damage. The evaluation phase consists of estimating the relative importance of the events and actions to potential levee damage and determining if sufficient data exist to develop relationships between an event or action and the level of potential levee damage.

The process of identifying levee hazards begins with an understanding of levee failure mechanisms. Although levees may be damaged without breaching, the DLIS project is only concerned with breaching failures. Levee failures without breaching may have cleanup and repair costs, but breaching levee failures will be significantly more dangerous to human health and safety and much more costly.

An understanding of failure mechanisms leads to a search for natural events and human actions that can initiate one or more of the levee failure mechanisms. It is important to note that a given hazard may be able to initiate one or more failure mechanisms and some failure mechanisms can be initiated by several different hazard types. The most commonly reported levee failure mechanisms are listed in Table 4-1.

Table 4-1
Levee Failure Mechanisms

Category	Failure Mechanism
Geotechnical	Slope failure
	Foundation failure
	Subsidence, settling, cracking
Surface Degradation	Overtopping
	Erosion or other loss of levee prism
	Large woody vegetation
Hydraulic	Seepage
	Bottom heave
	Internal erosion and piping
	Liquefaction

Most failure mechanisms listed in Table 4-1 are common to levees in general. However, Delta levees are also vulnerable to seepage or destabilization due to subsidence (Mount and Twiss 2005). Geotechnical failure mechanisms are related to the strength and compressibility of the levee and levee foundation soils. Surface degradation failure mechanisms are a consequence of changes to levee geometry that may reduce freeboard or over-steepen levee slopes. Hydraulic failure mechanisms are related to the levee's fundamental purpose of keeping water from a protected area. This mechanism is of particular importance because many of the Delta and Suisun Marsh levees are "wet" levees that continuously keep water from the protected areas (which are generally below sea level) compared to "dry" levees that are built to keep water from protected areas only during a high river stage.

A comprehensive list of potential current and future Delta and Suisun Marsh levee hazards compiled by the DLIS team is provided in Table 4-2. Previous studies have focused on hydrologic/hydraulic, seismic, and wind hazards. However, it is important to consider all hazards to ascertain if their potential to cause levee failure is significant and can be incorporated into further analyses.

Table 4-2
Levee Hazards

Type	Source	Hazard
Natural Hazard	Hydrologic / Hydraulic	High volume inflow
		High flow velocity
		High head differential
		River morphology changes
		Rapid drawdown
	Climatic Change	Higher water level
		Greater head differential
	Wind	Wave run-up
		Storm surge
	Geologic / Geotechnical	Soft or organic soils below levee embankment
		Soft or organic soils on land side
		Earthquake
	Ecologic	Animal burrows
		Vegetation type or location
Human Action Hazard	Permanent or Periodic	Encroachments
		Channel dredging
		Deferred maintenance
		Upstream water management and storage
	Temporary	Boat and ship wakes
		Impact (ship, debris)
		Fires / footpaths / camping/ day use

Some of the levee hazards in Table 4-2 may lead to fundamental changes to another hazard. For example, climate change in the form of sea level rise represents a change in the hydraulic hazard. Other hazards can be a direct hazard or can be a contributing factor. For example, low strength soft or organic soils can lead to levee slope failure even in a “dry” levee, but soil strength is also a significant contributing factor to levee performance during an earthquake. It is essential that the interaction of hazard effects be considered to avoid double counting their impact on levee performance.

The potential relationships between levee hazards and levee failure mechanisms are illustrated in Table 4-3. In this table, the primary levee failure mechanism(s) are shown for each hazard; however, some

hazard-induced levee failure mechanisms can cause secondary failures. For example, earthquake inertial forces can cause a levee slope failure directly, or the levee slope failure may be a secondary consequence of liquefaction in the levee foundation soil.

Based on a review of the previous studies (DWR 2008b, 2012b; USACE 2013), the most significant current hazards to the Delta and Suisun Marsh levees are hydrologic, hydraulic, and seismic hazards. These are discussed in Sections 4.3.2, 4.3.3, and 4.3.4, respectively. Future hazards include changes to inflow caused by changing precipitation or snowmelt patterns in the Delta drainage basins, changes to upstream water management practice or capacity, changes to flow through the Delta due to potential sea level changes, and continued subsidence. Among the future hazard changes, only potential sea level changes are considered in the DLIS analyses. The other future hazard changes are considered to be too unpredictable to provide a meaningful estimate of levee response to changed conditions.

Table 4-3
Levee Hazards and Levee Failure Mechanisms Matrix

Type	Source	Hazard	Levee Failure Mechanism								
			Geotechnical			Surface Degradation		Hydraulic			
			Slope Failure	Foundation Failure	Subsidence or Settling	Overtopping	Erosion or Other Loss of Levee Prism	Seepage	Bottom Heave	Internal Erosion and Piping	Liquefaction
Natural Hazards	Hydrologic / Hydraulic	High volume inflow	✓			✓	✓	✓	✓	✓	
		High flow velocities	✓				✓				
		River morphology					✓				
		High head differential						✓	✓	✓	
		Rapid drawdown	✓								
	Climatic	High water level	✓			✓	✓	✓	✓	✓	
		High head differential						✓	✓	✓	
	Wind	Wave run-up				✓	✓				
		Storm surge				✓	✓				

Table 4-3
Levee Hazards and Levee Failure Mechanisms Matrix

Type	Source	Hazard	Levee Failure Mechanism								
			Geotechnical			Surface Degradation		Hydraulic			
			Slope Failure	Foundation Failure	Subsidence or Settling	Overtopping	Erosion or Other Loss of Levee Prism	Seepage	Bottom Heave	Internal Erosion and Piping	Liquefaction
Geologic / Geotechnical		Soft or organic soils below levee embankment	✓		✓						
		Soft or organic soils on landside	✓		✓						
		Earthquake	✓	✓	✓						✓
	Ecologic	Animal burrows						✓		✓	
		Vegetation type or location					✓	✓		✓	
		Encroachments					✓	✓		✓	
Human Action Hazards	Permanent or Periodic	Channel dredging	✓				✓	✓			
		Deferred maintenance	✓				✓				
		Upstream water management and storage				✓		✓	✓	✓	
		Boat and ship wakes					✓				
	Temporary	Impact (ship, debris)					✓				
		Fires / footpaths / camping/ day use					✓				

4.3.2 Hydrologic Hazards

The hydrologic hazards to the Delta and Suisun Marsh levees are related to the volume of water flowing into and out of the Delta. Inflow is the sum of the flows from the rivers and streams that flow into the Delta, and outflow is tempered by the tidal cycle at the western end of the Delta and by water exports and in-Delta water uses. Increased inflow and higher tide levels result in higher water levels in the Delta and Suisun Marsh and greater hydraulic pressure on the Delta and Suisun Marsh levees. Water exports and in-Delta water uses will tend to reduce water levels and hydraulic pressure on the Delta and Suisun Marsh levees.

4.3.2.1 Total Delta Inflow

Hydrologic hazards due to stream flows are typically analyzed using the statistical method outlined in U.S. Geological Survey (USGS) Bulletin 17B of the Hydrology Subcommittee (USGS 1982). The USGS method is used to develop a discharge-recurrence curve based on the historical record of annual extreme flow rates in a river. A discharge-recurrence curve relates extreme or peak flow rate (volume/time) to annual probability of exceedance or return period. This method was used in the DRMS (DWR 2008a). The DRMS discharge-recurrence curve was adopted by the USACE for its Delta islands and levees feasibility study (USACE 2013).

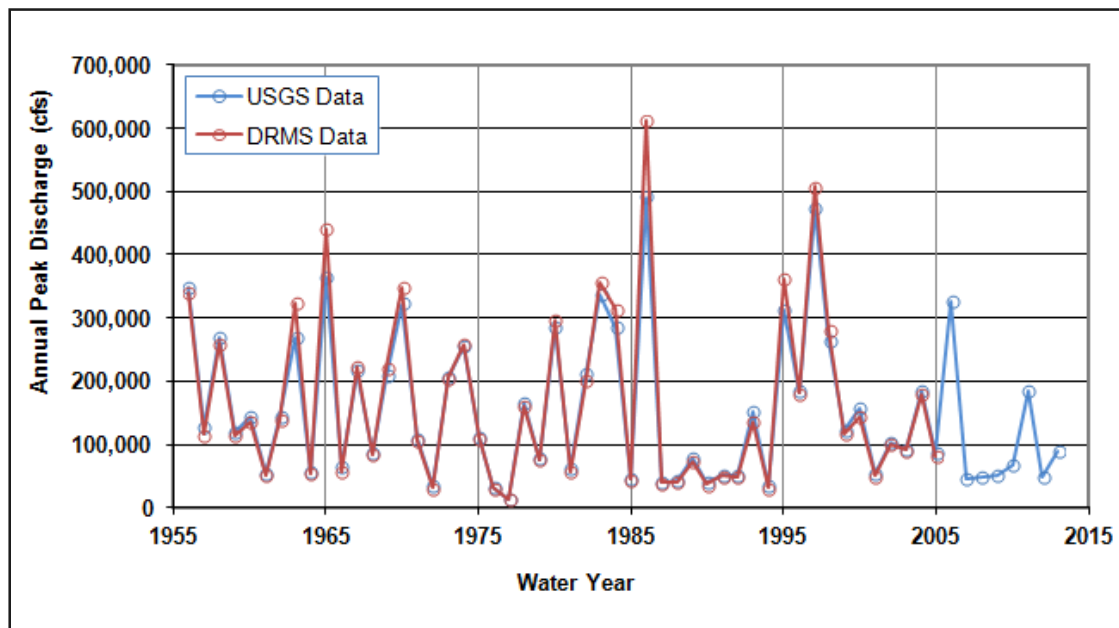
The data used to develop a discharge-recurrence curve are generally the annual peak flow rates for a single river for the period of record. In the case of the Delta, two major rivers, the Sacramento and San Joaquin, and several smaller rivers and streams contribute to total Delta inflow. The approach used in the DRMS to calculate the peak annual inflow was to determine the date of the peak annual inflow from the Sacramento River and sum the Delta inflows from all rivers and streams for that date. Although all of the rivers and streams flowing into the Delta may not have peak annual flow rates at exactly the same time, all of these rivers and streams have similar climate and weather influences and will likely have peak annual flow rates at or near the same time. Furthermore, the inflow to the Delta from the Sacramento River, Yolo Bypass, and San Joaquin River represents, on average, 90 percent of the total Delta peak inflow for the 50-year period (water years 1956 to 2005) analyzed in the DRMS study (DWR 2008b). Thus, variations in the peak inflow times at the smaller inflow sources will not have a substantive effect on the analytical results.

Revised historical data and an additional eight years of peak annual flow data have been made available by the USGS since the completion of the DRMS study. The newer data from the Sacramento and San Joaquin river gauges were analyzed to determine if the newer data would substantially change the conclusions reached in the DRMS study.

The newer USGS data (USGS 2014a) for the Sacramento, San Joaquin, Mokelumne, and Cosumnes rivers and Yolo Bypass were plotted versus water year along with the data used in the DRMS study to compare datasets. For example, graphs of peak annual discharge for the Sacramento River plus Yolo Bypass are shown on Figure 4-1. The differences between the DRMS dataset and the currently available USGS dataset are likely due to revisions made by the USGS since the DRMS study was completed. Similar differences were noted in the comparisons of DRMS data and current USGS data for the San Joaquin, Mokelumne, and Cosumnes rivers.

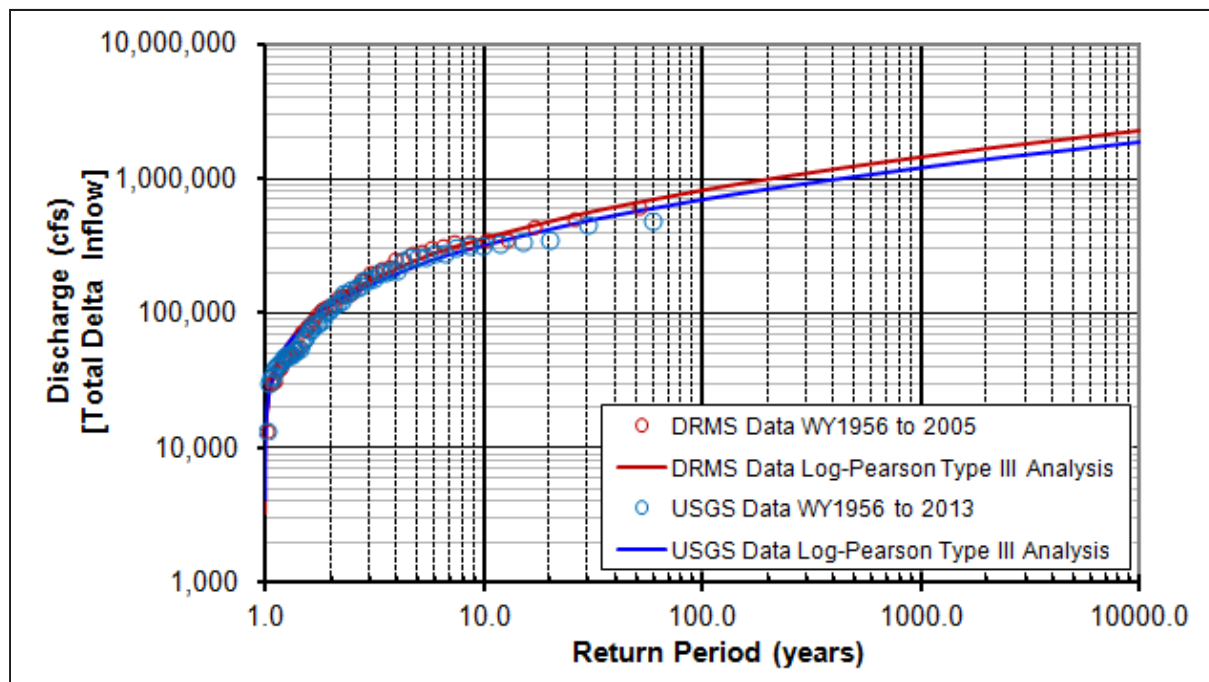
The 1956 to 2013 Sacramento River plus Yolo Bypass data were analyzed using the USGS Bulletin 17B method to determine if the data revisions and new data could significantly change the discharge-recurrence curve. The results of the analysis are shown on Figure 4-2. The discharge-recurrence curve developed from the USGS data revisions and new data generally predict lower flows than the discharge-recurrence curve presented in the DRMS study. For example, the predicted flow rate for a 100-year return period using the DRMS result is about 820,000 cubic feet per second (cfs) whereas the predicted flow rate for the same return period using the revised and new USGS data is about 701,000 cfs.

Figure 4-1
Peak Annual Discharge Sacramento River – Yolo Bypass



(Source: USGS 2014a; DWR 2008b)

Figure 4-2
Discharge-Recurrence Sacramento River – Yolo Bypass



Considering that peak annual inflow to the Delta is the sum of the flow of all rivers and streams into the Delta, not just the Sacramento and San Joaquin rivers, and the similarity of the comparison between new and old inflow data described above, the project team concluded that the newer data did not substantially change the discharge-recurrence curve as presented in the DRMS report. Consequently, subsequent levee risk analyses completed by the DLIS team have used the discharge-recurrence curve presented in the DRMS report (DWR 2008b).

4.3.2.2 Tidal Influence on Delta Flows

Tidal fluctuations in the Delta and Suisun Marsh have a strong influence on water elevations and flows throughout the Delta and Suisun Marsh. The results presented in the DRMS study are based on readings from the San Francisco tide station (National Oceanic and Atmospheric Administration [NOAA] Station 9414290) with a range of approximately 3.8 to 9.2 feet (NAVD 88); these tide data have been used to calculate stage-recurrence curves for the Delta and Suisun Marsh.

4.3.3 Hydraulic Hazards

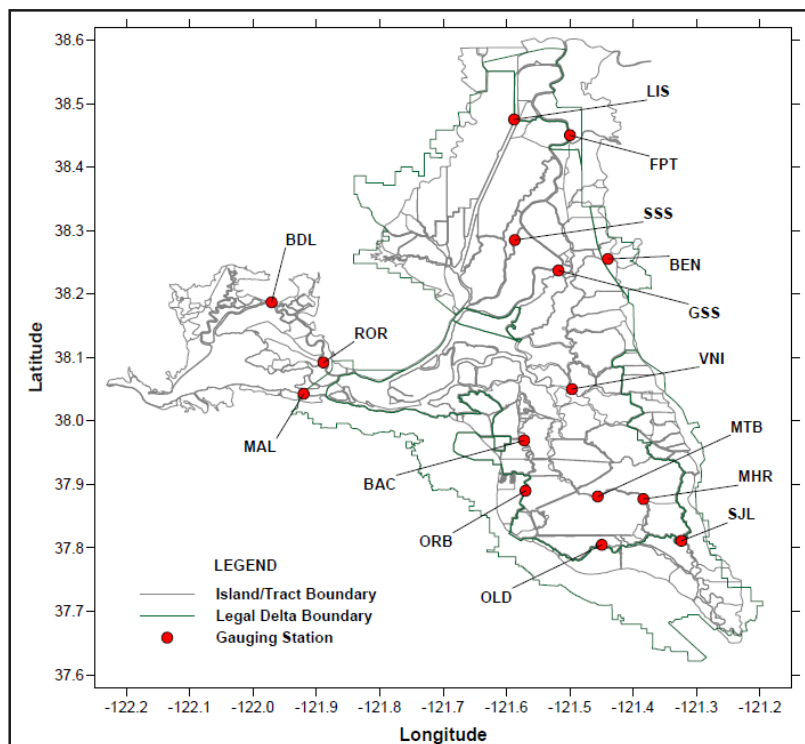
Levees are hydraulic structures built to keep water from inundating people, assets, and property. Levees are generally intended to function up to a certain water level; but, depending on age and maintenance history, can fail during extreme, or even normal, water level loads. Levee hydraulic hazards are generally proportional to the surface elevation of the body of water retained by the levee relative to the elevation of the ground protected by the levee. In addition, many of the Delta and Suisun Marsh levees are “wet”

levees that are under continuous hydraulic pressure because the ground elevation on the land side of the levee is almost always less than the elevation of the body of water.

Levee hydraulic hazard is typically expressed as a stage-recurrence curve that relates water elevation (stage) to annual probability of exceedance, or return period. A stage-recurrence curve for a specific location depends on the volume rate of flow, the hydraulic flow characteristics of the water channel at that location, and the magnitude of the tidal influence. A stage-recurrence curve can be developed from a discharge-recurrence curve and the hydraulic flow characteristics at the location of interest, or from direct stage measurements obtained over several years.

For the levee risk analysis undertaken in the DLIS study, the stage-recurrence equations presented in the DRMS study (DWR 2008b) have been extended to develop stage-recurrence curves for each Delta and Suisun Marsh island and tract in the DLIS project. The DRMS investigators used a simplified model of channel hydraulic characteristics and multiple regression methods to develop equations that relate Delta inflow and tide level to water level at 15 gauging stations in the Delta (Figure 4-3 and Table 4-4).

Figure 4-3
Gauging Stations



(Source: DWR 2008b)

Table 4-4
Gauging Station Names

Station Identifier	Station Name	Station Identifier	Station Name
BAC	Bacon Island at Old River	MTB	Middle River at Tracy Blvd.
BDL	Beldon Landing	OLD	Old River near Tracy
BEN	Benson's Ferry	ORB	Old River at Byron
FPT	Sacramento River at Freeport	ROR	Roaring River
GSS	Georgiana Slough at Sac River	SJL	San Joaquin R btw Old R near Lathrop
LIS	Yolo Bypass at Lisbon	SSS	Steamboat Slough
MAL	Sacramento River at Mallard Island	VNI	Venice Island
MHR	Middle River at Howard Road Bridge		

The stage-recurrence equations are listed below. Equation 4-1 applies to the Lisbon (LIS) and Freeport (FPT) stations and Equation 4-2 applies to all other stations. Equation coefficients “a” through “g” developed by the DRMS investigators are shown in Table 4-5.

$$WSE_i = aT + b(QS_{Sac})^{0.67} + c(QY_{Yolo})^{0.67} + d(QS_J)^{0.67} + e(QC_{Cos})^{0.67} + f(QM_{Mok})^{0.67} + g(Qm_{misc})^{0.67} \quad (\text{Equation 4-1})$$

$$WSE_i = aT + b(QS_{Sac} + QY_{Yolo})^{0.67} + d(QS_J)^{0.67} + e(QC_{Cos})^{0.67} + f(QM_{Mok})^{0.67} + g(Qm_{misc})^{0.67} \quad (\text{Equation 4-2})$$

where:

WSE _i	= water-surface elevation at station “i”
T	= Golden Gate maximum daily tide elevation
QS _{Sac}	= Sacramento River inflow
QY _{Yolo}	= Yolo Bypass inflow
QS _J	= San Joaquin River inflow
QC _{Cos}	= Cosumnes River inflow
QM _{Mok}	= Mokelumne River inflow
Q _{misc}	= miscellaneous inflow

Table 4-5
Estimated Coefficients "a" through "g" in Equations 4-1 and 4-2

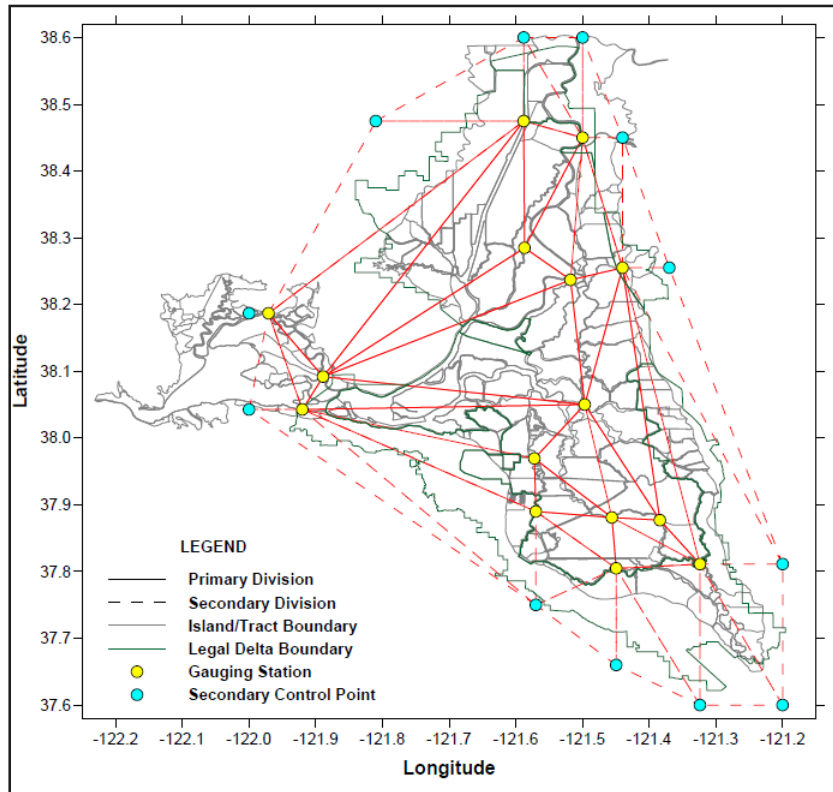
Station ID	a	b	c	d	e	f	g
	Tide	(Sac)	(Yolo)	(Sjr)	(Csmr)	(Moke)	(Misc)
MAL	0.91	0.000247	NA	0.000363	0.000385	0.000000	0.000000
BDL	1.00	0.000123	NA	0.000696	0.000566	0.000000	0.000102
ROR	0.94	0.000302	NA	0.000148	0.000337	0.000000	0.000001
BEN	0.38	0.002020	0.000047	0.000750	0.013245	0.010418	0.006022
GSS	0.34	0.005067	0.000201	0.000000	0.000000	0.007334	0.000000
FPT	0.00	0.009705	0.000520	0.000000	0.001266	0.001466	0.000660
SSS	0.19	0.006071	0.000162	0.000003	0.000368	0.003880	0.000000
LIS	0.67	0.004997	0.001708	0.002487	0.000000	0.000000	0.000000
MHR	0.88	0.000431	NA	0.002279	0.002543	0.000000	0.000000
MTB	0.90	0.000312	NA	0.001652	0.001220	0.000000	0.000000
OLD	0.81	0.000294	NA	0.002717	0.002480	0.000000	0.000000
BAC	1.00	0.000306	NA	0.000113	0.003236	0.000000	0.000000
ORB	0.79	0.000531	NA	0.001602	0.002982	0.001474	0.000000
SJL	0.77	0.000181	NA	0.009743	0.001596	0.000000	0.000000
VNI	0.97	0.000387	NA	0.000925	0.000328	0.000000	0.000000

In the DRMS report, linear interpolation was used to estimate water levels at locations between gauging stations. Given the relatively small elevation change between each of the gauging stations and the approximations used in the DRMS analysis, the linear interpolation concept can be extended to planar interpolation so that the DRMS equations can be used to develop a stage-recurrence curve for any location in the Delta or Suisun Marsh.

The planar interpolation employed to develop a stage-recurrence curve consisted of dividing the Delta and Suisun Marsh area into triangles based on the locations of the 15 gauging stations used in the multiple regression analysis described in the previous paragraphs. The division of the Delta and Suisun Marsh area into triangular areas is illustrated on Figure 4-4. For each triangular area, a variable plane equation was derived from the equations at the triangle vertices. A stage recurrence curve was then developed by calculating a water level for a range of tide levels and total Delta inflows, and, because each inflow has a return period, the calculated water level can be related to return period.

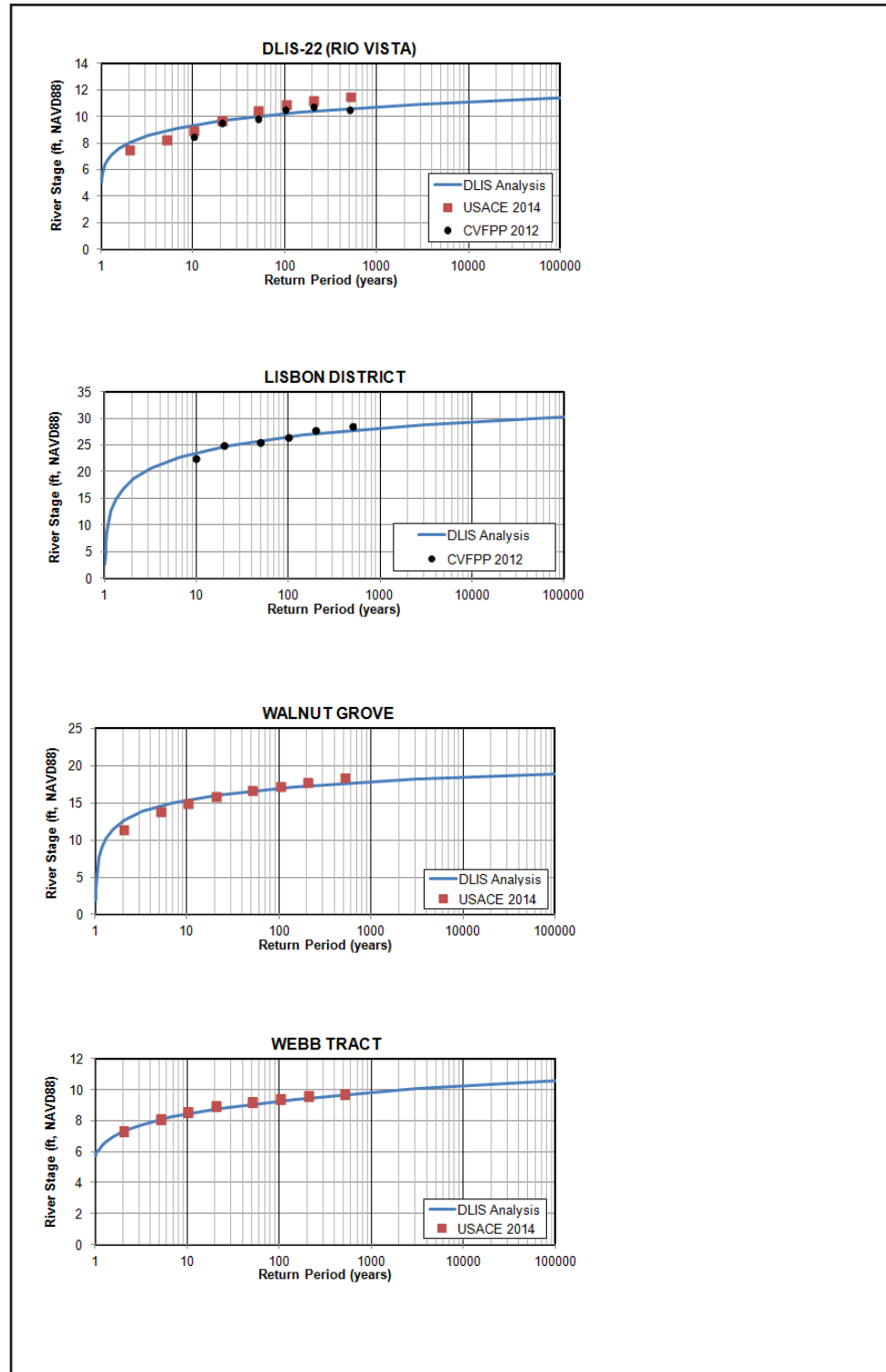
Stage-recurrence curves can be developed for any assumed tide level. An average maximum daily Golden Gate tide level was used to develop the curves prepared for the DLIS project and for baseline risk calculations.

Figure 4-4
Triangular Division for Planar Interpolation



To evaluate the effectiveness of the planar interpolation method, stage-recurrence curves developed by this method were compared to stage-recurrence curves developed in previous studies. Three stage-recurrence curves presented in the USACE study (USACE 2013) and two stage recurrence curves presented in the CVFPP (DWR 2012a) from locations in the Delta are shown on Figure 4-5 along with stage-recurrence curves developed with the planar interpolation method. At these locations, there is good agreement among the different methods used to develop stage recurrence curves. Nevertheless, the triangle method of interpolating river stage has limitations, especially near the Delta and Suisun Marsh boundaries. Consequently, stage-recurrence curves have been adjusted at locations for which the interpolation overestimates or underestimates river stage. These adjustments were based on observed river stage data from the California Data Exchange Center (DWR 2014).

Figure 4-5
Stage-Recurrence Comparisons



4.3.3.1 Tide Effects in the Delta and Suisun Marsh

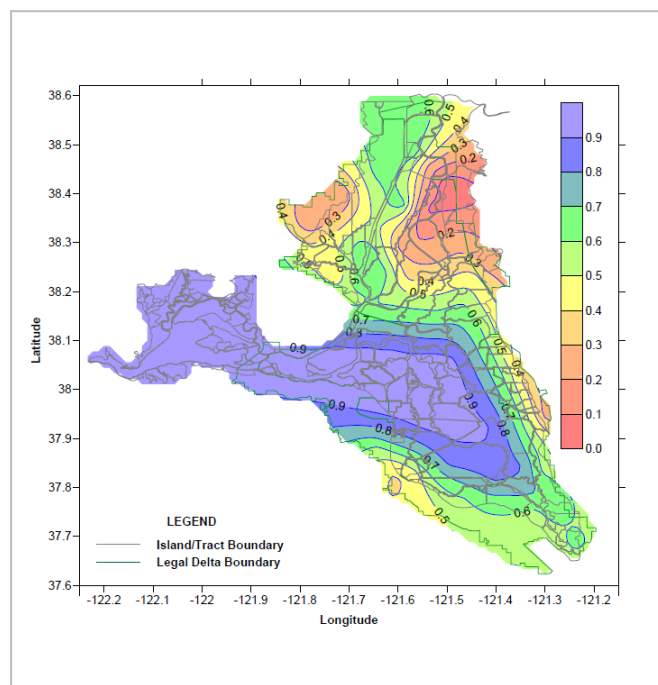
The tidal component of the DRMS multiple regression equations is a factored daily maximum tide level at Golden Gate that is added to the water level determined from total Delta inflows (see term aT in Equations 4-1 and 4-2). The DRMS investigators derived tide factors (see Table 4-5) for each of the 15 gauging stations. The tide factor is related to channel hydraulic characteristics and distance from the west Delta and varies from 1.00 in Suisun Marsh to 0.00 in the north Delta.

The planar interpolation concept used for calculating stage-recurrence curves was also applied to estimating the tide factor. The division of the Delta into triangular areas (see Figure 4-4) was used to estimate tide factors at any location in the Delta. Because of the strong tidal influence (NOAA 2014; also see tide factor for Lisbon gauging station in Table 4-5) in the Sacramento River Deep Water Ship Channel (SRDWSC) and lack of a sufficient number of gauging stations west of the SRDWSC, it was necessary to use engineering judgment to adjust the planar interpolation of tide factors at 14 islands and tracts in the north Delta. A contour map of estimated tide factors is presented on Figure 4-6, and the 14 adjusted tide factors are shown in Table 4-6. The contours were calculated from adjusted and unadjusted tide factors.

Table 4-6
Adjusted Tide Factors

Name	Adjusted Tide Factor	Name	Adjusted Tide Factor
Cache Haas Area	0.44	Little Egbert Tract	0.65
DLIS-20 (Yolo Bypass)	0.65	Netherlands	0.65
DLIS-21	0.20	Peters Pocket	0.44
Egbert Tract	0.44	Prospect Island	0.65
Glide District	0.65	Ryer Island	0.65
Hastings Tract	0.44	West Sacramento	0.65
Liberty Island	0.65	Yolano	0.20

The tide cycle creates daily and seasonal variations in the Delta and Suisun Marsh water levels that, to varying degrees, mimic the daily and seasonal tide cycles at Golden Gate. The degree to which Delta and Suisun Marsh water levels mimic Golden Gate tide cycles depends on the location within the Delta or Suisun Marsh. Water levels at islands and tracts in Suisun Marsh and the western Delta islands, near relatively large bodies of open water, have daily and seasonal variations that are essentially equal to local tide cycles. Water level cycles at islands and tracts farther inland and upstream from the open bodies of water are muted in approximate proportion to their distance from an open body of water.

Figure 4-6 Tide Factor Contours

In the DRMS study (DWR 2009b), a simplified model of channel hydraulic characteristics and multiple regression methods were used to develop equations that relate Delta inflow and tide level to water level at 15 gauging stations in the Delta. Among the regression coefficients in this analysis is a tide factor that defines the effect of tide level at Golden Gate on water level at each gauging station. For example, a tide level of 5 feet at Golden Gate would contribute 4.55 feet (5×0.91) to the water level at the Sacramento River at the Mallard Island (MAL) gauging station. The tide factors from the DRMS analysis are shown in Table 4-5 and locations of the gauging stations used in its analysis are shown on Figure 4-3.

A contour map generated by the DLIS team that shows the general distribution of the estimated tide factors is presented on Figure 4-6. The contours were developed from the individual island and tract tide factors and provide a general indication of the influence of tide throughout the Delta and Suisun Marsh.

The distribution of sea level change effects in the Delta and Suisun Marsh will follow a pattern similar to that shown on Figure 4-6. The source and uncertainty of future sea level predictions are discussed later in this report. The increase in water level at any location in the Delta and Suisun Marsh due to an increase in mean sea level at Golden Gate will be approximately equal to the mean sea level increase near Carquinez Strait multiplied by the value shown on the contour map at that location. For example, a mean sea level rise of 1 foot at Golden Gate would create a water level rise of 0.2 to 0.3 foot at Walnut Grove. Similar calculations are performed for all islands and tracts for the DLIS analyses of 2030 and 2050 conditions.

4.3.3.2 Underseepage

Some islands and tracts in the Delta (e.g., Franks Tract) were abandoned after levee failures. Consequently, levees on adjacent islands now face much larger bodies of water than the rivers and sloughs that once ran between the abandoned island and remaining islands. The increased wind fetch across the new larger water body will likely exacerbate the threat of erosion on the water side levees of these adjacent islands. In addition, anecdotal evidence suggests that the presence of the large bodies of water has increased underseepage on some of the remaining islands. This section focuses on the issue of increased underseepage on adjacent islands following levee failure.

There are at least two plausible explanations for increased underseepage in these circumstances. The first is that the larger body of water adjacent to the remaining islands may alter the groundwater flow pattern sufficiently to increase underseepage. The second is that a permeable zone of soil or peat that was not open to the river or slough before the island was abandoned is now open to the large body of water, providing a new seepage path.

The DLIS project team completed seepage analyses of these two scenarios using a fluid flow model to estimate the magnitude of the potential increase in underseepage. The analyses were done on generic cross-sections rather than specific locations in the Delta because the intent of the analysis is to assess the plausibility of the explanations rather than evaluate a reported case of increased underseepage. The two-dimensional, finite element software program Seep/W 2012 (Geo-Slope International 2012) was used for the analysis. Seep/W is designed for the analysis of transient and steady-state, saturated, and unsaturated fluid flow through porous materials such as soil and peat.

Underseepage Modeling Approach (Scenario 1)

Scenario 1 consists of a continuous, permeable foundation layer and was modeled as shown on Figures 4-7 through 4-10. Figures 4-7 and 4-8 show conditions before the right bank levee failed and Figures 4-9 and 4-10 show conditions after the levee failed. Steady-state analyses were completed for the before-failure and after-failure conditions to assess the change in underseepage due to the failure.

To assess the effect of variable water levels on underseepage, the analyses were completed with "normal," "flood," and crest elevation water levels. Normal water level is assumed to be representative of typical water levels in the river or slough, generally 5 to 10 feet below levee crest. Flood level for these analyses was assumed to be approximately half way between normal level and the levee crest.

Figure 4-7
Scenario 1, Before Failure, Full Model

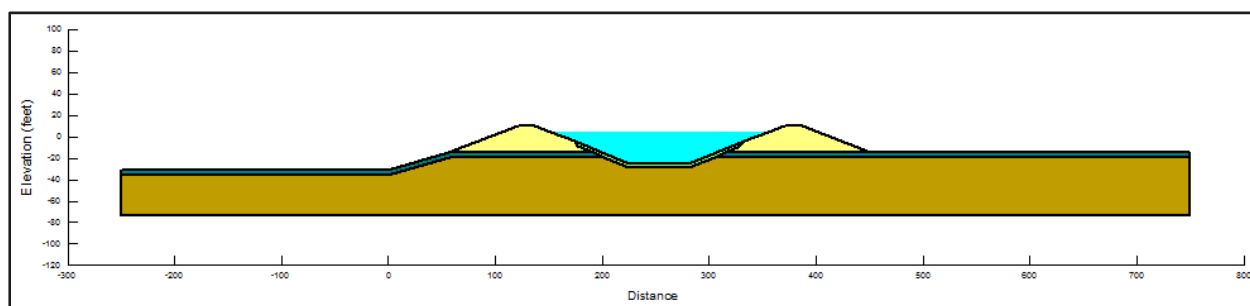


Figure 4-8
Scenario 1, Before Failure, Model Detail

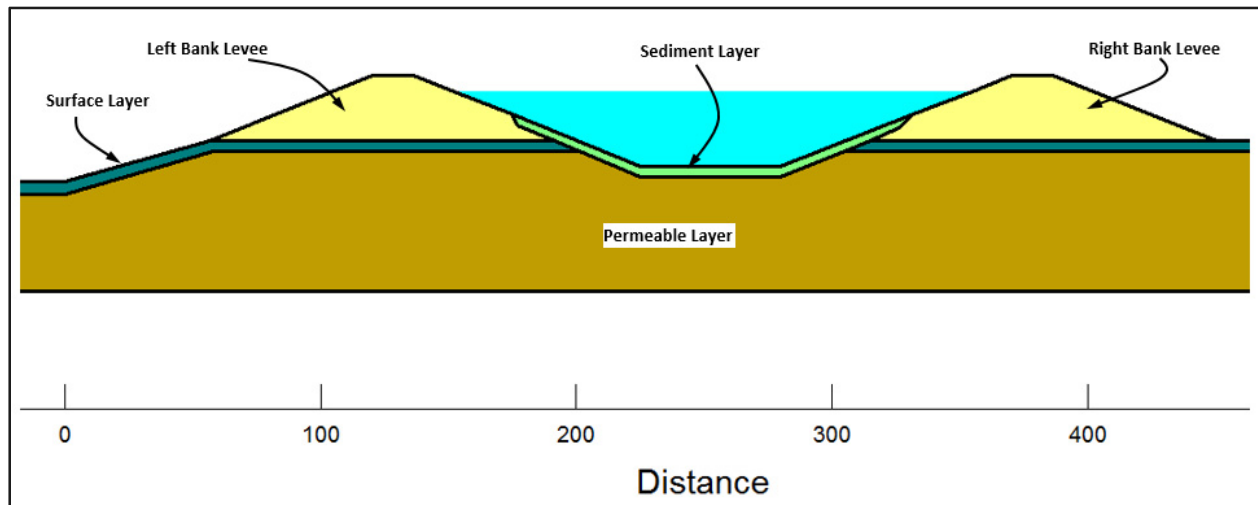


Figure 4-9
Scenario 1, After Failure, Full Model

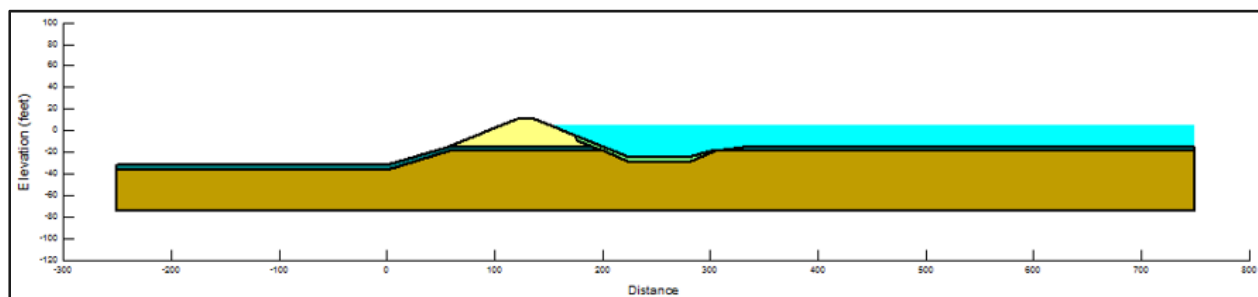
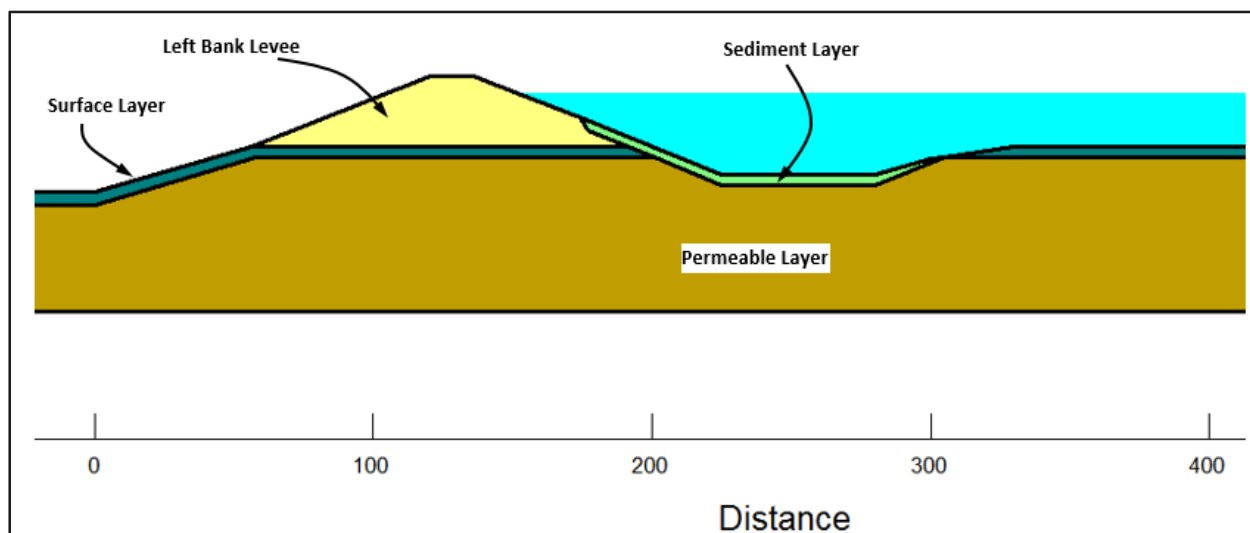


Figure 4-10
Scenario 1, After Failure, Model Detail



In Scenario 1, the permeable foundation layer (brown zone on Figures 4-7 to 4-10) is assumed to extend continuously across the site and underseepage may occur beneath the left and right bank levees before the right bank levee fails. Note that the ground surface elevation on the land side of the left bank levee is below the elevation of the river or slough, similar to many subsided islands in the Delta. This condition was included in the model because island subsidence can result in greater seepage forces. The presence of the sediment layer at the bottom of the river or slough is based on DRMS studies (DWR 2008c). The land surface layer is a slightly less porous material representing an arable layer (i.e., used for growing crops). The levee and foundation materials used in this scenario are identified on Figure 4-8, and material properties used in the numerical modeling of Scenario 1 are presented in Table 4-7. Material properties were obtained from the DRMS data (DWR 2008c).

Table 4-7
Scenario 1 Material Properties

	Permeability		Volumetric Water Content
	centimeters/second	feet/second	--
Levee Fill	1.0E-04	3.3E-06	0.25
Permeable Layer	1.0E-04	3.3E-06	0.20
Sediment Layer	1.0E-05	3.3E-07	0.25
Surface Soil	1.0E-04	3.3E-06	0.25

The after-failure condition of this scenario was modeled by removing the right bank levee and a portion of the sediment layer along the right bank. Water levels were extended to the right boundary of the model to represent the large body of water created by the levee failure (see Figures 4-9 and 4-10). As with the before-failure condition, the after-failure condition was analyzed using normal, flood, and crest elevation water levels.

Underseepage Modeling Approach (Scenario 2)

The geometry of Scenario 2 is similar to the geometry of Scenario 1, but with a permeable layer that is only open to surface water in the after-failure condition. Figures 4-11 and 4-12 show this scenario in the before-failure condition and Figures 4-13 and 4-14 show the scenario in the after-failure condition. The permeable layer is bordered by a less permeable material (Soil 2, gray zones on Figures 4-11 to 4-14).

Figure 4-11
Scenario 2, Before Failure, Full Model

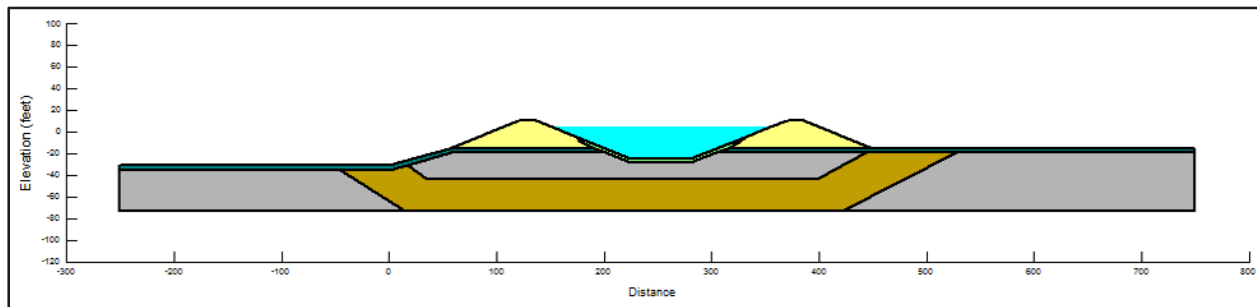


Figure 4-12
Scenario 2, Before Failure, Model Detail

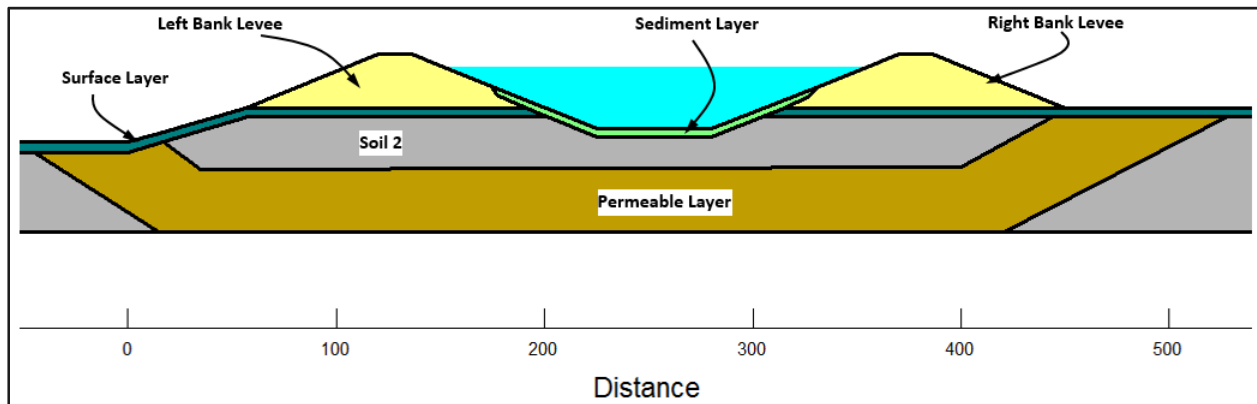


Figure 4-13
Scenario 2, After Failure, Full Model

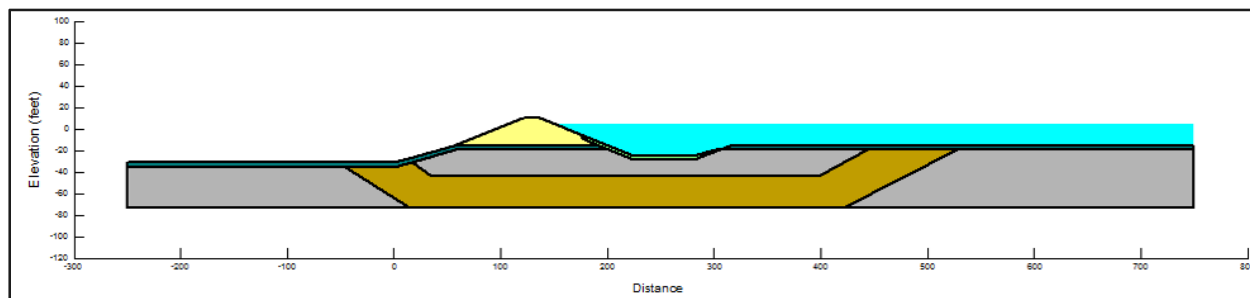
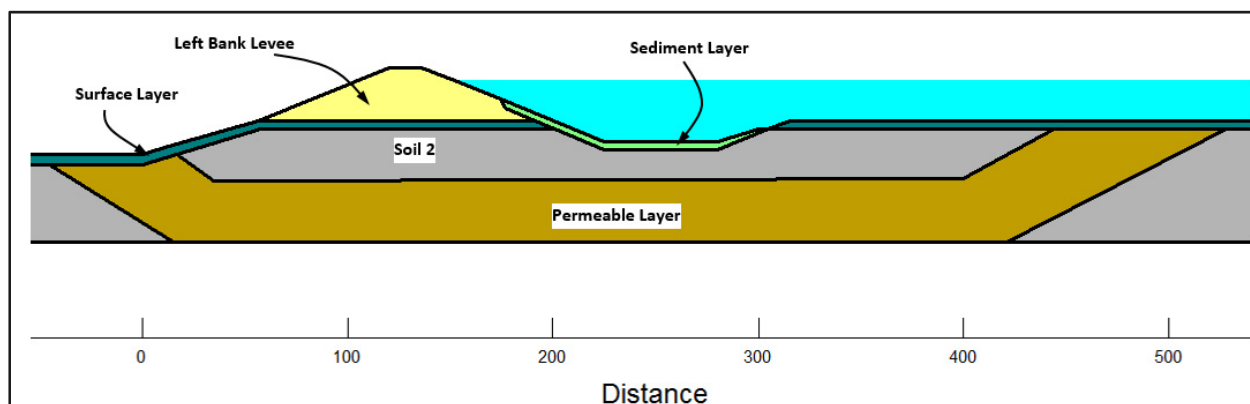


Figure 4-14
Scenario 2, After Failure, Model Detail



Material properties used in the numerical modeling of Scenario 2 are presented in Table 4-8. With the exception of Soil 2, the material properties in Scenario 2 are the same as were used in Scenario 1 and were obtained from the DRMS studies (DWR 2008c).

Table 4-8
Scenario 2 Material Properties

	Permeability		Volumetric Water Content
	centimeters/second	feet/second	--
Levee Fill	1.0E-04	3.3E-06	0.25
Permeable Layer	1.0E-04	3.3E-06	0.20
Soil 2	3.0E-05	1.0E-06	0.25
Sediment Layer	1.0E-05	3.3E-07	0.25
Surface Soil	1.0E-04	3.3E-06	0.25

The configuration of the permeable layer was chosen subjectively to assess the plausibility of Scenario 2. It does not reflect any known conditions in the Delta; however, if similar conditions were found to exist in the Delta, this analysis would be applicable. The Scenario 2 before- and after-failure conditions were analyzed with normal, flood, and crest elevation water levels as described above for Scenario 1.

Underseepage Modeling Results

The two results from the Seep/W analysis of most interest are the volume rate of groundwater flow (flux) through the permeable layer beneath the left bank levee and the exit gradient at or near the land side toe of the left bank levee.

Volume Rate of Flow

Volume rate of flow is a measure of the quantity and rate of seepage beneath the levee. A substantial increase in the volume rate of flow because of adjacent island levee failure would imply that additional drainage and pumping may be required to maintain existing groundwater levels on the land side of the remaining levee.

The volume rates of flow through the permeable layer from the Scenario 1 analyses are shown in Table 4-9. The flow rate was measured in the permeable layer at the centerline of the left bank levee.

Table 4-9
Scenario 1 Volume Rate of Flow

Water Level	Cubic Feet per Second		Gallons per Day		Percent Change
	Before Failure	After Failure	Before Failure	After Failure	
Normal	8.5E-05	1.0E-04	55	65	18%
Flood	1.1E-04	1.4E-04	74	91	23%
Crest	1.4E-04	1.8E-04	91	115	26%

Assuming that underseepage translates directly to an increase in drainage and pumping requirements, an island with subsurface conditions similar to that modeled in Scenario 1 could have an increase of about 18 percent in drainage and pumping requirements along the levee now exposed to a larger body of water. Transient drainage and pumping requirements due to higher than normal water levels could be as much as 26 percent greater than normal requirements.

Volume rates of flow for Scenario 2 are presented in Table 4-10. In this scenario, flow occurs in the permeable layer as well as the less permeable layer (Soil 2) in the before-failure condition as well as in the after-failure condition. In the before-failure condition, groundwater flows to the permeable layer from the river or slough through the sediment layer and the Soil 2 layer. In the after-failure condition, water can flow directly into the permeable layer. As with Scenario 1, flow rates were measured at the centerline of the left bank levee.

Table 4-10
Scenario 2 Volume Rate of Flow

	Water Level	Cubic Feet per Second		Gallons per Day		Percent Change
		Before Failure	After Failure	Before Failure	After Failure	
Permeable Layer	Normal	5.7E-06	6.1E-06	3.7	3.9	7%
	Flood	7.8E-06	9.5E-06	5.0	6.2	22%
	Crest	1.1E-05	1.2E-05	6.8	7.4	10%
Soil 2	Normal	1.8E-06	1.8E-06	1.2	1.2	2%
	Flood	2.7E-06	2.8E-06	1.7	1.8	3%
	Crest	3.5E-06	3.6E-06	2.3	2.4	4%

Again, assuming that underseepage translates directly to an increase in drainage and pumping requirements, an island with subsurface conditions similar to that modeled in Scenario 2 could have an increase of about 7 percent in drainage and pumping requirements along the levee now exposed to a larger body of water. Transient drainage and pumping requirements due to higher water levels could be as much as 22 percent greater than static drainage and pumping requirements at normal water levels.

The volume rates of flow for Scenarios 1 and 2 were computed using a steady-state analytical method. Because the flood and crest elevation water levels are transient conditions, the higher water levels may not exist long enough to reach a steady state of flow through the levee and foundation materials. Thus, the volume rates of flow for flood and crest elevation water levels may be less than those shown in Tables 4-9 and 4-10. The volume rates of flow will return to normal rates when the flood or crest elevation water levels return to normal levels.

Exit Gradient

The exit gradient is the vertical hydraulic gradient at or near the ground surface and is generally greatest at or near the land side toe of a levee. The exit gradient is of interest because steeper exit gradients are correlated with greater potential for seepage problems and sand boils. Steep and continuous exit gradients can lead to internal erosion and, potentially, levee failure. Table 4-11 from the USACE's Technical Letter No. 1110-2-569 (USACE 2005) shows the variation in consequences of a range of exit gradients. An exit gradient of 1 is defined as the critical exit gradient because, at that gradient, the upward fluid (water) force on the material (soil) is equal to the submerged weight of the material, creating a buoyant condition and the potential for soil piping.

Table 4-11
Exit Gradient vs. Seepage Condition

Exit Gradient, i	Seepage Condition
0 to 0.5	Light/no seepage
0.2 to 0.6	Medium seepage
0.4 to 0.7	Heavy seepage
0.5 to 0.8	Sand boils

Exit gradients for Scenarios 1 and 2, before and after failure, are shown on Figures 4-15 through 4-18. These figures show plots of exit gradient versus horizontal distance for normal, flood, and crest elevation water levels. The exit gradients were calculated at a depth of about 1 foot below the ground surface. The approximate location of the land side toe of the left bank levee is indicated on each figure.

Figure 4-15
Scenario 1, Before Failure Exit Gradients

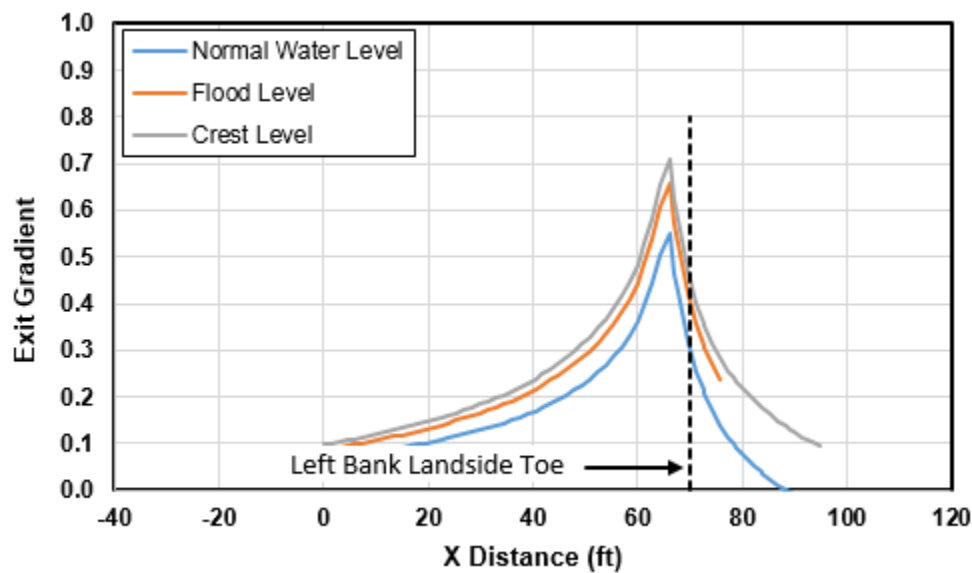


Figure 4-16
Scenario, After Failure Exit Gradients

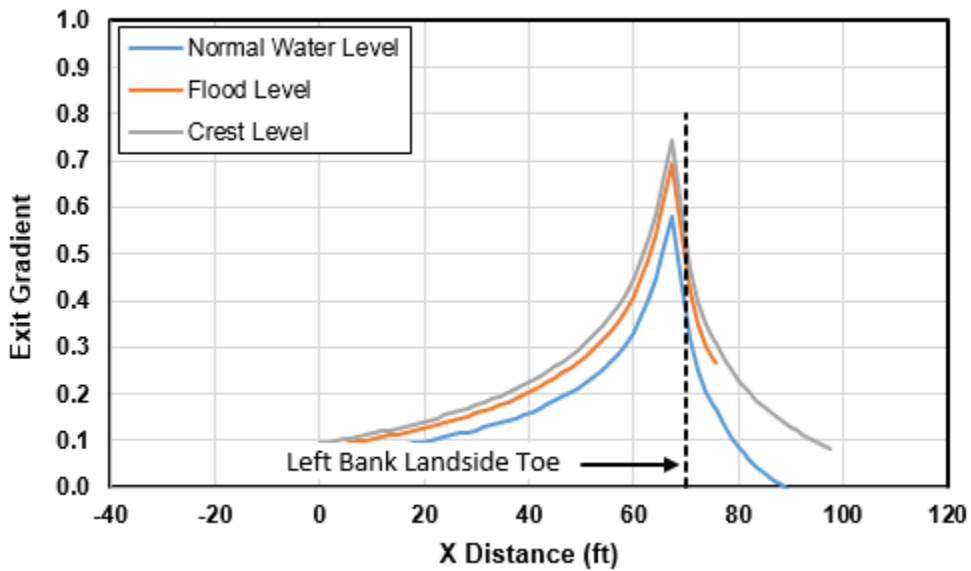


Figure 4-17
Scenario 2, Before Failure Exit Gradients

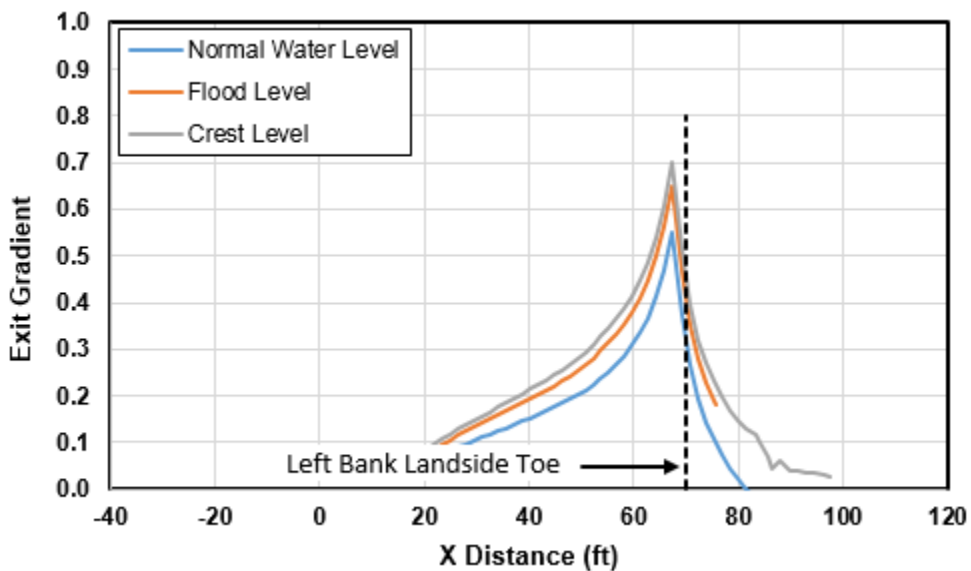
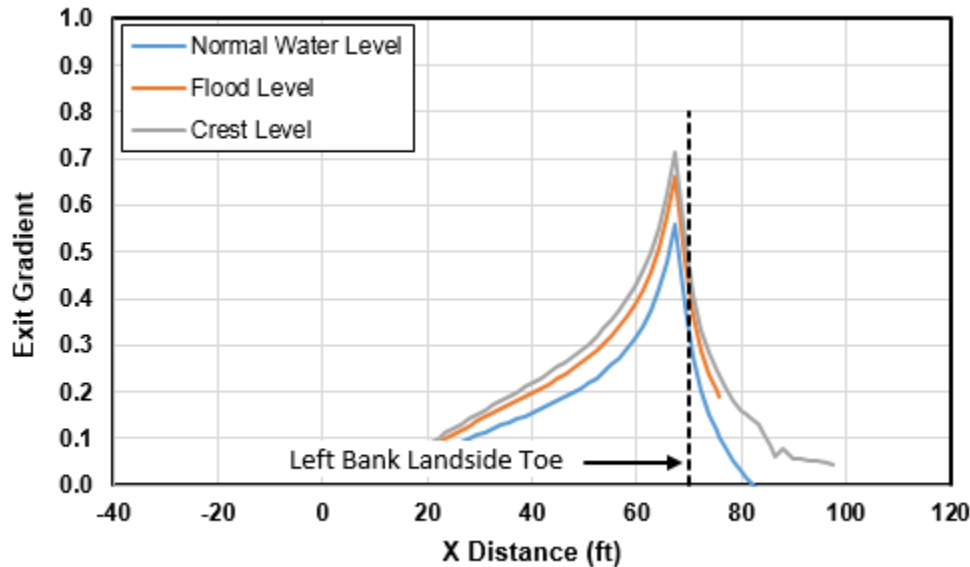


Figure 4-18
Scenario, After Failure Exit Gradients



The calculated exit gradients indicate that medium to heavy seepage (i.e., 0.2 to 0.7) would occur in both scenarios. However, as noted above, the flood and crest elevation water levels are transient; hence, the steady state exit gradients may not be reached and would return to normal levels when water levels returned to normal.

Inspection of these graphs shows an increase in exit gradient with increasing water level in the river; the exit gradients, however, are not substantially altered by the failure of the right bank levee in either Scenario 1 or Scenario 2. This result is consistent with the basic definition of exit gradient, which is expressed as $i = dH/L$ where i is the exit gradient, dH is the difference in water level between water entry and exit points, and L is the distance between the entry and exit points.

In the two scenarios considered in this analysis, dH is the same in the before- and after-failure conditions. The shortest distance between the water entry and exit points L (which yields the steepest exit gradient) is a point in the river or slough channel for the before-failure conditions. Although the after-failure condition creates more water entry points, the distance between the new entry points and the land side toe of the remaining levee (exit point) is greater than the before-failure entry point and, therefore, would not increase the calculated exit gradient.

Observations and Conclusions

The seepage analyses described above were completed to evaluate plausible explanations for reported increases in seepage in Delta islands following failure of an adjacent island. The analyses focused on potential increases in underseepage that could lead to increased requirements for drainage and pumping on the remaining islands and potential increases in seepage forces at the land-side toe of a levee that could decrease the stability of the levee. The results of the analyses lead to the following observations and conclusions for the cases considered.

The failure of an adjacent island could lead to an increase in the underseepage volume rate of flow (quantity and rate of seepage beneath the levee) of 7 to 10 percent during normal water levels and as much as 26 percent during high water events. The amount of the increase in underseepage will depend on the permeability of the levee foundation soils and the elevation difference between the exterior water level and the land elevation of the island.

The failure of an adjacent island does not appear to significantly lower the seepage stability factor of the levee on the remaining island. For the cases considered in these analyses, there is little substantive change in exit gradient between the before- and after-failure conditions; therefore, there is little substantive change in the stability of the remaining levee with respect to the effect of underseepage. The results indicate that the loss of an adjacent levee will create an increase in seepage quantities and exit gradient, but the increase in exit gradient does not appear to be sufficient to cause a levee breach in the remaining levee unless the remaining levee is already on the verge of failure. For purposes of the DLIS analyses, the results of this underseepage study appear to support the assumption that islands survive or fail independently. The assumption of independent island survival or failure is key to the multiple island failure analysis presented later in this report.

4.3.4 Seismic Hazards

4.3.4.1 Delta and Suisun Marsh Seismicity

The Sacramento-San Joaquin Delta and Suisun Marsh are in and adjacent to some of the highest seismic hazard zones in the United States (USGS 2014a). Earthquakes originating in or near the Delta or Suisun Marsh can result in levee slope failure, cracking, settlement (loss of freeboard), foundation liquefaction, and lateral spreading. The DLIS team has reviewed a number of previous reports to gain an understanding of the seismic hazards and develop a rational approach to characterizing Delta seismic hazards for subsequent risk calculations.

The general approach to estimating the annual probability of seismic levee breaching is to obtain a seismic recurrence relationship for the site of interest and a seismic fragility relationship for the levee or levees at that site. The seismic recurrence and fragility relationships are then used to calculate an annual probability of levee breaching by integrating the product of the seismic recurrence probability and the conditional seismic fragility probability over the peak ground acceleration (pga) range.

The evaluation and selection of seismic recurrence curves is described in this section, and the evaluation and selection of seismic fragility curves is described later in this report.

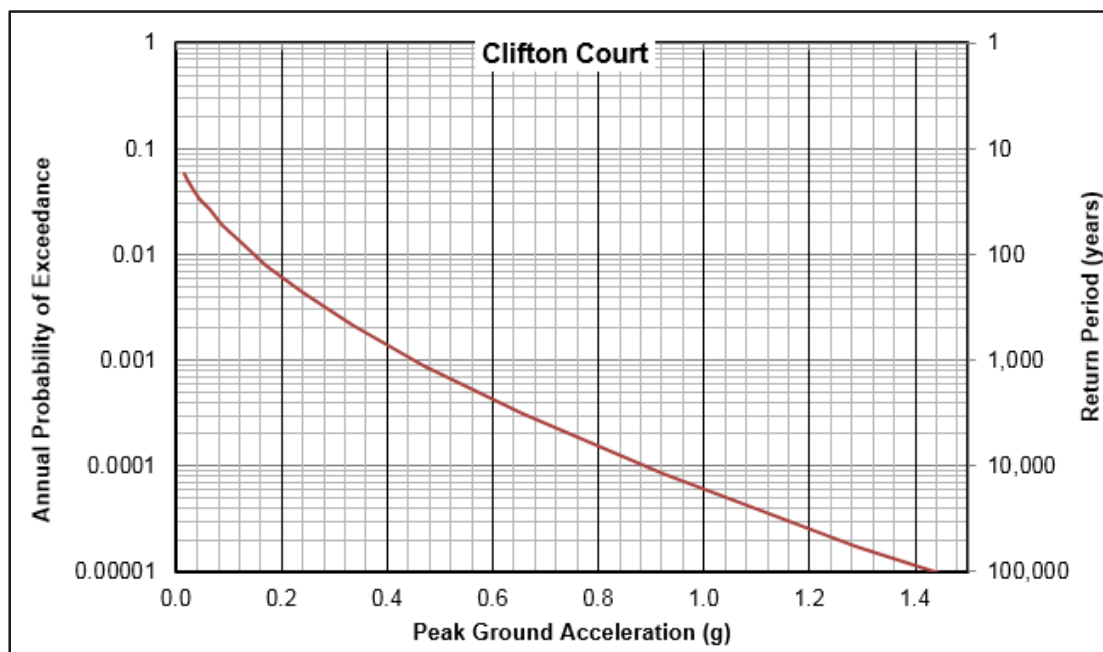
Seismic Recurrence Relationship

A seismic recurrence relationship describes the seismic hazard for a site in terms of the annual probability of a pga or greater occurring (annual probability of exceedance). This relationship is developed for the expected pga range at the site. For example, a USGS Class D seismic recurrence relationship for Clifton Court is shown on Figure 4-19. In this example, an annual probability of exceedance of 0.01 corresponds to a pga of approximately 0.15g; i.e., there is a 0.01 (1 percent) annual probability that the pga will be 0.15g or greater at this location.

Seismic recurrence relationships for locations in the 48 contiguous states can be obtained from the USGS or can be developed for a specific location using a probabilistic seismic hazard analysis (PSHA). The

relationships published by the USGS are based on regional seismic data and parameters, whereas a PSHA would generally rely on site-specific data and parameters.

Figure 4-19
Example Seismic Recurrence Relationship



4.3.5 DRMS and DLIS Seismic Recurrence Relationships

The seismic recurrence relationships used in the DRMS study were developed by the DRMS investigators based on a PSHA with a time-dependent hazard model. As noted in the DRMS report (DWR, 2008a), a time-dependent hazard model is a departure from the standard time-independent models typically used in a PSHA. A time-dependent hazard model considers the time elapsed since the last prior hazard event. In this model, the probability of the hazard event is low immediately after the event, but the probability of occurrence of the next event increases with time. In a time-independent model, the probability of occurrence of the next event is the same regardless of the time since the last event. Over the relatively short time considered in the DLIS analyses (to 2050), the differences between time-independent and time-dependent seismic models are expected to be small.

The DRMS investigators completed a PSHA for six sites in and adjacent to the Delta and Suisun Marsh (Clifton Court, Delta Cross Channel, Montezuma Slough, Sacramento, Sherman Island, and Stockton). Seismic recurrence relationships were developed for each of these locations, but the DRMS reports are not clear on how the six relationships were applied to other locations in the Delta and Suisun Marsh.

The seismic recurrence relationships currently used in the DLIS analyses are based on the USGS 2014 update of the national seismic hazard maps (USGS 2014a, 2014c), which incorporate time-dependent models; furthermore, the California portion of the 2014 data is based on the Uniform California Earthquake Rupture Forecast version 3 (UCERF3). The 2014 data were obtained from a USGS web site (<http://earthquake.usgs.gov/hazards/products/conterminous/index.php#2014>). The data available from

this source are provided as probability of exceedance and pga for Site Class B/C conditions (shear velocity $V_s = 760$ m/s) on a longitude and latitude grid of 0.05 degree (~3.4 miles) increments. Probability of exceedance and pga were interpolated from this grid for each island and tract to produce a probability of exceedance vs. pga curve as illustrated on Figure 4-19. To match the seismic recurrence curves to the seismic fragility curves available from the DRMS study, the USGS 2014 data were scaled to a Site Class D by multiplying the 2014 Site Class B/C probability of exceedance by the ratio of the 2008 Site Class D and Site Class B/C probabilities of exceedance.

The USGS data were updated in 2014 and published in 2015. The more recent USGS data are incorporated in the DLIS analyses and Decision Support Tool. In general, the USGS 2014 seismic hazard curves are similar to the USGS 2008 seismic hazard curves in the eastern Delta, but show a greater seismic hazard in the western Delta and Suisun Marsh.

One of the DRMS reports (DWR 2008a) provides a comparison among 100-year pga values from the DRMS studies and two prior studies (DWR 1992; CALFED 2000). That comparison and pga values from the USGS 2008 update used in the DLIS analyses are summarized in Table 4-12. The changes over time reflect additional data that have become available and improved seismic hazard models.

Table 4-12
Peak Ground Acceleration (pga) Comparison

Location Identification		Source			
DRMS	DLIS	DWR 1992	CALFED 2000	DWR 2008a	USGS 2014a
Sacramento	West Sacramento	0.08	0.09	0.10	0.12
Delta Cross Channel	Walnut Grove	0.12	0.13	0.12	0.15
Stockton	DLIS-14 (Central Stockton)	0.12	0.13	0.11	0.15
Clifton Court	Clifton Court	0.26	0.19	0.17	0.20
Sherman Island	Sherman Island	0.35	0.22	0.20	0.20
Montezuma Slough	Grizzly Island	0.40	0.24	0.22	0.25

Graphical comparisons between the USGS and DRMS seismic recurrence relationships for the six locations analyzed in the DRMS study are shown on Figures 4-20 and 4-21. In each of the graphs on these figures, the solid black line represents the USGS data, the yellow circles are DRMS data points, and the blue dashed line is a visual-manual projection of the DRMS data over the same pga range that is available from the USGS. In addition, the open square symbols on the Sacramento graph on Figure 4-20 show a more recent seismic recurrence relationship developed for the Urban Levees Evaluation (ULE) project for West Sacramento (DWR 2015c).

Using DRMS (and ULE) data (i.e., for a given pga), the annual probability of exceedance based on the USGS data is less than the annual probability of exceedance based on the DRMS data. Conversely, the return period for the given pga is generally greater using the USGS data than using the DRMS data. The consequence of a less frequent occurrence of any given pga will be a lower annual probability of levee breaching.

Figure 4-20

USGS and DRMS Seismic Recurrence: Sacramento, Delta Cross Channel, Stockton

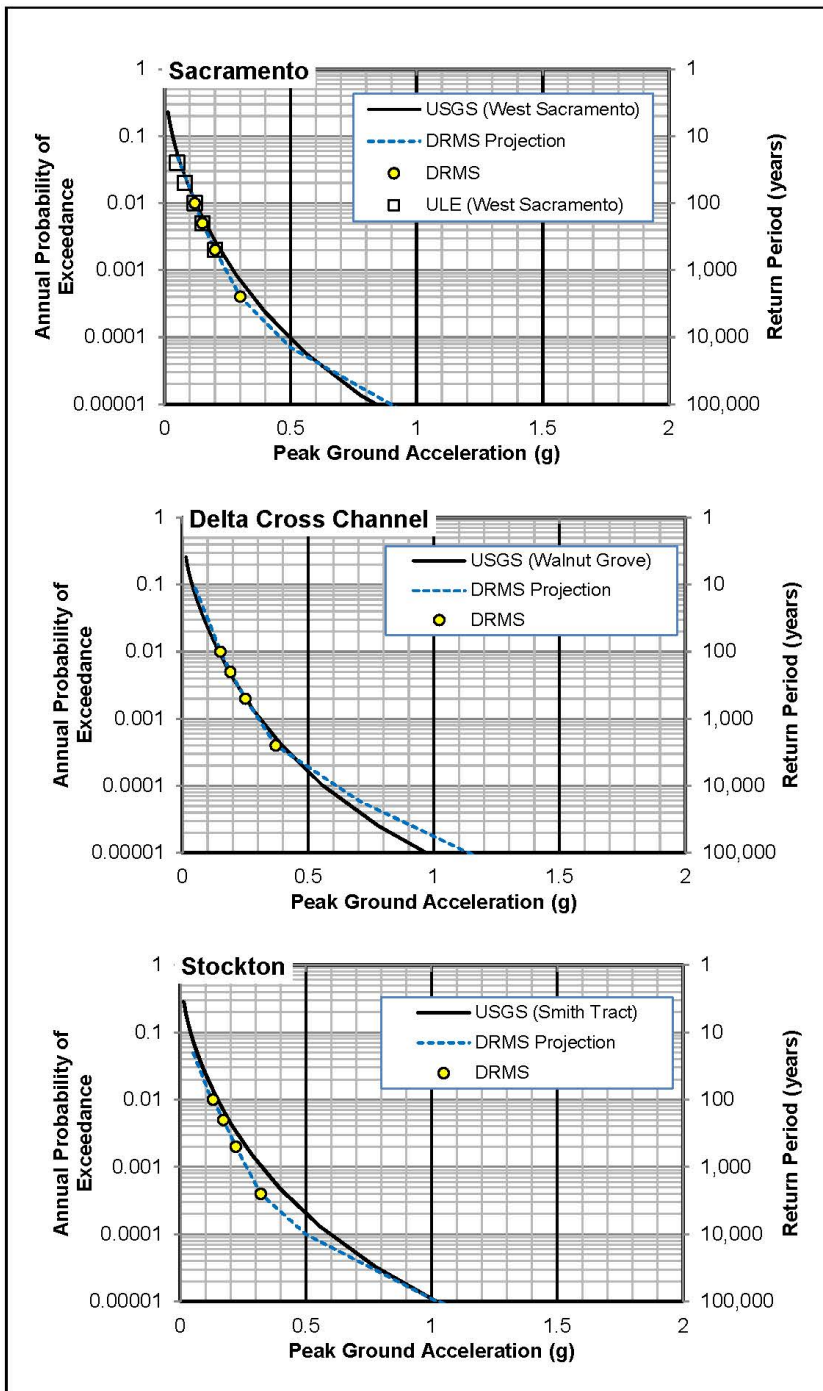
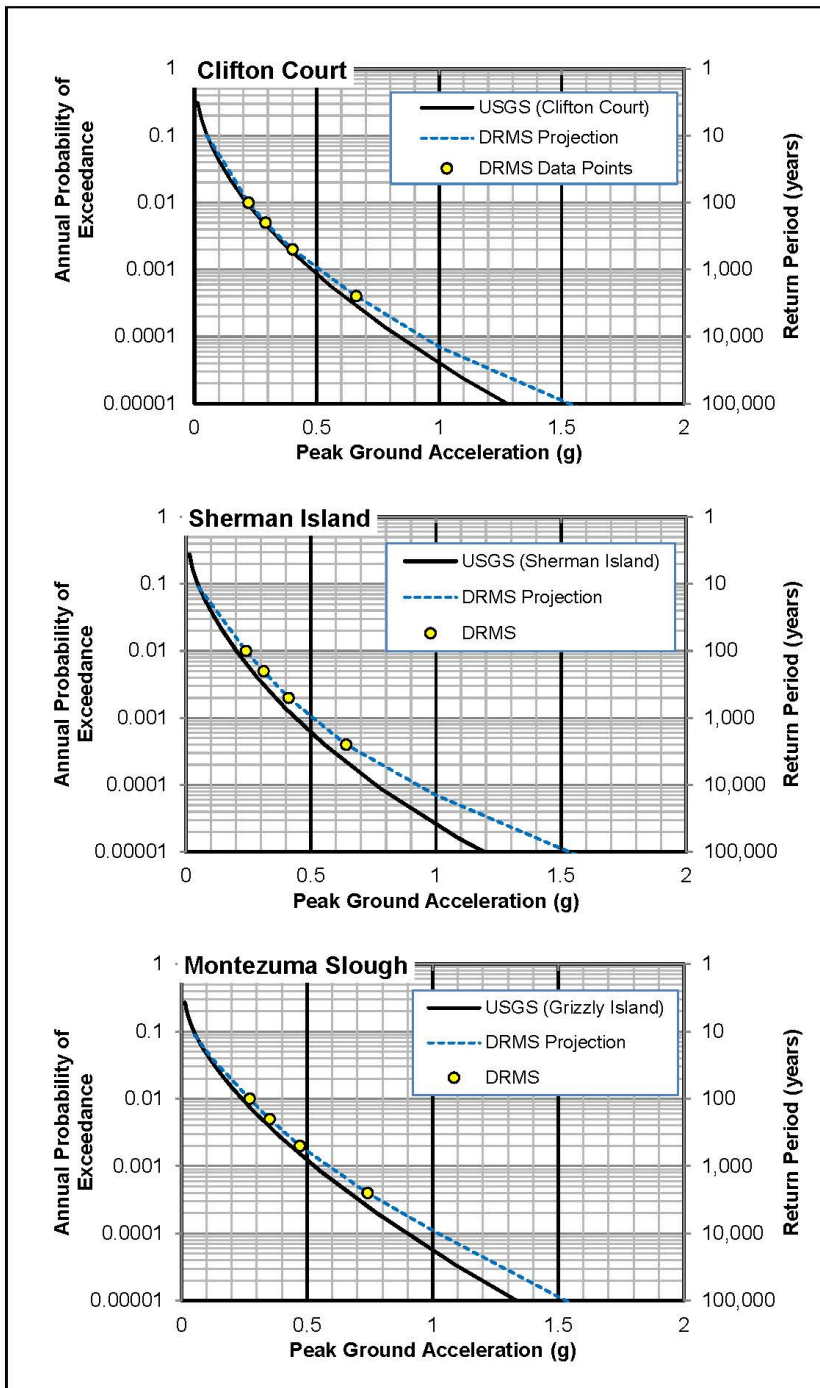


Figure 4-21
USGS and DRMS Seismic Recurrence: Clifton Court, Sherman Island, and Montezuma Slough



4.3.6 Other Hazards

4.3.6.1 Subsidence Hazards

Subsidence or settling of the levees and interior of many islands in the Delta has generally occurred because of human actions taken to use the islands for agriculture. The subsidence has resulted in island interior elevations that are lower than river or channel elevations and, in many cases, the subsidence continues to occur. Although continued subsidence will increase the hydraulic pressure on the levees, only the existing hazard is incorporated in levee performance evaluations.

While the RD 5-Year Plans report the same rate of subsidence (5/8 inch per year), it is likely that subsidence rates are not linear and vary among the islands and tracts in the Delta based on a variety of factors. The National Aeronautics and Space Administration (NASA) Jet Propulsion Library is collaborating with DWR in an ongoing effort to assess and monitor land and levee settlement across the Delta (NASA 2014). Collection and analysis of these data may produce different results than the standard 5/8 inch, and work performed by Deverel and Leighton (2010) may provide a broader, more thorough perspective on Delta subsidence rates that could be incorporated into future refinements to the DLIS analysis.

4.3.6.2 Wind and Wave Hazards

Wind and wave action on open bodies of water with sufficient depth and fetch length creates additional water height and erosion potential. Engineering judgment was applied to incorporate the additional water height into stage-recurrence curves and erosion potential into levee fragility curves. These adjustments to stage-recurrence or levee fragility were only applied to islands facing open water with sufficient depth and fetch length.

4.3.6.3 Other Hazards

The effects of past and current upstream water management and storage are reflected in the peak annual inflows used to develop a discharge-recurrence curve for the Delta and, hence, are implicitly incorporated in the analysis of present conditions. Analyses of future conditions undertaken by the DLIS team are based on the assumption of no substantive changes to upstream water management and storage.

The other ecological and temporary human action hazards listed in Table 4-3 are relatively rare occurrences or are mostly supported by anecdotal evidence. Engineering judgment was used to assess the potential contribution of these hazards to levee performance. The DLIS team concluded that these hazards would not contribute significantly to the evaluation of levee performance.

4.3.7 Hazard Data Gaps

Data on the alignment and conditions of Suisun Marsh levees are incomplete (Suisun Marsh RCD 2014). The data used in the DLIS analyses come from the DRMS dataset provided by DWR. These data include the total length of all levees and levee alignments in Suisun Marsh, but contain no details on the condition of levees. Therefore, Suisun Marsh levees were assumed to be consistently below HMP. While this is a conservative default, it is consistent with comments from the Suisun Marsh RCD indicating that levees in the marsh are not maintained to an accepted engineering standard.

4.4 Levee Vulnerabilities

4.4.1 Fragility Curves

Levee vulnerability is typically expressed as one or more levee fragility curves that relate the magnitude of a hazard to the conditional probability of levee failure should that hazard occur. The joint probability of levee failure can be determined by integrating, over all hazard levels, the probability of the hazard multiplied by the conditional probability of failure. In addition, the hazard levels, fragility curves, and consequences of failure are used to estimate EAD, EAF, and other flood risk metrics (see Section 5.0).

As described earlier in this section, the significant current levee hazards are primarily hydrologic, hydraulic, and seismic hazards. Hydrologic and hydraulic hazards are often expressed in a single levee fragility curve that incorporates geotechnical, seepage, overtopping, and seismic failure mechanisms. However, seismic levee fragility is addressed separately (a) because of the particular geologic and seismic hazards in the Delta; (b) because flooding due to a seismic levee failure will happen with less warning than flooding due to a hydrologic event and, consequently, has a greater potential for fatalities and damage; and (c) because it is unlikely that a flood and an earthquake would happen simultaneously. The remainder of this section discusses hydrologic and hydraulic levee fragility. Seismic levee fragility is addressed later in this report.

4.4.2 Weakest Link Concept

The approach taken to levee vulnerability by the DLIS team is based on a “weakest link” concept. A levee will tend to fail first at the weakest link, which may be at a low point in the levee crest if failure is by overtopping or may be at a structurally weak point if failure is by mass sliding. The weakest link may also be at a more porous section if failure is by through-seepage or underseepage. The location of the weakest link in a levee is generally not known, but can be inferred from an examination of the available survey and geotechnical data and consideration of the magnitude and frequency of the hazards that can lead to levee failure. Although a levee may tend to fail at a weak link, the length of a levee must also be considered as more than one weak link may exist. The “length effect” is discussed more completely later in this section.

For purposes of the DLIS analyses, the weakest link with respect to hydrologic and hydraulic hazards was selected primarily based on levee geometry. In general, the section of levee with the lowest levee crest was taken as the weakest link for each island and tract because the reach with the lowest crest elevation will be most susceptible to overtopping failure. A levee reach with the lowest levee crest will also typically have the narrowest levee base width, which could make this reach more susceptible to through-seepage or underseepage failure as well. While many of the Delta and Suisun Marsh levees have geotechnical data available, the available data were generally too sparse to significantly alter the selection of the weakest link. Furthermore, some levees had no available geotechnical data, in which case, the weakest link was selected solely based on levee geometry.

The selection of the weakest link with respect to seismic hazards was based on an assessment of seismic vulnerability for 70 islands and tracts presented in the DRMS study (DWR 2009c). The DRMS assessment included the definition of 22 Seismic Vulnerability classes and identification of the length of levee reach in each vulnerability class for each of the 70 islands and tracts. A portion of the DRMS data is

shown in Table 4-13. The seismic weakest link used in the DLIS analysis was taken as the lowest (weakest) vulnerability class. For example, the lowest vulnerability class at Atlas Tract is 2; thus, this 3.0-mile reach was taken to be the seismic weakest link.

Table 4-13
Levee Miles by Seismic Vulnerability Class (DWR 2009c)

Island/Tract	DRMS Seismic Vulnerability Class							
	1	2	3	4	5	6	7	(continues)
ATLAS TRACT		3.0						:
BACON ISLAND		0.2	5.2				0.6	:
BETHEL ISLAND		3.2	7.0					:
BISHOP TRACT	2.3	4.7	1.7					:
BOULDIN ISLAND		2.3	8.5	2.1				:
(continues)	:	:	:	:	:	:	:	:

For the islands and tracts not assessed in the DRMS study, the DLIS team reviewed soil maps of the Delta and Suisun Marsh, especially maps of peat thickness, and assigned seismic weakest link values to those islands and tracts based on their proximity to the DRMS-assessed islands and similarity of soil types. For example, the islands and tracts of the Suisun Marsh were not addressed in the DRMS study, but were assigned a seismic weakest link value approximately midway between DRMS Seismic Vulnerability Class 3 and 4 based on apparent depth of peat and assumed levee conditions.

The fragility curves described in the following sections were developed for the weakest link (hydrologic/hydraulic and seismic) at each island and tract.

4.4.3 Hydrologic and Hydraulic Fragility Curve Development

Because levee fragility curves are not available for every Delta and Suisun Marsh levee from previous studies, the DLIS project team adopted a procedure for developing levee fragility curves for islands and tracts without existing curves. The procedure is similar to that outlined in the CVFPP study (DWR 2012c). The procedure entails estimating a water level at which the probability of failure is expected to be zero, probable non-failure point (PNP), a water level at which the probability failure is expected to be 0.85 (assessment point), and a water level at which the probability of failure is expected to be 1.0 (probable failure point [PFP], at levee crest or above if overtopping is necessary to fail the levee). Based on levee fragility curves presented in previous studies of the Delta and Suisun Marsh levees, the DLIS team used multiple assessment points between the PNP and PFP to develop more complete fragility curves. This procedure is a modification of a USACE method (USACE 2010a) and required engineering judgment on the part of the DLIS team to estimate the water levels and failure probabilities that define a fragility curve. The procedures used to estimate the PNP, assessment points, and PFP are described in the following paragraphs.

4.4.3.1 Probable Non-failure Point (PNP)

The PNP is defined to be the greater of the minimum stage-recurrence elevation in the channel and the average interior elevation of the island or tract interior. The minimum stage-recurrence elevation is the lowest expected water elevation derived from the total Delta inflows and the stage-discharge relationships developed for each island and tract. The average interior elevation is the average elevation of the land on the protected side of each levee, stage-recurrence elevations less than the average interior elevation cannot inundate the island and were assumed to be unable to fail the levee.

The minimum stage-recurrence elevation is taken as the PNP when it is greater than the average interior elevation based on noting that the minimum stage-recurrence elevation is a rare event (generally less than once in 100,000 years) and that the hydraulic load at the minimum stage-recurrence elevation will be the least among all possible stages. Any stage greater than the minimum stage-recurrence elevation will have a probability of failure greater than zero.

For example, at Walnut Grove (Figure 4.22) the average interior elevation is 3.4 feet and the minimum stage-recurrence elevation is 0.0 foot; hence, the PNP is taken as 3.4 feet.

At Veale Tract (Figure 4.23), the minimum stage-recurrence elevation is above the average interior elevation; hence, the PNP is taken as 3.5 feet.

Figure 4-22
Walnut Grove PNP

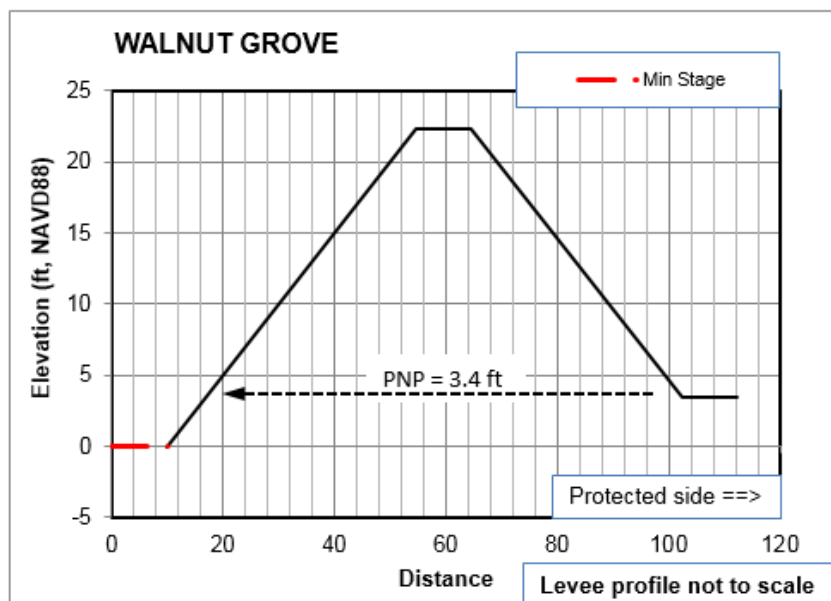
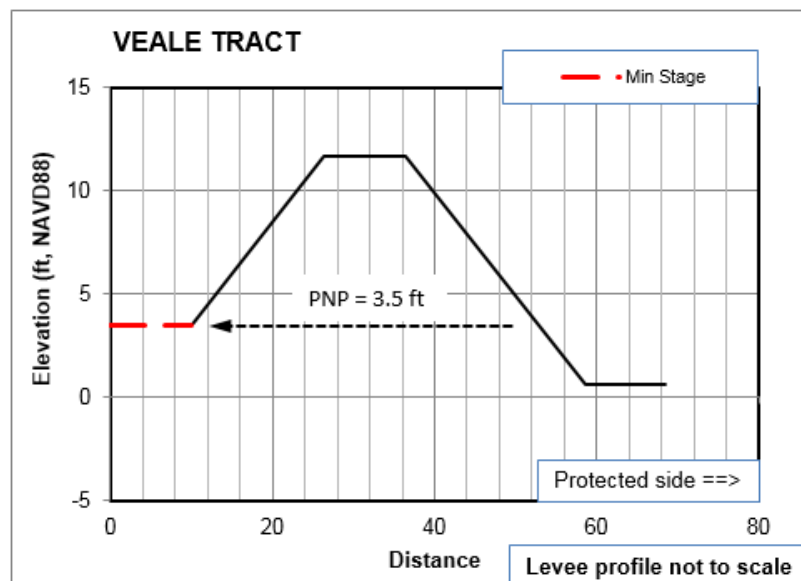


Figure 4-23
Veale Tract PNP



4.4.3.2 Assessment Points

Because the DLIS project relies on the best available existing data, the levee fragility curves developed by the DLIS team were, to the extent possible, based on the available levee fragility curves. These fragility curves were used to define assessment points at annual failure probabilities of 2, 5, 15, 60, and 90 percent.

The detailed analyses that were completed in previous studies (DWR 2008b, 2012c) to develop levee fragility curves incorporate geotechnical, seepage, and overtopping failure mechanisms for hydrologic and hydraulic hazards. The location of several of the levee fragility curves from the CVFPP study that are within the Delta and Suisun Marsh area are shown on Figure 4-24, and examples of CVFPP levee fragility curves are shown on Figure 4-25. Water level elevations for the levee fragility curves in the CVFPP study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29) datum. The water level elevations in the CVFPP curves were converted to reference datum NAVD 88 to be consistent with other elevations used in the DLIS project. The CVFPP study (DWR 2012c) produced levee fragility curves for approximately 100 areas in the Sacramento and San Joaquin river basins.

About 25 of the areas in the CVFPP study are in the legal Delta, and levee fragility curves from these areas have been used to inform the development of fragility curves for the DLIS project. While the DLIS hydrologic/hydraulic fragility curves are primarily levee geometry failure curves, the similarities among the CVFPP curves were used by the DLIS team to help define the assessment points and assessment point failure probabilities. The similarities include reasonably consistent curve shapes and probabilities of failure at river stage equal to each levee crest elevation. The similarities among the CVFPP curves imply that, except in extreme cases, levee hydrologic/hydraulic fragility in the Delta is highly dependent on levee geometry.

Additional data for the fragility curves were obtained from the DRMS studies (DWR 2008d). The major result of this study was levee failure rates per year per levee mile rather than levee fragility curves. Nevertheless, data and analyses from the DRMS study can be used to assess the validity of the levee fragility curves for the DLIS project by comparing DLIS results of annual probability of failure to DRMS annual probability of levee failure.

One significant assumption in using existing fragility curves and supporting data is that the curves reflect levee conditions at the time the curves were drawn and the data were obtained. This may no longer be correct, but updating these curves was beyond the scope of the DLIS project.

Figure 4-24
Locations of Levee Fragility Curves from CVFPP Report (DWR 2012a)

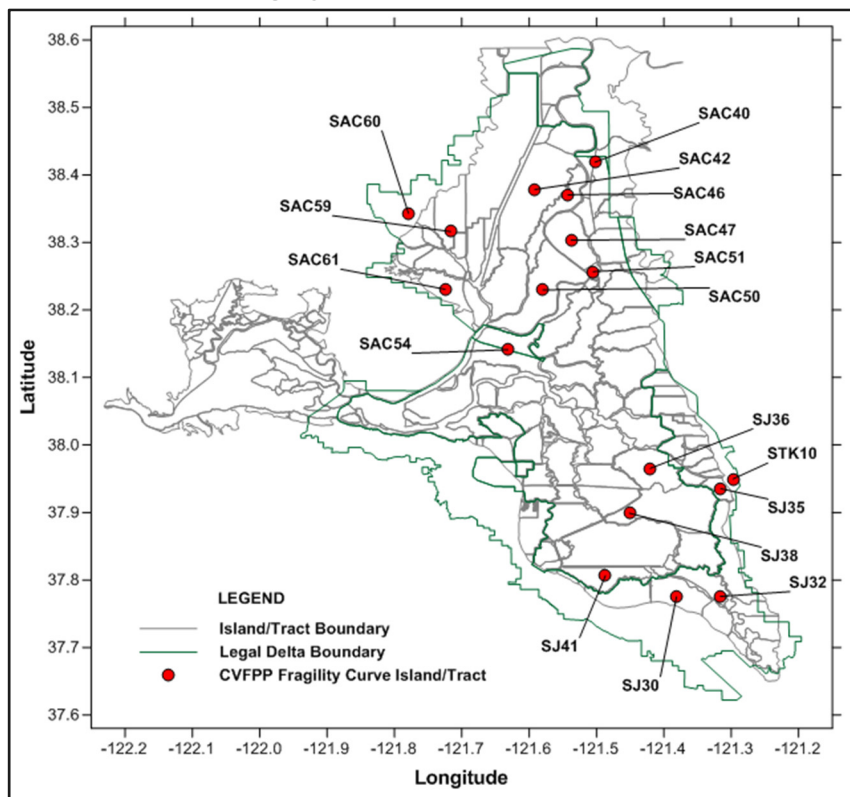
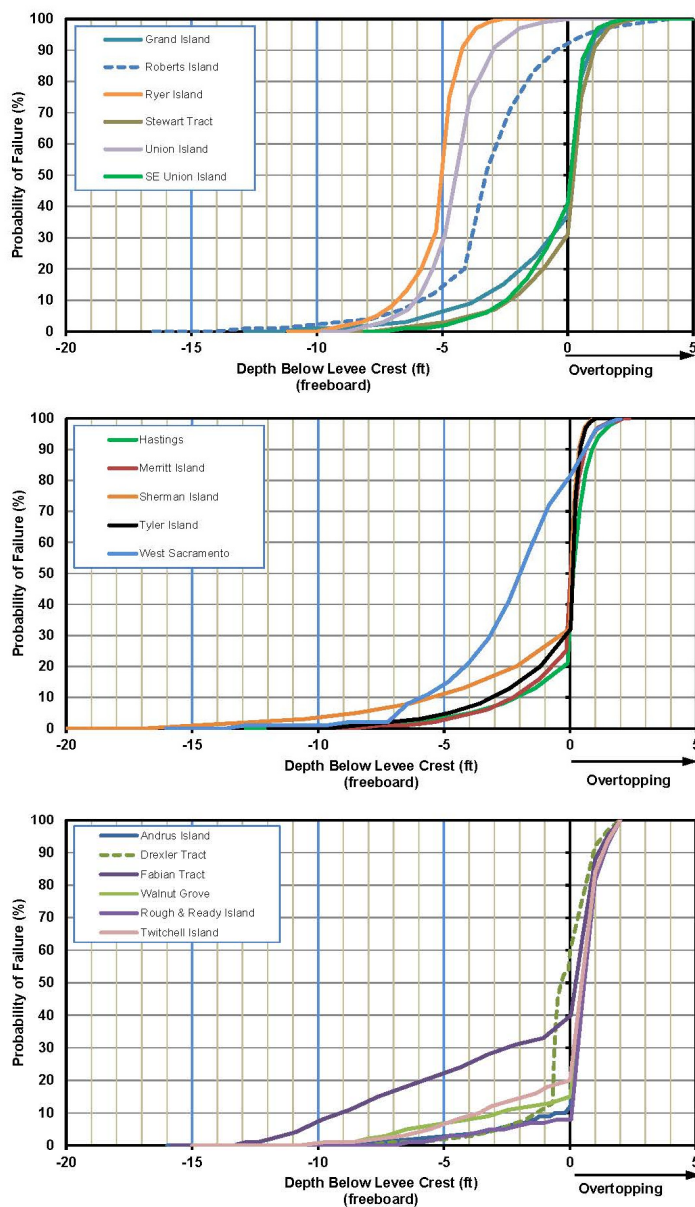


Figure 4-25
Example CVFPP Levee Fragility Curves



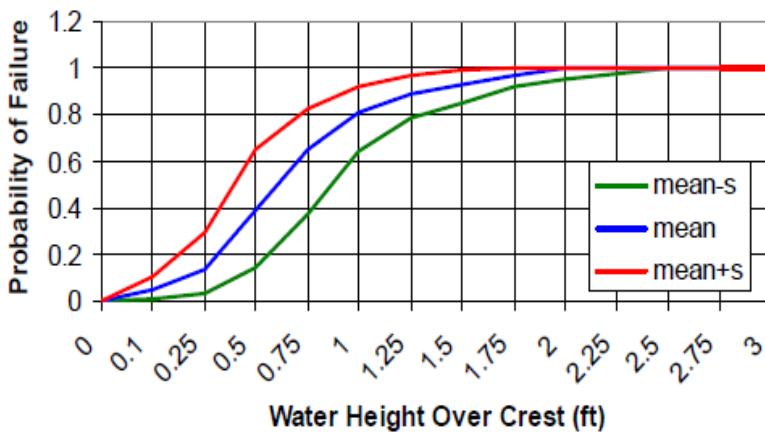
4.4.3.3 Probable Failure Point (PFP) and Overtopping

Based on the existing fragility curves described above, the DLIS team concludes that, in most cases, the PFP would be at a water elevation above the crest of the levee; i.e., a 100 percent probability of failure would only occur when the levee is overtopped. The DRMS report (DWR 2009d) included an analysis of the probability of failure due to overtopping that the DLIS team used to define the PFP.

The DRMS overtopping analysis is summarized on Figure 4-26, which shows the probability of failure versus the height of water above the levee crest. On this figure, the “mean” curve is the most likely relationship between water height and failure probability while “mean+s” and “mean-s” are plus and minus one standard deviation from the mean; respectively. The mean curve from this figure was used to set the PFP of the DLIS fragility curves at 2 feet above the levee crest.

The fragility curve between the levee crest and an elevation 2 feet above the levee crest was adjusted to create a monotonic transition of failure probabilities from the assessment point failure probability and the PFP.

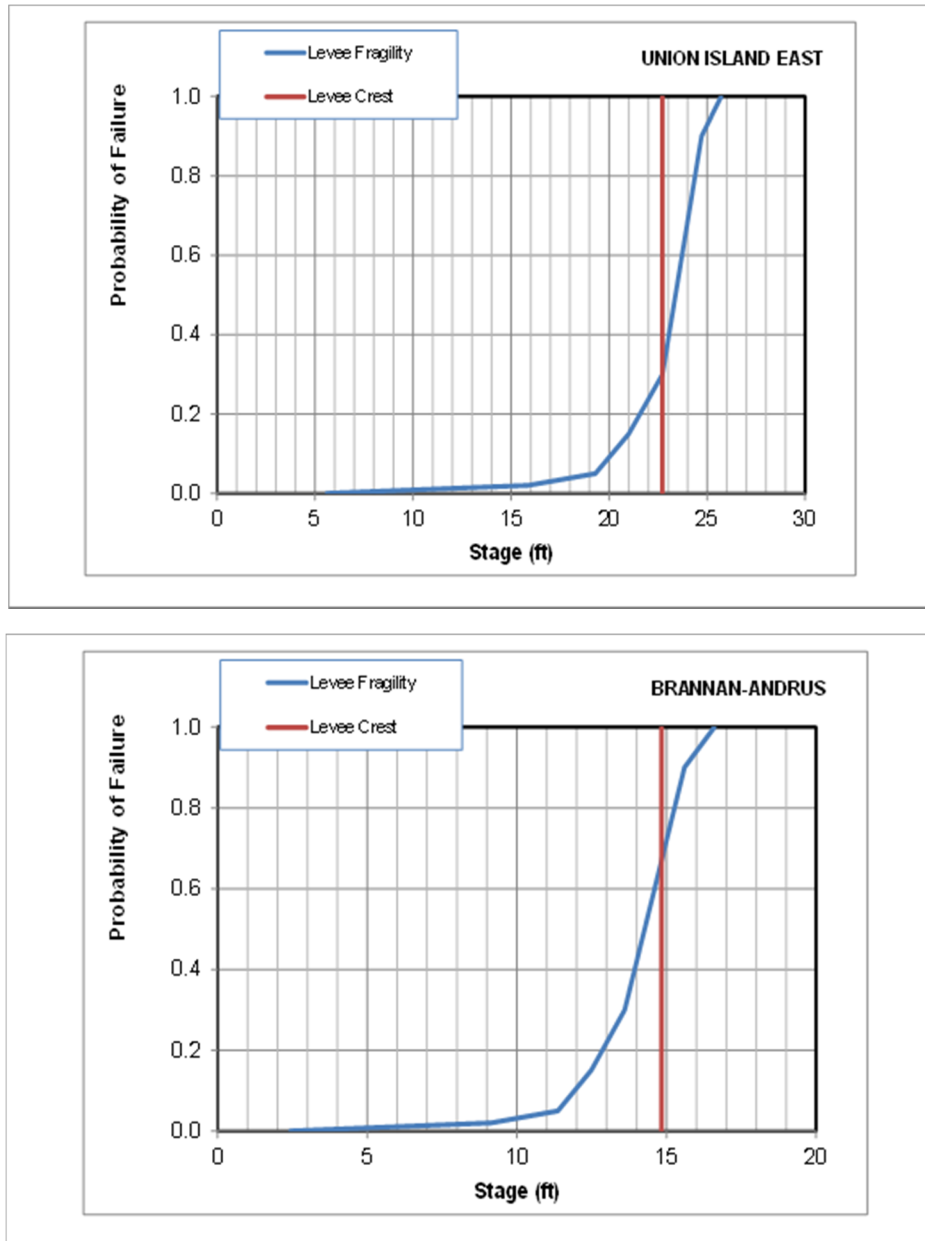
Figure 4-26
Probability of Failure Due to Overtopping (DWR 2009d)



4.4.3.4 DLIS Fragility Curves

Examples of the DLIS fragility curves developed as described are shown on Figure 4-27. The entire set of fragility curves for all leveed islands and tracts is included in Appendix D.

Figure 4-27
Example DLIS Fragility Curves



4.4.3.5 Levee Length Effect

Levee fragility curves are typically defined based on a two-dimensional cross section that is representative of some length of levee that has similar dimensions, properties, and response to hydraulic or seismic load. However, one would expect that two levees with similar conditions (the first 1 mile long and the second 5 miles long) would have different probabilities of failure due to the difference in length. The “length effect” also applies to the islands and tracts of the Delta and Suisun Marsh. The fragility curves for these levees were developed for a weakest-link cross section and it is necessary to adjust the fragility curve to account for the entire length of levees protecting an island or tract.

As noted in the DRMS report (DWR 2009d), it may seem logical to conclude that the levee that is five times longer than another similar levee is five times more likely to fail; however, the historical record of levee failures in the Delta, Suisun Marsh, and elsewhere does not support this conclusion. The greater probability of failure of the longer levee due to the relative length of the two levees is some scale factor less than the ratio of the levee lengths.

The DRMS investigators and the DLIS team have applied a hyperbolic scaling function to more realistically estimate failure probabilities. A hyperbolic scaling function is generally used when there are insufficient data to define the correlation distance of levee strength properties along the entire length of a levee.

A hyperbolic scaling function takes the form

$$SF = 1 + ((L_i - L_R)/L_{max}) \quad (\text{Equation 4-3})$$

where

SF = scaling factor

L_i = length of levee being scaled

L_R = reference length

L_{max} = length of longest levee among all levees considered

The length of the levee being scaled and the longest levee among all levees considered are readily determined, but a reference length must be chosen. The DRMS investigators elected to use the length of the levees at Venice Island as the reference length for reasons described in their report (DWR 2009d). The result was that the DRMS scaling factor ranged from about 0.7 to 1.7. Thus, failure probabilities, which were determined at a two-dimensional cross section, were scaled down for islands or tracts with levee lengths less than the length of levees at Venice Island.

The DLIS team chose a reference length of 500 feet. The rationale for this choice is that the correlation distance of levee strength properties is typically 100 to 300 feet (Phoon 2008) and values of 150 feet (VanMarcke 1977) and 500 feet (Vrouwenvelder 1987) are used in practice. The scaling factors for reference lengths of 150 feet and 500 feet vary by at most 0.2 percent; hence, the DLIS team elected to use a reference length of 500 feet. The range of scaling factors for all of the Delta and Suisun Marsh islands and tracts is 1.0 to 2.0. The DLIS scaling factor range is greater than the DRMS scaling factor range because the DLIS reference length is less than any island's levee length. If the reference length is greater than an island's levee length (as was used in DRMS), the scaling factor is less than 1

(see examples in Table 4-14 below). Thus, using the DLIS reference length, the tract with the shortest levee, Weatherbee Lake (0.14 mile), has a fragility curve scaling factor of 1.0 and the tract with the longest levee, West Sacramento (39.6 miles), has a fragility curve scaling factor of 2.0.

Table 4-14
Scaling Factor Comparison

	DLIS	DRMS
	Reference Length, miles	
	0.1	12.4
Levee Length, miles	Scale Factor	
1	1.0	0.7
2	1.0	0.7
5	1.1	0.8
10	1.3	0.9
20	1.5	1.2
30	1.8	1.4
40	2.0	1.7

4.4.3.6 Estimating Changing Vulnerabilities Due to Sea Level Rise

For the DLIS analysis and developing the DLIS Decision Support Tool, current and future levee vulnerabilities were considered. Current levee vulnerability analyses address the likelihood of levee failure for the present condition of the levees and the magnitude and frequency of current levee hazards. Future levee vulnerability analyses address the likelihood of levee failure under assumptions made about the future condition of the levees and changes to the magnitude and frequency of levee hazards.

Water levels in the Delta and Suisun Marsh at any given time are the result of a complex interaction between the tide level at Golden Gate and the variable inflow of the rivers and streams that enter the Delta and Suisun Marsh. An increase in the average sea level at Golden Gate will alter the hydraulic conditions in the Delta and Suisun Marsh, which would increase the hydraulic stress on the levees and, assuming other levee conditions remain unchanged, will increase the annual likelihood of levee failure.

To address potential sea level change in the Delta, the DLIS team adapted the methodologies presented in the DRMS Flood Hazard Report (DWR 2009b). Section 5 of the DRMS report provides a method to determine water levels in the Delta and Suisun Marsh based on present day tide levels at Golden Gate and total Delta and Suisun Marsh inflows. Section 6 of the DRMS report provides a method to determine the effect of future sea level rise at any location in the Delta or Suisun Marsh based on a simplified hydraulic flow model and an assumed sea level increase. Excerpts from the DRMS report that describe these two methodologies are included in Appendix C.

To calculate the probabilities of levee failure and risk to people and assets, it is necessary to develop stage-recurrence curves at locations throughout the Delta and Suisun Marsh. Stage-recurrence curves

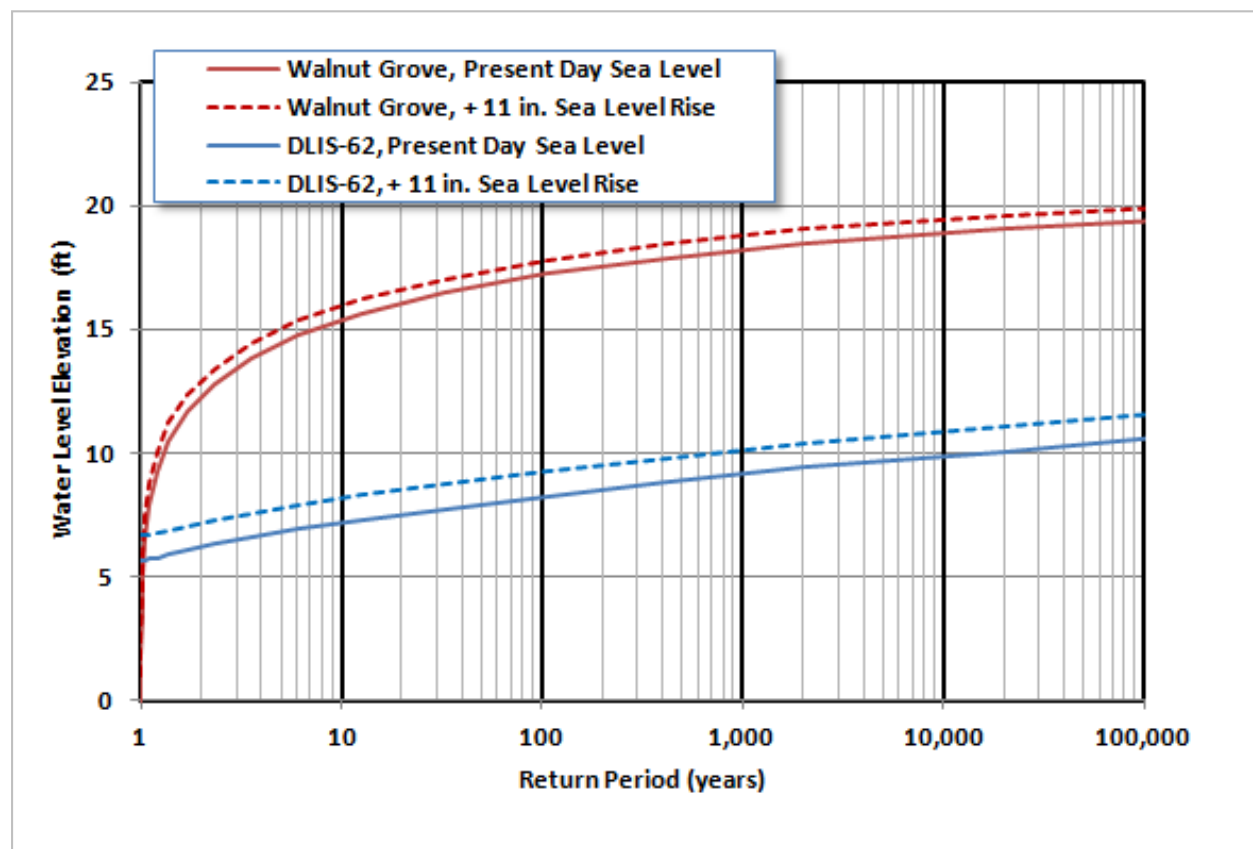
define the return period (by annual probability of occurrence) for each potential water level at a location. The DLIS team developed stage-recurrence curves for present day tide conditions and for the potential future tide conditions shown in Table 4-15. The values in this table are sea level increases relative to baseline (year 2000) sea levels at Golden Gate and were obtained from a National Research Council (NRC) report of potential future sea level rise (NRC 2012). The 2012 NRC report is the basis for updated sea level rise guidance to State agencies. The Delta Plan cited anticipated sea level rise at the Golden Gate of 14 inches by 2050 and 55 to 65 inches by 2100 based on the interim guidance adopted by the Ocean Protection Council (OPC) in March 2011. In March 2013, the OPC updated the guidance for State agency project planning based on the 2012 NRC report. The OPC noted that the purpose of the guidance is “to help State agencies incorporate future sea-level rise impacts into planning decisions.” The OPC further noted that the guidance “has now been updated to include the best current science, as summarized in the NRC report.” The California Coastal Commission (2015) also adopted these NRC sea level rise projections as the best available science.

Table 4-15
Sea Level Rise Scenarios

Year	Average Estimate	High Estimate
Current	+2.0 inches (+5.0 cm)	Not analyzed
2030	+5.7 inches (+14.4 cm)	+11.7 inches (+29.7 cm)
2050	+11.0 inches (+28.0 cm)	+23.9 inches (+60.8 cm)

The DLIS team developed stage-recurrence curves for all Delta and Suisun Marsh islands and tracts; two of which are shown on Figure 4-28. The solid lines are stage-recurrence curves for present day sea level and were developed using the method shown in Appendix C. The dashed lines are for an average estimated sea level in 2050 (+11.0 inches from 2000 baseline) and were developed by adding the estimated sea level rise calculated by the method shown in Appendix C to the present day recurrence water elevations (solid lines). In general, the effect of sea level rise (increase in water surface elevation) decreases with (1) higher inflow to the Delta and Suisun Marsh; with (2) distance from the point of known sea level rise; and with (3) the difference between water level at the point of interest and water level at the point of known sea level rise. Hence, potential future sea level rise will have the greatest effect on the Suisun Marsh and western Delta islands and tracts.

Figure 4-28
Stage-Recurrence Curves



Because the increment of water level change due to sea level rise depends on distance, inflow (which is heavily regulated), and other variables, the DLIS team did not prepare a contour plot of the influence of the projected Delta and Suisun Marsh increases. However, the general pattern of water level increases due to sea level rise will be similar to the pattern of tidal effects shown on Figure 4-6.

Stage-recurrence curves are combined with levee fragility curves to compute probabilities of levee failure at each water level and compute an annual probability of levee failure by integrating the two curves over all water levels. The implication of this integration is that, even if a levee fragility curve does not change with time, the annual probability of levee failure can increase because of sea level rise alone. The incremental probabilities of levee failure at each water level and the annual probability of levee failure are used in the calculation of EAF, EAD, and other metrics used in the DLIS DST ranking and prioritization algorithms.

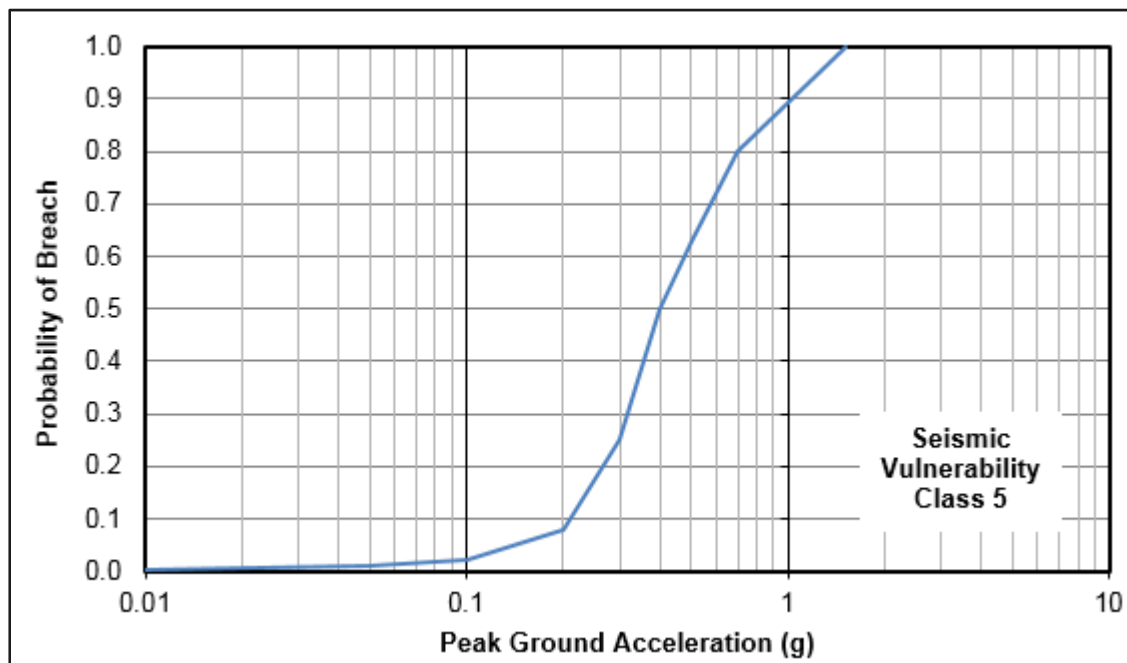
4.4.4 Seismic Fragility

The performance of a levee under seismic loading is a complex interaction of the levee materials, levee foundation materials, water level in the river or channel, groundwater conditions, and the nature of the seismic load. Hence, it is challenging to develop seismic fragility relationships that capture this complexity, yet are sufficiently straightforward to apply in a risk analysis. The quality of the results of the

risk analysis depends directly on the quality of the fragility curves. For the purposes of comparing annual probabilities of seismic levee breaching from DRMS and from DLIS, the DLIS project team selected the seismic fragility curves used in DRMS (DWR 2009d) as the best information currently available for the Delta and Suisun Marsh. These fragility curves and the DLIS analysis only consider levee failure due to the level of peak ground acceleration and do not consider seismic directivity or post-event compression of levee or levee foundation materials.

The approach taken in the DRMS study (DWR 2009d) was to define 22 seismic vulnerability classes for the Delta and Suisun Marsh levees based on levee material and levee foundation material types. Seismic fragility relationships were then developed for each seismic vulnerability class. The DRMS seismic levee fragility relationships describe the performance of a levee in terms of probability of levee breach for a range of potential pga values. An example of a DRMS seismic levee fragility relationship is shown on Figure 4-29. In this example, the probability of a levee breach (y axis) at a pga of 0.4g (x axis) is about 0.5 (50 percent) for Seismic Vulnerability Class 5, one of 22 vulnerability classes defined for the Delta in the DRMS study (DWR 2009d).

Figure 4-29
Example Seismic Levee Fragility Relationship (DWR 2009d)



4.4.4.1 DRMS Seismic Levee Fragility Relationships

The seismic levee fragility relationships used in the DRMS study were developed by the DRMS investigators based on a series of numerical and statistical analyses of levee performance under dynamic loading (DWR 2009d). Seismic levee fragility relationships were developed for 22 seismic levee vulnerability classes. Vulnerability classes were defined by differences in levee and levee foundation conditions throughout the Delta and Suisun Marsh.

The seismic levee fragility relationships used in the DLIS analyses were the same as those used in the DRMS study. Based on the “weakest link” concept, the seismic levee fragility relationship for the worst seismic vulnerability class at each island or tract was used in the DLIS analyses.

4.4.4.2 DLIS Annual Probability of Seismic Failure

The methods used by the DLIS team to calculate an annual probability of seismic levee failure for the Delta and Suisun Marsh levees are described below. Although the DRMS reports do not specifically describe the methods that were used to calculate annual probabilities of seismic levee failure, it is reasonable to assume that similar methods were used based on the presentations (DWR 2007, 2008a, 2008b) of the DRMS analysis of Delta and Suisun Marsh seismicity and levee fragility.

Basic Methodology of Annual Probability of Failure

The annual probability of failure of a system or structure due to hazard events can be calculated if the following can be estimated for every hazard level:

1. Annual probability of occurrence of each hazard level
2. Conditional probability of failure of the system or structure for each hazard level.

The annual probability of failure can then be calculated as the sum of the products of the annual probability of occurrence and conditional probability of failure over all hazard levels, which can be mathematically expressed as:

$$P_{af} = \sum_{i=1}^N P_H(i) \times P_{f|H}(i) \quad (\text{Equation 4-4})$$

where:

P_{af} = annual probability of failure

N = number of hazard levels

$P_H(i)$ = annual probability of occurrence of hazard level i

$P_{f|H}(i)$ = conditional probability of failure at hazard level i

Note that all hazard levels must be considered and the sum of the annual probability of occurrence of all hazard levels must equal one (100 percent).

For example, if the hazard levels for a system or structure were *none*, *moderate*, and *severe* with annual probabilities of occurrence of 0.80, 0.15, and 0.05 (80, 15, and 5 percent) and conditional probabilities of failure of 0.0, 0.1, and 0.5 (0, 10, and 50 percent), respectively, the annual probability of failure of the system or structure would be 0.04 (4 percent).

$$P_{af} = (0.80 \times 0.0) + (0.15 \times 0.1) + (0.05 \times 0.5) = 0.04$$

Methodology for Annual Probability of Seismic Levee Failure

The methodology used by the DLIS team to calculate an annual probability of levee seismic failure is based on the assumption that the seismic hazard can be represented by a range of pga and that seismically induced levee failure is a function of pga. Under these assumptions, it is necessary to obtain

an estimate of the probabilities of occurrence over the anticipated pga range and an estimate of the conditional probability of seismic levee failure for the range of pga values.

Probability of pga Occurrence

As noted earlier, the range and probability of pga values were derived from the 2014 National Seismic Hazard Maps (NSHMs) pga recurrence data published by the USGS (2014a, 2014c). The 2014 NSHM pga recurrence data are provided for the contiguous 48 U.S. states and consist of a pga range of 0.005g to 3.3g in a regular grid of points separated by 0.05 degrees of latitude and longitude. In the area of the Delta and Suisun Marsh, 0.05 degrees of latitude is a distance of approximately 3 miles and 0.05 degrees of longitude is a distance of approximately 2 miles. The 2014 NSHM pga recurrence data at the grid point nearest the centroid of each island or tract in the Delta and Suisun Marsh were used to develop pga recurrence curves for each island and tract. An example of a pga recurrence curve developed from the NSHM data grid for Tyler Island is shown on Figure 4-30.

To use NSHM pga recurrence data in Equation 4-4, it is necessary to convert the recurrence data to the probability of occurrence for incremental pga ranges. The USGS data are provided in base-10 logarithm increments; thus, it is reasonable and convenient to use these increments. The probability of occurrence of each incremental pga range is the difference between the recurrence probabilities at each end of each incremental range. A graph of the occurrence probabilities for Tyler Island is shown on Figure 4-31, which is based on an example of this conversion as illustrated in Table 4-16.

Figure 4-30
pga Annual Recurrence Curve, Tyler Island

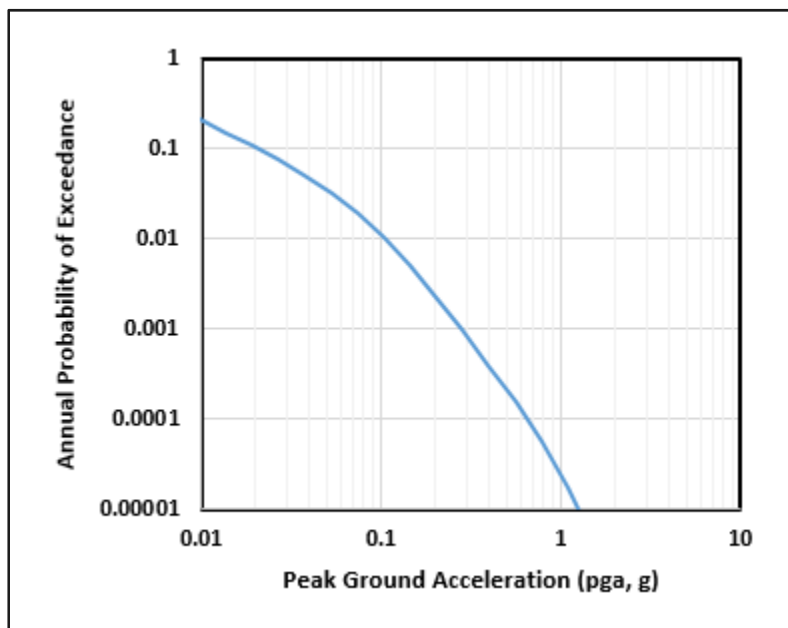


Figure 4-31
pga Annual Occurrence Probability, Tyler Island

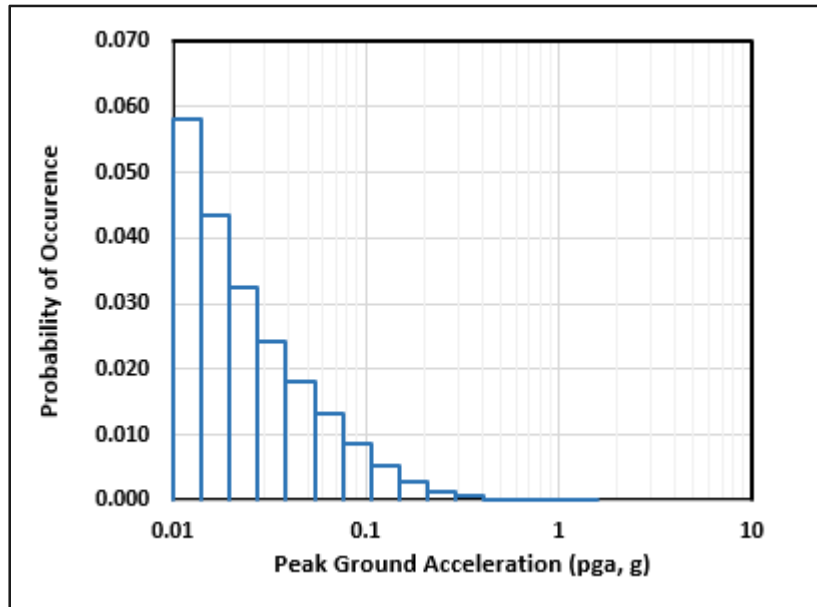


Table 4-16
Recurrence to Occurrence Probability Conversion, Tyler Island

2014 NSHM Data		Incremental Range	
pga	Exceedance Probability	pga	P _H
0.00980	0.20850		
0.01370	0.15038	0.00390	0.05812
0.01920	0.10685	0.00550	0.04353
0.02690	0.07451	0.00770	0.03234
0.03760	0.05036	0.01070	0.02415
0.05270	0.03211	0.01510	0.01825
0.07380	0.01900	0.02110	0.01311
0.10300	0.01034	0.02920	0.00865
0.14500	0.00505	0.04200	0.00530
0.20300	0.00229	0.05800	0.00275
0.28400	0.00098	0.08100	0.00131
0.39700	0.00040	0.11300	0.00058
0.55600	0.00016	0.15900	0.00025
0.77800	0.00006	0.22200	0.00010
1.09000	0.00002	0.31200	0.00004
1.52000	0.00000	0.43000	0.00001
2.20000	0.00000	0.68000	0.00000

Note that the incremental hazard level probabilities (P_H) shown in Table 4-16 sum to only about 0.21 rather than 1.0 as required by the methodology described in the previous section. The remaining hazard level probability of 0.79 are pga values of less than about 0.01g. The conditional probability of seismic levee failure for pga values below 0.01g is negligible; hence, for clarity, the probabilities of the remaining, very low hazard levels are not shown.

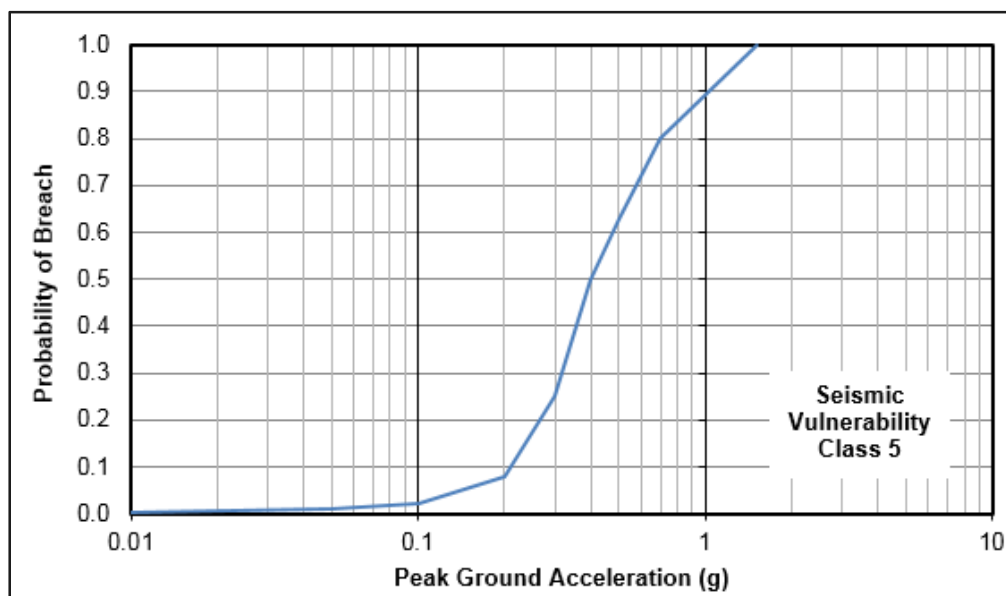
Conditional Probability of Seismic Levee Failure

The conditional probability of seismic levee failure used by the DLIS team are the seismic fragility curves presented in DRMS (DWR 2008e, 2008g). The approach taken in the DRMS study was to define 22 seismic vulnerability classes for the Delta and Suisun Marsh levees based on levee material and levee foundation material types. Seismic fragility relationships were then developed for each seismic vulnerability class. The DRMS seismic levee fragility relationships describe the performance of a levee in terms of probability of levee failure for a range of potential pga values. An example of a DRMS seismic

levee fragility relationship is shown on Figure 4-32. In this example (Site Vulnerability Class 5), the probability of a levee breach at a pga of 0.4 is about 0.5 (50 percent).

Because the pga probabilities of occurrence are based on incremental pga ranges, it is necessary to consider the conditional probability of seismic levee failure using the same incremental pga ranges. The implication of this requirement is that all pga values within an incremental range must be assumed to have the same effect on seismic levee performance; e.g., for the example shown in Table 4-16, it is necessary to assume that any pga in the range of 0.103g to 0.145g would have the same effect on seismic levee performance. Considering the uncertainty in estimating seismic recurrence and seismic levee fragility, this discrete approximation of continuous relationships is reasonable.

Figure 4-32
Seismic Levee Fragility Curve



Incremental conditional probabilities of failure ($P_{f|H}$) for use in Equation 4-4 are computed by piece-wise linear interpolation of a seismic levee fragility curve such as the one shown on Figure 4-32. The interpolation is done for each hazard level using the mid-point of the incremental pga range as the independent variable in the interpolation as shown in Table 4-17.

Annual Probability of Seismic Levee Failure

The final steps in calculating an annual probability of seismic levee failure are to multiply incremental hazard level probabilities (P_H , fourth column in Table 4-17) by the conditional probability of failure ($P_{f|H}$, fifth column in Table 4-17) and sum the results (P_f , sixth column in Table 4-17). In the example shown, the annual probability of seismic levee failure is approximately 0.011 (1.1 percent) as shown at the bottom of Table 4-17.

Table 4-17

Calculation of Annual Probability of Seismic Levee Failure, Tyler Island

2014 NSHM Data		Incremental Range		Conditional Probability of Failure	Incremental Probability of Failure
pga	Exceedance Probability	pga	P_H	$P_{f H}$	P_f
0.00980	0.20850	0.00280			
0.01370	0.15038	0.00390	0.05812	0.00317	0.00018
0.01920	0.10685	0.00550	0.04353	0.00899	0.00039
0.02690	0.07451	0.00770	0.03234	0.01715	0.00055
0.03760	0.05036	0.01070	0.02415	0.02853	0.00069
0.05270	0.03211	0.01510	0.01825	0.04449	0.00081
0.07380	0.01900	0.02110	0.01311	0.10935	0.00143
0.10300	0.01034	0.02920	0.00865	0.22108	0.00191
0.14500	0.00505	0.04200	0.00530	0.36470	0.00193
0.20300	0.00229	0.05800	0.00275	0.55654	0.00153
0.28400	0.00098	0.08100	0.00131	0.72657	0.00095
0.39700	0.00040	0.11300	0.00058	0.83829	0.00048
0.55600	0.00016	0.15900	0.00025	0.89150	0.00022
0.77800	0.00006	0.22200	0.00010	0.91522	0.00009
1.09000	0.00002	0.31200	0.00004	0.94175	0.00004
1.52000	0.00000	0.43000	0.00001	0.97863	0.00001
2.20000	0.00000	0.68000	0.00000	1.00000	0.00000
Annual Probability of Seismic Levee Failure					0.011
					1.1%

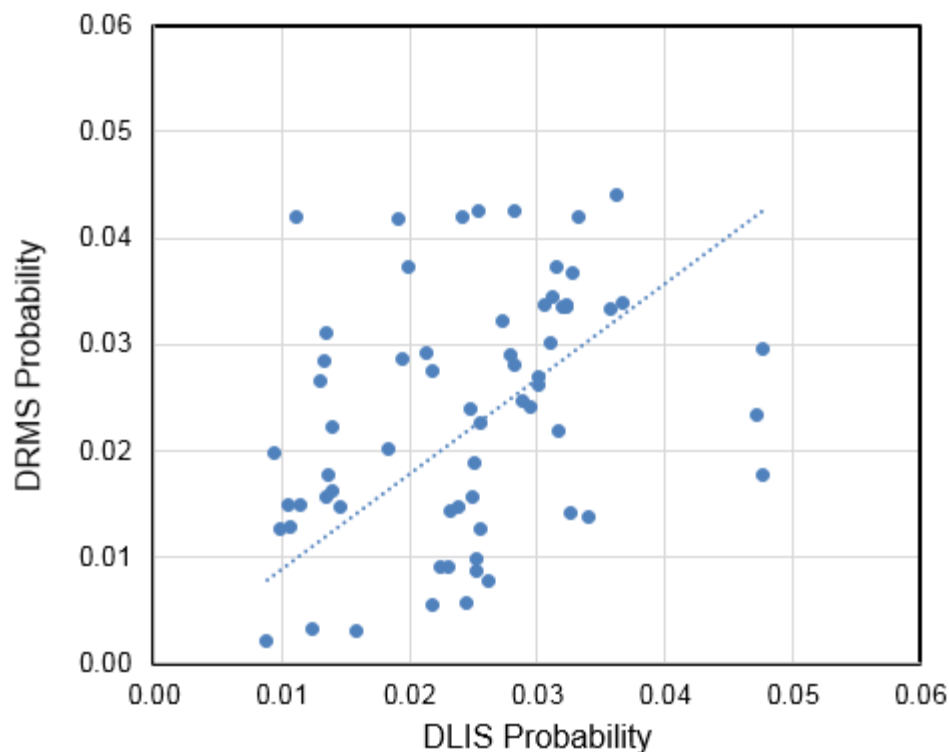
4.4.4.3 DRMS and DLIS Probability of Seismic Levee Failure

The annual probabilities of seismic levee breaching for the Delta and Suisun Marsh levees that have been estimated by the DLIS team are somewhat less than the annual probabilities of seismic levee breaching presented in the DRMS reports (DWR 2007, 2008e, 2008g). This section summarizes the different approaches and assumptions that lead to the differences in estimated probabilities. In this report, a seismic levee breach is presumed to result in island flooding.

The annual probabilities of seismic levee breaching calculated in the DRMS study are presented in Table 13-3 in DWR (2008c). The probabilities were calculated for islands and tracts in the Delta and

Suisun Marsh that are in the 100-year flood plain. The graph on Figure 4-33 provides a comparison between the annual probability of seismic levee breaching calculated by the DRMS and DLIS methods. This graph is limited to 65 islands and tracts in the Delta 100-year flood plain to match the limitation imposed in the DRMS study.

Figure 4-33
DRMS and DLIS Annual Probability of Seismic Levee Breach



The annual probability of seismic levee breaching calculated in the DLIS analyses is, on average, about 10 percent less than the probabilities calculated in the DRMS study. The difference between the DRMS and DLIS method of estimating seismic recurrence is the most likely reason for the difference in the calculated annual probabilities of seismic levee breaching.

Because the calculation of the expected number of seismic levee breaches in a 25-year period depends on the annual probability of seismic levee breach, the expected number of seismic levee breaches in a 25-year period that have been calculated in the DRMS and DLIS studies are different, as well. Figure 4-34 shows the somewhat greater severity of the DRMS results. The difference in expected number of seismic levee breaches in a 25-year period is consistent with the difference in annual probability of seismic levee breaching between the DRMS and DLIS studies.

Due to the level of detail presented in the DRMS reports, it is not possible to completely replicate the DRMS calculation of annual probability of levee breaching. However, it is possible to calculate an annual probability of levee breaching using the DRMS and DLIS seismic recurrence relationships shown on Figures 4-20 and 4-21 and a common seismic fragility relationship. This calculation, completed for the six locations shown on Figures 4-20 and 4-21, is presented in Table 4-18.

Figure 4-34
Probability of Levee Breaching in 25-Year Period

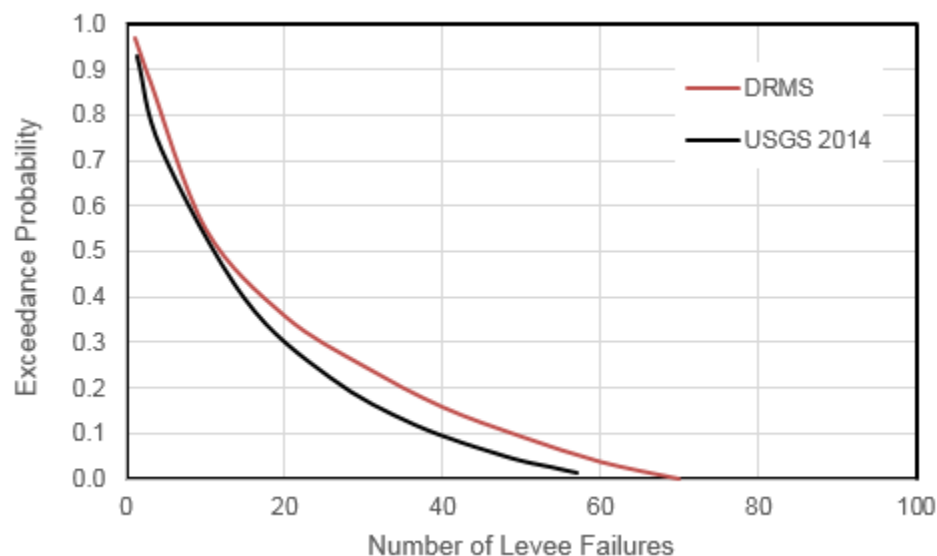


Table 4-18
Annual Seismic Levee Breaching Probability Comparisons

DRMS Designation ¹	DLIS Designation ²	DRMS 1 ³	DRMS 2 ⁴	DLIS ⁵
Sacramento	West Sacramento	0.0150	0.0123	0.0121
Stockton	Stockton	0.0022	0.0127	0.0088
Delta Cross Channel	Walnut Grove	0.0091	0.0165	0.0054
Clifton Court	Clifton Court	0.0296	0.0236	0.0223
Sherman Island	Sherman Island	0.0367	0.0241	0.0327
Montezuma Slough	DLIS-63	0.0543	0.0243	0.0195

1 = Location designation used in references DWR 2007 and 2008c

2 = Location designation used in DLIS reports

3 = Annual probability of seismic island flooding reported in DWR 2008c

4 = Annual probability of seismic island flooding based on seismic recurrence data in DWR 2007

5 = Annual probability of seismic island flooding based on USGS seismic recurrence data (Petersen et al. 2008)

With the exception of the Sherman Island result, the annual probability of levee breaching presented in the DRMS report (column DRMS 1 in Table 4-18) is about 1.5 times greater than the annual probability of levee breaching calculated using the USGS data (column DLIS in Table 4-18). With the exception of the Stockton result, the annual probability of levee breaching calculated using the DRMS seismic recurrence relationships (column DRMS 2 in Table 4-18) is about 1.3 times greater than the annual probability of levee breaching calculated using the USGS data (column DLIS in Table 4-18). Based on our analysis, we conclude that the difference in seismic recurrence relationships between DRMS and DLIS appears to account for about 90 percent of the difference in the annual probability of levee breaching between the

two studies. The remaining difference may be due to the different datasets used to generate the seismic recurrence relationships. Updating the DRMS analysis with the 2014 USGS data will reduce the difference between DRMS and DLIS annual probabilities of levee breaching, but may not align them completely.

The DLIS method for determining the probability of flooding for each island due to seismic events was selected because it is based on the more commonly used time-independent hazard model and can easily and reliably be applied to each leveed island and tract throughout the Delta and Suisun Marsh. Considering the range of possible seismic levee breaching probabilities, the DLIS team has completed sensitivity analyses (Section 5-3) to determine if the range of probabilities has a material effect on the investment priorities.

4.5 Consequences of Levee Failure

A comprehensive analysis of levee failure consequences considers the immediate and long-term impacts to human health and safety; economic damage to assets; and other social, political, and environmental consequences. The DLIS project addresses these consequences by calculating expected monetary and non-monetary damages and developing the DLIS DST, as described in Sections 5.0 and 6.0 of this report.

In general, levee failure consequences can be categorized as direct or indirect and tangible or intangible. Direct consequences are those that occur through contact with the flood waters, whereas indirect consequences are those created by the levee failure but occurring outside the flooded area, or after the flood is over. Tangible consequences are generally those damages that can be assigned a monetary value or can be enumerated (e.g., fatalities). Intangible consequences may be monetary in nature, but are generally more difficult to identify and calculate (e.g., ecosystem damages).

A matrix of direct-indirect and tangible-intangible levee failure consequence categories is shown in Table 4-19. Most of the assets in the direct, tangible consequence category are discussed (including estimates of potential monetary damages where possible) in Section 5.0, and are addressed using the DST, as discussed in Section 6.0.

Table 4-19
Levee Failure Consequence Categories

Type of Consequence	Tangible (generally monetary)	Intangible (monetary or non-monetary)
Direct	Buildings and contents	Fatalities
	Infrastructure	Injuries
	Crops and livestock	Psychological distress
	Erosion of agricultural soil	Cultural heritage loss
	Ecosystem	
	Evacuation and rescue	
	Repair and cleanup	
Indirect	Business disruption	Loss of trust in authorities
	Public service disruption	Trauma
	Traffic disruption	
	Loss of tax revenue	

(Source: Merz et al. 2010)

4.5.1 Multiple Island Failures

Flood and seismic hazard events affect all Delta and Suisun Marsh levees approximately simultaneously. Hence, there is a potential for multiple islands to flood simultaneously during any hazard event. The number of islands that might simultaneously flood due to levee failure from a flood event or seismic event depends on the magnitude of the event, the probability of a levee failure at each event magnitude, and the correlation of levee failure between islands (i.e., how likely they are to fail at the same time).

The analysis of individual island risk in the Delta and Suisun Marsh estimated the range of flood and seismic hazards and the probabilities of flood-induced and seismic island flooding. These estimates can also be used to estimate the potential number of islands that flood simultaneously in different events. This is accomplished using a Monte Carlo analysis (USACE 2015). A Monte Carlo analysis is a problem solving technique that uses repeated simulations of an uncertain event to estimate the likelihood of each possible outcome.

In the case of Delta levees, the uncertain event is a flood or an earthquake and the outcome is the number of islands that could flood simultaneously during the event. The probability of each possible outcome is estimated by repeatedly simulating the event and counting the number of islands that flood in each simulation.³ Importantly, there is insufficient scientific evidence about the vulnerability of Delta levees to determine the correlation among levee failures. This analysis treats the islands as though levees fail independently. Doing so does not affect the number of islands expected to flood in any

³ Note that this is a numerical simulation rather than a geophysical or hydrologic simulation.

particular event, but it does affect the distribution of that number. The tails of the distribution would be more likely if levee failures are correlated.⁴

The results of 50,000 simulations of a 100-year and a 500-year hydrologic flood in the Delta are shown in on Figure 4-35. The horizontal axis represents the number of islands that simultaneously flood in the simulations. The vertical axis on the left is the number of simulations (out of 50,000) corresponding to each bin of the number of flooded islands. The vertical axis on the right shows percent of the simulations corresponding to each bin. These percentages can be interpreted as the probability that the specified number of islands would flood in a 100-year and 500-year hydrologic flood. For a 100-year flood event, the total number of islands flooded per simulation ranged from zero to 18, with a peak frequency of 8 flooded islands. For a 500-year flood event, the total number of islands flooded per simulation ranged from 8 to 32, with a peak frequency of 20 flooded islands.

Simulations similar to the one illustrated on Figure 4-35 were completed for a range of flood and seismic events to estimate the distribution of the number of islands that flood under different flood and seismic event return periods, as described in the following sections. Note that flood and seismic hazards are addressed separately because the probability of a flood event and seismic event occurring simultaneously is very small.⁵

4.5.1.1 Multiple Levee Failures Due to Flood Events

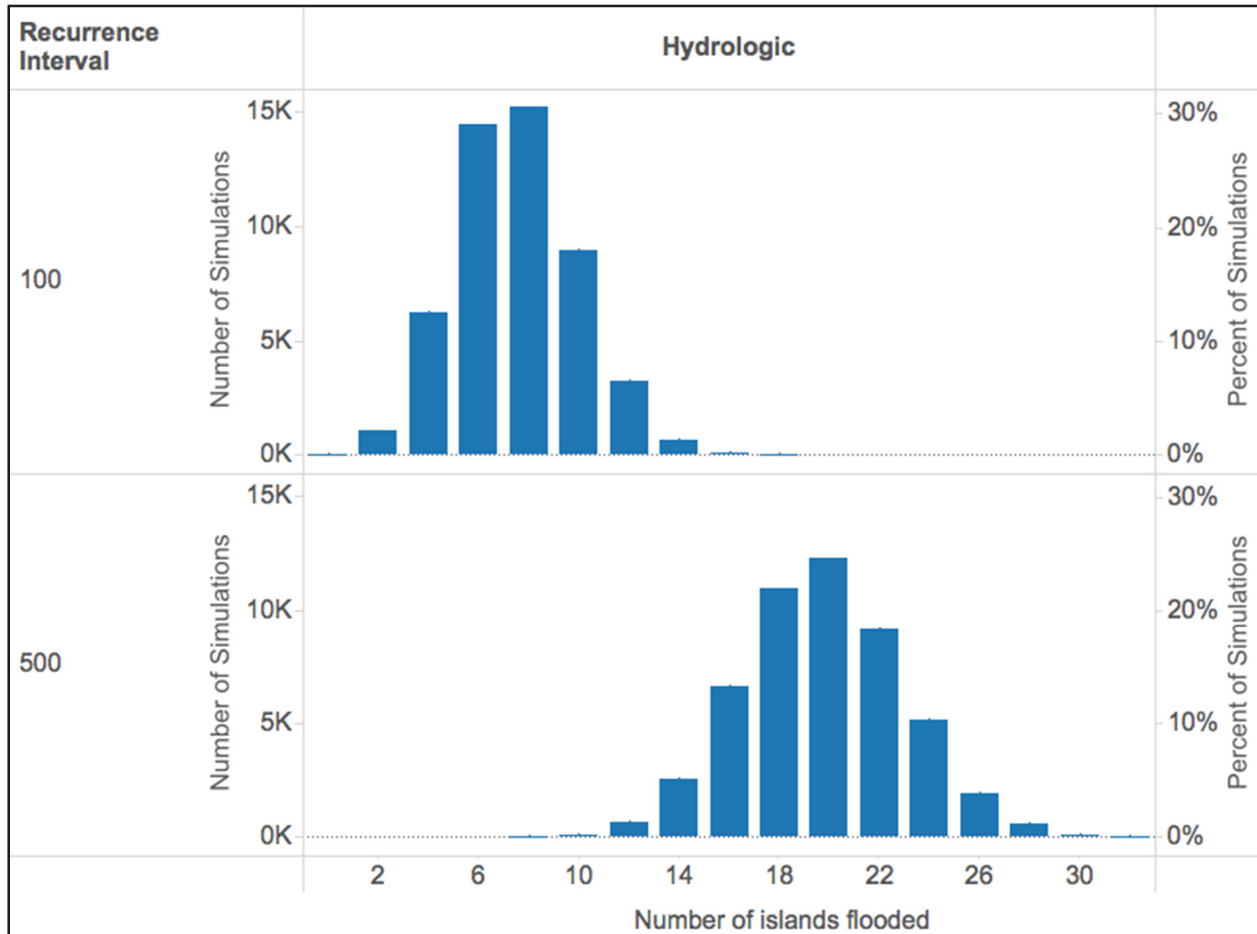
The Monte Carlo analysis was performed only for the leveed islands and tracts in the Delta and Suisun Marsh. Monte Carlo analyses were performed separately for the 109 leveed islands and tracts in the Delta (Table 4-20) and for the 31 leveed islands and tracts in Suisun Marsh (Table 4-21). An additional Monte Carlo analysis was performed for the 20 leveed islands and tracts in the Delta that have been identified in this project as being critical to water supply and water quality (Table 4-22). The DLIS team analyzed water supply islands separately because, due to the complex interplay of islands' effects on hydrodynamics and water supply reliability, there was concern that impacts to water supply might not be adequately captured without considering multiple-island failure scenarios. This additional analysis was performed to assess whether there is disproportionately more risk from flooding in these critical islands than in the Delta as a whole.

By analyzing these water supply islands separately, the project team assessed whether there is disproportionately more risk of flooding in these critical islands than in the Delta as a whole.

⁴ This is true because the expected value of the sum of n random variables is the sum of the expected values of each, regardless of whether they are independent or dependent. However, the distribution of the sum will depend upon their correlation. For example, suppose two islands each have a 10 percent chance of flooding in a particular event. Regardless of the correlation of flooding, the expected number of flooded islands is 0.2. If the levees fail independently, the probability of 0 flooded islands is 81 percent, the probability of 1 flooded island is 18 percent, and the probability of 2 flooded islands is 1 percent. However, if the levee failures are perfectly correlated – either both islands flood or neither floods -- then the probability of 0 flooded islands is 90 percent, the probability of 1 flooded island is 0 percent, and the probability of 2 flooded islands is 10 percent. The tails of the distribution have more likelihood when levee failures are correlated than when they are independent. In the extreme case of perfect correlation shown here, the distribution is bimodal: either all the islands flood or none of them flood. The true distribution is somewhere in the middle, between independence and total correlation.

⁵ For example, the probability that a 100-year flood event and 100-year seismic event would occur in the same year is 1 in 100,000, and the probability that these two events would occur in the same month is less than one in a million.

Figure 4-35
Monte Carlo Simulation of a 100-Year and 500-year Flood Event (109 Delta Islands)



RISK ANALYSIS METHODOLOGY

Table 4-20
Delta Islands and Tracts Evaluated in Multiple Island Failure Analysis

Name	Name	Name
ATLAS TRACT	HONKER LAKE TRACT	STARK TRACT
BACON ISLAND	HOTCHKISS TRACT	STATEN ISLAND
BETHEL ISLAND	JERSEY ISLAND	STEWART TRACT
BISHOP TRACT	KASSON DISTRICT	SUTTER ISLAND
BIXLER TRACT	KING ISLAND	TERMINOUS TRACT
BOULDIN ISLAND	LIBBY MCNEIL	TWITCHELL ISLAND
BRACK TRACT	LISBON DISTRICT	TYLER ISLAND
BRADFORD ISLAND	LITTLE EGBERT TRACT	UNION ISLAND EAST
BRANNAN-ANDRUS	LOWER ROBERTS ISLAND	UNION ISLAND WEST
BYRON TRACT	MAINTENANCE AREA 9 NORTH	UPPER ANDRUS ISLAND
ACHE HAAS AREA	MANDEVILLE ISLAND	UPPER ROBERTS ISLAND
CANAL RANCH TRACT	MCCORMACK-WILLIAMSON	VEALE TRACT
CHIPPS ISLAND	MCDONALD ISLAND	VENICE ISLAND
CLIFTON COURT FOREBAY	MCMULLIN RANCH	VICTORIA ISLAND
CONEY ISLAND	MEDFORD ISLAND	WALNUT GROVE
DEAD HORSE ISLAND	MERRITT ISLAND	WALTHALL
DLIS-01 (PITTSBURG AREA)	MIDDLE ROBERTS ISLAND	WEBB TRACT
DLIS-06 (OAKLEY AREA)	MOSSDALE ISLAND	WEST SACRAMENTO
DLIS-07 (KNIGHTSEN AREA)	NETHERLANDS	WETHERBEE LAKE
DLIS-08 (DISCOVERY BAY AREA)	NEW HOPE TRACT	WINTER ISLAND
DLIS-10	PALM-ORWOOD	WOODWARD ISLAND
DLIS-14 (CENTRAL STOCKTON)	PARADISE JUNCTION	WRIGHT-ELMWOOD
DLIS-15	PEARSON DISTRICT	YOLANO
DLIS-17	PESCADERO DISTRICT	MAINTENANCE AREA 9 SOUTH
DLIS-18	PETERS POCKET	
DLIS-19 (GRIZZLY SLOUGH)	PICO-NAGLEE	
DLIS-22 (RIO VISTA)	PROSPECT ISLAND	
DLIS-62	QUIMBY ISLAND	

RISK ANALYSIS METHODOLOGY

Name	Name	Name
DREXLER POCKET	RANDALL ISLAND	
DREXLER TRACT	RECLAMATION DISTRICT 17	
DUTCH SLOUGH	RINDGE TRACT	
EGBERT TRACT	RIO BLANCO TRACT	
EHRHEARDT CLUB	RIVER JUNCTION	
EMPIRE TRACT	ROUGH AND READY ISLAND	
FABIAN TRACT	RYER ISLAND	
FAY ISLAND	SHERMAN ISLAND	
GLANVILLE	SHIMA TRACT	
GLIDE DISTRICT	SHIN KEE TRACT	
GRAND ISLAND		
HASTINGS TRACT		
HOLLAND TRACT		
HOLT STATION		

RISK ANALYSIS METHODOLOGY

Table 4-21
Suisun Marsh Islands and Tracts Evaluated in Multiple Island Failure Analysis

Name	Name
DLIS-25	DLIS-44 (HILL SLOUGH UNIT)
DLIS-26 (MORROW ISLAND)	DLIS-46
DLIS-27	DLIS-47
DLIS-28	DLIS-48
DLIS-29	DLIS-49
DLIS-30	DLIS-50
DLIS-31 (GARABALDI UNIT)	DLIS-53
DLIS-32	DLIS-54
DLIS-33	DLIS-55
DLIS-34	DLIS-56
DLIS-35	DLIS-57
DLIS-36	DLIS-59
DLIS-37 (CHADBOURNE AREA)	DLIS-63 (GRIZZLY ISLAND AREA)
DLIS-39	MEIN'S LANDING
DLIS-40	SUNRISE CLUB
DLIS-41 (JOICE ISLAND AREA)	

Table 4-22

Water Supply Islands and Tracts Evaluated in Multiple Island Failure Analysis

Name	Name
BACON ISLAND	JONES TRACT
BETHEL ISLAND	MANDEVILLE ISLAND
BRADFORD ISLAND	MCDONALD ISLAND
BYRON TRACT	PALM-ORWOOD
CLIFTON COURT FOREBAY	SHERMAN ISLAND
DLIS-08 (DISCOVERY BAY AREA)	TWITCHELL ISLAND
HASTINGS TRACT	UNION ISLAND WEST
HOLLAND TRACT	VICTORIA ISLAND
HOTCHKISS TRACT	WEBB TRACT
JERSEY ISLAND	WOODWARD ISLAND

The results of a Monte Carlo analysis of the potential number of simultaneous islands flooded in the Delta, Suisun Marsh, and water supply islands are shown in on Figures 4-36, 4-37, and 4-38, respectively. The horizontal axis of each graph is the event return period. The vertical axis is the expected number of flooded islands at a given return period. The solid line in each of these graphs is the mean number of flooded islands for each event return period, and the shaded lines show one standard deviation around the mean, which capture 68 percent of the outcomes. For the case shown on Figure 4-36, the expected number of flooded islands for a 100-year flood event is approximately 16 of the 109 leveed Delta islands and tracts (14.6 percent of the islands), with one standard deviation ranging from approximately 8 to 24 flooded islands.

Figure 4-36
Monte Carlo Analysis of Multiple Island Flooding Due to Flood Events (109 Delta Islands)

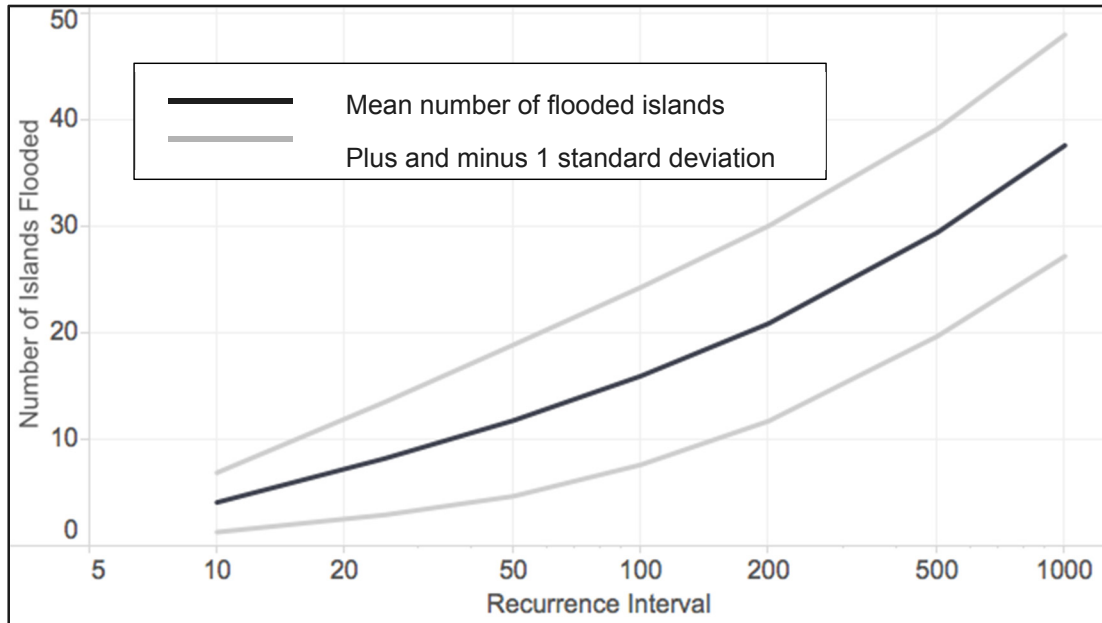


Figure 4-37
Monte Carlo Analysis of Multiple Island Flooding Due To Flood Events (31 Suisun Marsh Islands)

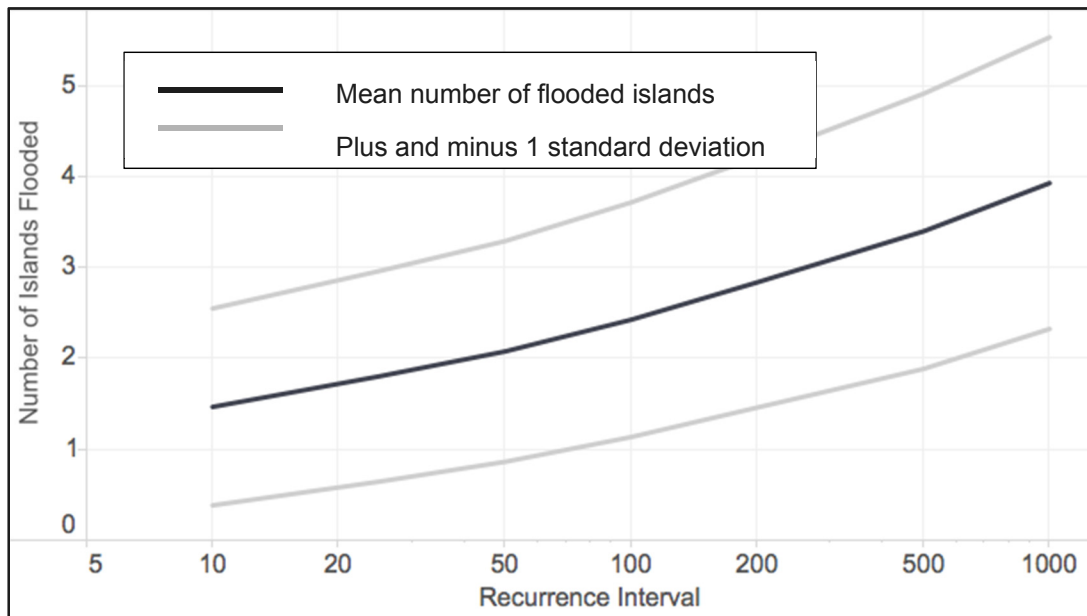
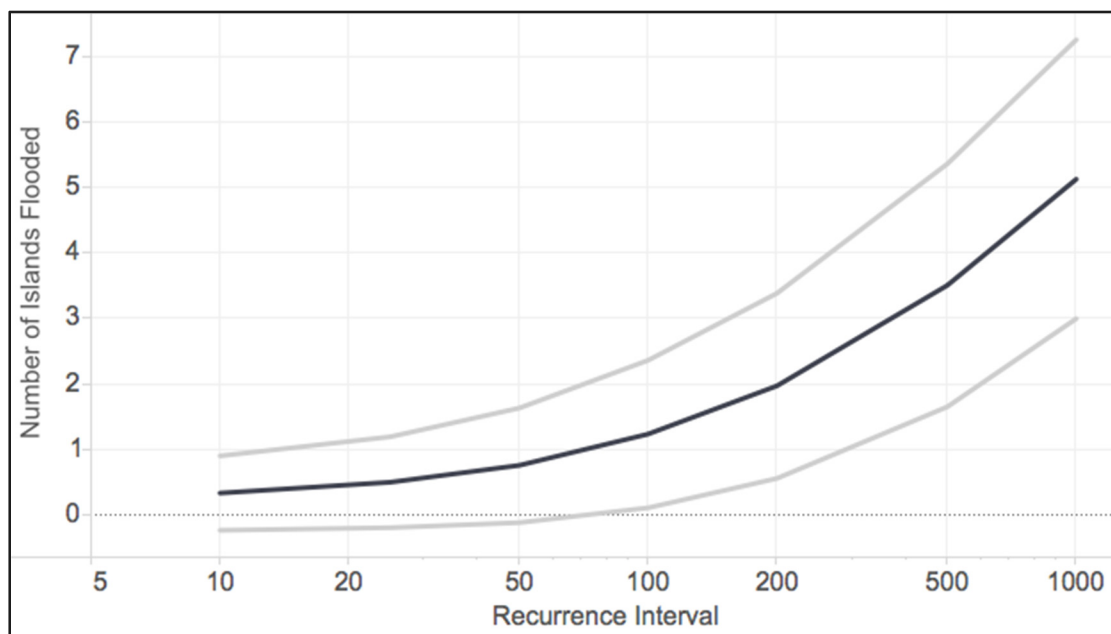


Figure 4-38
Monte Carlo Analysis of Multiple Island Flooding Due to Flood Events (20 Water Supply Islands)



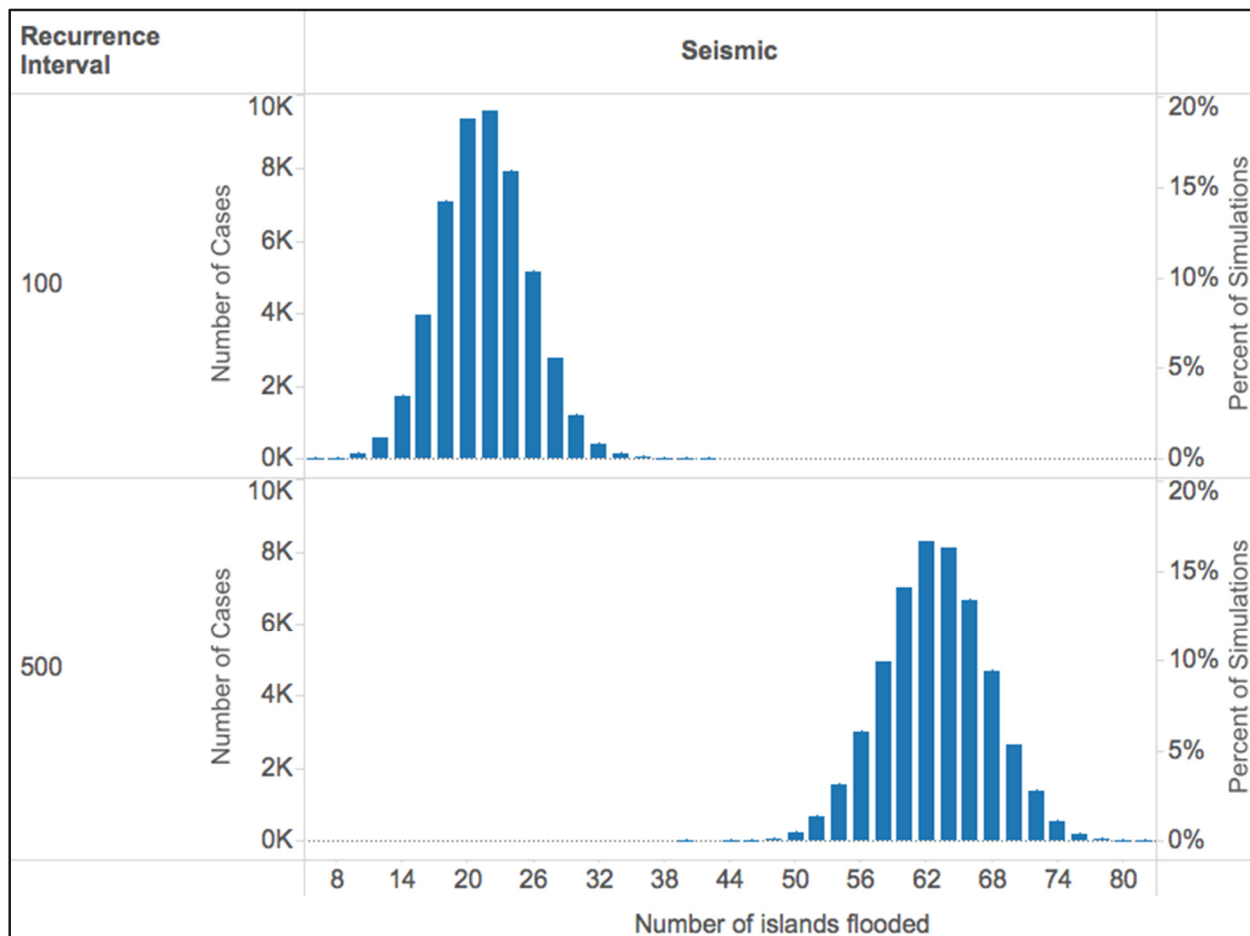
The number of flooded islands rises more sharply with increasing return periods in the Delta than it does in the Suisun Marsh. The difference can be attributed to differences in flood storage capacity in the two areas. The greater storage capacity of the bays facing the Suisun Marsh mitigates the impact of high Delta inflows into the marsh. In contrast, the channels and sloughs in the Delta have much less capacity. The result is a lesser rise in water levels in the Suisun Marsh than in the Delta for a given Delta inflow.

Figure 4-38 shows that the percent of islands that flood due to high water levels among the subset of 20 water supply islands is significantly lower than the percent of islands that flood in the entire Delta. For the 100-year event, for example, only slightly more than one island (or 6 percent of the water supply islands) would fail, indicating that the leveed water supply islands have lower flood vulnerability than the whole Delta. This is important because it suggests that the risk of flooding is *not* concentrated in those critical islands.

4.5.1.2 Multiple Islands Flooded Due to Seismic Events

The results of 50,000 simulations of a 100-year and a 500-year seismic event in the Delta are shown on Figure 4-39. As on Figure 4-35, the horizontal axis is the range of outcomes, i.e., the number of islands that could simultaneously flood. The vertical axis on the left is the frequency, and the vertical axis on the right is the percent of simulations in which each outcome occurred. For a 100-year seismic event, the total number of islands flooded per simulation ranged from 0 to 42, with the peak frequency of flooded islands of 22. For a 500-year flood event, the total number of islands flooded per simulation ranged from 40 to 82, with a peak frequency of flood islands of 62.

Figure 4-39
Monte Carlo Simulation of a 100-Year and 500-year Seismic Event (109 Delta Islands)



The results of a Monte Carlo analysis of the potential number of islands that might fail simultaneously in the Delta, Suisun Marsh, and water supply islands due to a seismic event are shown on Figures 4-40, 4-41, and 4-42, respectively. As on Figures 4-36, 4-37, and 4-38, the horizontal axis of each graph is the event return period. The vertical axis is the expected number of flooded islands at a given return period. The solid line on each of these graphs is the mean number of islands flooded for each event return period, and the shaded lines show one standard deviation around the mean.

The pattern of increasing number of islands flooded with increasing seismic return periods is generally similar between the Delta and Suisun Marsh. However, the percent of islands flooded at a particular return period is slightly lower in the Suisun Marsh (for the 100-year event, 10 percent of Suisun islands would flood, versus 20 percent of all Delta islands).

The pattern of increasing number of islands flooded with increasing seismic return periods is also similar between the 20 water supply islands and the 109 Delta islands (approximately 20 percent of islands flood at the 100-year recurrence interval for the entire Delta and just the water supply islands). This indicates that the leveed water supply islands are no more seismically vulnerable than the entire set of Delta islands and tracts.

Figure 4-40
Monte Carlo Analysis of Multiple Island Flooding Due to Seismic Events (109 Delta Islands)

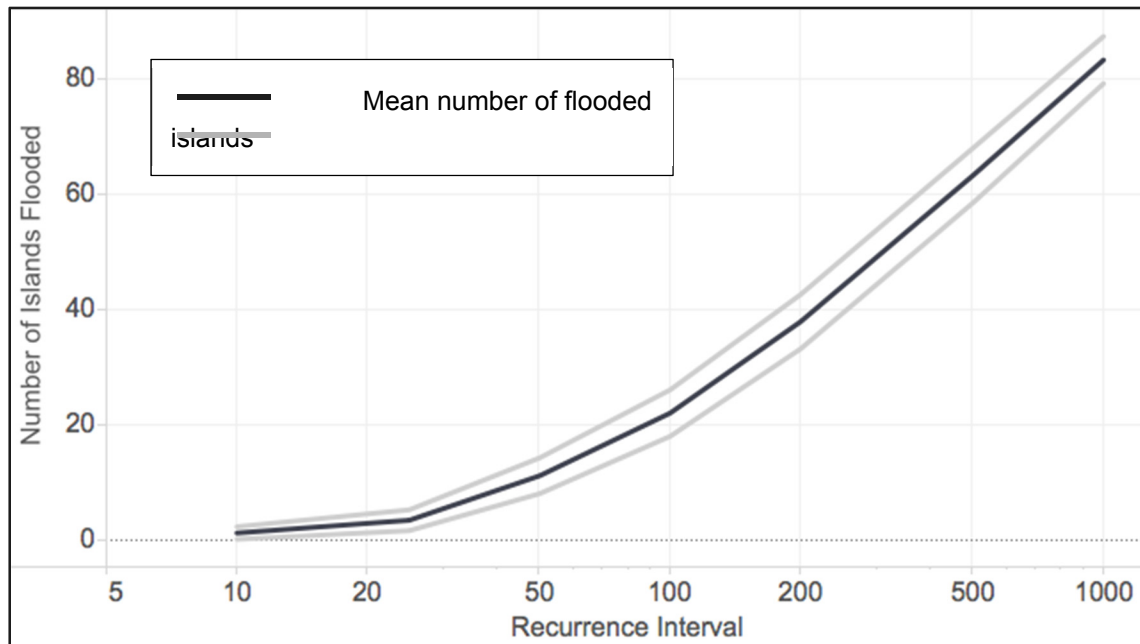


Figure 4-41
Monte Carlo Analysis of Multiple Island Flooding Due to Seismic Events (31 Suisun Marsh Islands)

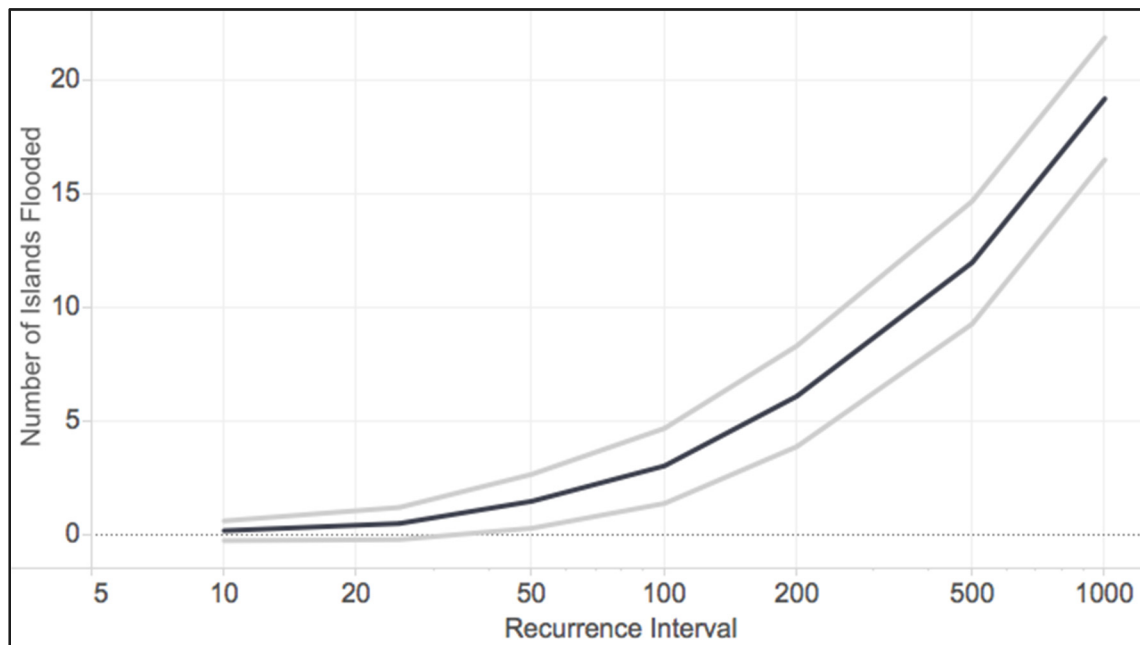
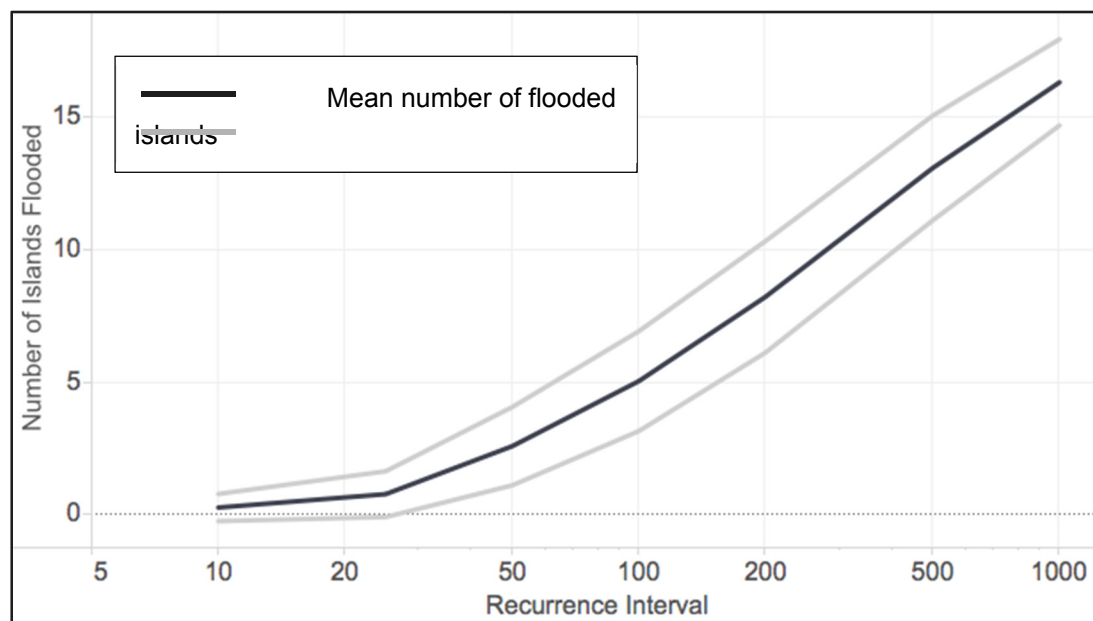


Figure 4-42
Monte Carlo Analysis of Multiple Island Flooding Due to Seismic Events (20 Water Supply Islands)



In general, the expected number of flooded islands is greater for flood events than for seismic events for return periods of less than about 50 years. For return periods of 50 years or more, the expected number of flooded islands due to seismic events is substantially greater than for flood events.

4.5.1.3 Comparing DLIS and Other Multiple Delta Island Failure Analyses

An additional analysis reported in *Risks and Options to Reduce Risks to Fishery and Water Supply Uses of the Sacramento/San Joaquin Delta* (DWR and CDFG 2008) shows the exceedance probability of multiple seismic levee failures in a 25-year exposure window (Figure 4-43). A similar analysis was completed using the results of the DLIS Monte Carlo analysis of 109 Delta islands and tracts presented in Table 4-20. This analysis is shown on Figure 4-44.

The DWR and CDFG (2008) analysis indicates that the probability of, for example, at least 10 levee failures occurring from a single seismic event in a 25-year period would range from about 0.32 to 0.58 with a most likely probability of 0.50 (Figure 4-43). The DLIS Monte Carlo analysis indicates that the probability of at least 20 islands flooding from a single seismic event in a 25-year period due to seismic activity would range from about 0.23 to 0.35 with a most likely probability of 0.30 for the 109 leveed Delta islands and tracts (Figure 4-44). This difference may be due to differing assumptions about the probabilities of seismic levee failure and the number of islands and tracts considered in the analyses. The probabilities of seismic failure and number of islands and tracts considered are not presented in the DWR and CDFG 2008 report; however, references in the report suggest the analysis was based on data from the DRMS reports and that approximately 70 islands and tracts were considered.

Figure 4-43
Exceedance Probability in a 25-year Exposure Period of the
Number of Simultaneous Levee Failures from a Seismic
Event (DWR and CDFG 2008)

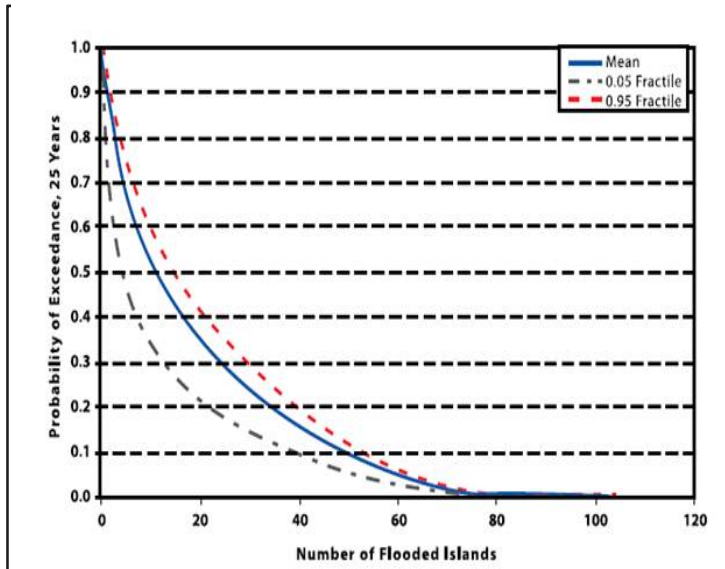
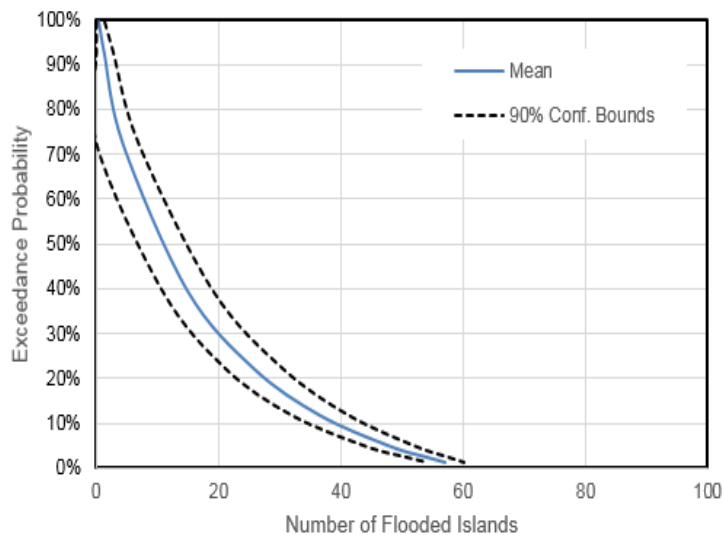


Figure 4-44
DLIS Monte Carlo Analysis of Exceedance Probability in
a 25-year Exposure Period of the Number of
Simultaneous Levee Failures from a Seismic Event



4.6 Future Conditions

Estimating the probability of future levee failures will depend on assumptions regarding future levee hazards and vulnerabilities, which will lead to changes in predicted consequences and damage costs. The monetary and non-monetary analyses described in Section 5.0 of this report are based on existing conditions as well as a range of possible future conditions to evaluate the effect on the magnitude and uncertainty of the predicted consequences and damage costs.

Based on a review of the previous Delta and Suisun Marsh studies and the literature, the DLIS project team concluded that the most significant uncontrollable variations in Delta and Suisun Marsh levee hazards would be from climatic changes and land subsidence; the most significant controllable hazard variations would be from levee deterioration.

Uncontrollable climatic changes that would alter the Delta and Suisun Marsh levee hazards include increased precipitation in the Delta drainage basin, earlier and higher elevation snowmelt in the Delta drainage basin, and sea level rise. Precipitation and snowmelt changes will alter the magnitude and frequency of total inflow to the Delta. Sea level rise will alter flows through the Delta by decreasing the flow gradient. As sea level rises, the difference in water elevation (gradient) between the Delta inflow points and outflow point at Carquinez Strait becomes smaller. The overall impact of precipitation and snowmelt changes on the DLIS analyses will be to alter the discharge-frequency curve used to estimate total Delta inflow probabilities and the stage-recurrence curves used to estimate water level probabilities at each Delta and Suisun Marsh island and tract. The impacts associated with sea level rise are discussed in Section 4.4.3.6 and are incorporated into the future conditions in the DLIS DST (see Section 6.0). The other potential impacts of climate change (e.g., precipitation or snowmelt changes) have yet to be incorporated into the DLIS analyses.

Continued subsidence, even in the absence of climatic changes, will increase the hydraulic pressure on the Delta and Suisun Marsh levees and will create groundwater control issues that may reduce agricultural productivity. The impact of continued subsidence on the DLIS analyses will be to alter the Delta and Suisun Marsh levee fragility curves to account for increased probability of seepage failure and will alter future agricultural asset values to account for reduced productivity.

The controllable hazard of levee deterioration, including subsidence, is addressed by continued maintenance and by major levee improvements, including strategic investments in the Delta and Suisun Marsh that can be considered via the DLIS DST. Major levee improvements will alter the levee fragility and depth-damage functions used in the DLIS analyses. Consideration of new or improved levees will require alterations to levee fragility curves to reflect levee performance improvements. Consideration of non-structural alternatives (e.g., flood-proofing buildings) require changes to depth-damage functions to reflect the lesser cost of flooding. For the purpose of the DLIS project, the DLIS team assumed that levee maintenance will be sufficient to maintain the levees in their present day condition.

5.0 RISK ANALYSIS

5.1 Introduction to Risk Methodology

Estimates of current and future flood risks to the Delta have been developed based on existing data. These estimates provide the baseline needed to evaluate risk reduction that may be achieved under various levee investment portfolios. The DLIS project team developed models to estimate each of the risk metrics, which include risks to life, property, and State interests. These models are described in Section 5.2 as the probability of flooding, EAD, EAF, and risks to water supply, ecosystem, and the Delta as a place. These models estimate risks for each island and tract, with and without additional investment, for the three time horizons (in the year 2012, in the year 2030, and in the year 2050). The following discussions describe the methods used to calculate these risks along with the supporting data sources, uncertainties, assumptions, and limitations.

Inputs to the risk models are stored in a database and comma separated files. The risk models are implemented in R—an open-source statistical analysis package—and are designed to be fast and user adjustable to represent different levee investments assumptions about future levee hazards and levee conditions. Section 6.3 presents various graphical depictions of the risk identified during the DLIS project. Model outputs are stored in an SQLite database and visualized using the DST, which is described in detail in Section 6.4.

5.2 Risk Metrics

5.2.1 Probabilities of Flooding

The risk metrics used to measure the impacts of floods have a common underpinning: the probability of flooding. While it is not possible to know precisely when a flood will occur, it is possible to estimate how likely a flood of a particular severity will be in any given year, under assumptions of future conditions. This, combined with the various consequences of flooding, leads to the measures of risk. The annualized approach used in the DLIS analyses assumes that an island or tract can only experience a levee breach once per year and, therefore, the consequences can only occur once per year. For example, a levee breach will result in flood damage to a home at most once per year or will result in the loss of a single year's crop value.

For a given island i , the annual probability of a flood of level d is written $p_{flood_{i,d}}$. This probability is itself a product of the probability of a hazardous event of severity h and the probability of a levee breach on the island if that event were to occur:

$$p_{flood_{i,d}} = p_{hazard_h} \times p_{breach_h} \quad (\text{Equation 5-1})$$

As described in Section 4.0, the two most significant hazards that may cause a Delta levee breach are water levels in the Delta and seismic activity. Because the timing of a particular hazard level is uncertain, the probabilities are represented by *stage-recurrence* relationships, which define the annual probability (recurrence) of each possible water level (stage), and by *peak ground acceleration-recurrence*

relationships, which define the annual probability of each possible level of pga from seismic activity. A levee's vulnerability to each possible hazard level is represented by a *fragility* curve that defines the probability of levee failure given the hazard level (height of water or the ground acceleration) and the condition of the levee.

Certain consequences of flooding depend on the severity of the flood. For example, as discussed in Section 5.2.3, fatality rates depend on how deep the water is when an island floods.⁶ In this case, the concern is the annual probability of an island flooding. The annual probability can be calculated by summing Equation 5-1 over all possible levels of hazard severity:

$$p_{flood_i} = \sum_h p_{hazard_h} \times p_{breach_h} \quad (\text{Equation 5-2})$$

where

p_{flood_i} is the annual probability of a flood, p_{hazard_h} is the annual probability of that hazard event occurring and

p_{breach_h} is the annual probability of a levee breach if that hazard were to occur.

These values, $p_{flood_{i,d}}$ from Equation 5-1 and p_{flood_i} from Equation 5-2, are used throughout the calculations of metrics.

Data Sources, Uncertainties, and Limitations

The data required for calculating the probability of flooding are hazard recurrence curves and fragility curves, which are discussed in Section 4.0. The uncertainties and limitations of estimating flood hazards and levee failures are discussed in Section 5.3.

5.2.2 Expected Annual Damages—Property in the Delta

One of the objectives of the DLIS project is to develop a methodology to estimate the losses resulting from levee failures in the Delta and Suisun Marsh. The methodology developed by the DLIS project team enables losses to be estimated for levee conditions with and without State investment for input to a comparative analysis of losses. The comparative analysis will help inform the State's deliberations about when, where, and how much to invest in the Delta and Suisun Marsh levees.

To focus the development of a loss estimation methodology, the DLIS team has adopted the terminology of loss estimation provided in the NRC report titled "The Impacts of Natural Disasters, A Framework for Loss Estimation" (NRC 1999). The definitions provided in this report are generally consistent with the terminology used by the USACE and FEMA.

The following definitions are cited from the NRC (1999) report.

The "impacts of disasters" is the broadest term, and includes both market-based and nonmarket effects. For example, market-based impacts include destruction to property and a reduction in income and sales. Nonmarket effects include environmental consequences and psychological effects suffered by

⁶ Other consequences are independent of flood depth.

individuals involved in a disaster. In principle, individual impacts can be either negative or positive, though obviously the impacts of disasters are predominantly undesirable.

*The “**losses of disasters**” represent market-based negative economic impacts. These consist of **direct losses** that result from the physical destruction of buildings, crops, and natural resources and **indirect losses** that represent the consequences of that destruction, such as temporary unemployment and business interruption.*

*The “**costs of disasters**,” as the term is conventionally used, typically refers to cash payouts by insurers and governments to reimburse some (and in certain cases all) of the losses suffered by individuals and businesses. Losses suffered by those who are uninsured, those whose losses do not make them eligible for insurance payments, and those who do not receive government relief should be counted in any complete compilation of the impacts of a disaster—but these losses are not included as “costs,” as that term is used in this [the NRC] report.*

*The “**damages caused by disasters**” refers to physical destruction, measured by physical indicators, such as the numbers of deaths and injuries or the number of buildings destroyed. **When valued in monetary terms, damages become direct losses.***

The NRC report further notes that “... many of the losses in natural disasters are intangible and difficult to quantify, such as personal anguish, the loss of family treasures, and the disruption of family and work routines. Indeed, these losses may sometimes be greater than the losses of direct physical destruction. Despite the importance of such losses, however, the great difficulties in objectively measuring them make their use in consistent and accurate loss estimations problematic. The committee’s recommendations for those data to be used in compiling accurate loss estimates thus focus on direct losses ...”

The DLIS project team is using the concept of EAD as the primary monetary measure of risk to the Delta and Suisun Marsh population and assets. EAD has been computed for existing levee conditions and can be calculated for future levee conditions, assuming certain State investments, to help inform the State’s investment strategy. The derivation and basis for using EAD to estimate direct flood losses is as follows.

The loss estimation methodology outlined in USACE guidance (USACE 1996b) is based on meeting the national economic development objective as measured by the net benefit (NB) of a project. Net benefit, as defined by the USACE, is:

$$NB = (B_L + B_I + B_{IR}) - C \quad \text{(Equation 5-3)}$$

where:

B_L = location benefit (new land available for economic use)

B_I = intensification benefit (intensified economic use of land)

B_{IR} = inundation reduction benefit (reduced flood losses to existing economic activity)

C = total cost of implementation, operation, maintenance, repair, replacement, and rehabilitation (OMRR&R)

Because the DLIS objective is to develop a strategy for protecting existing population, economic uses, and environment in the Delta and Suisun Marsh, the location and intensification benefits can be assumed

to be zero. That is, the project team assumes that there is no intent by the State to create new land or intensify the use of existing land. In this case, the net benefit is simply the inundation reduction benefit minus the total OMRR&R cost.

The inundation reduction benefit (B_{IR}) and OMRR&R (C) terms of this equation are used in the comparative analysis of investment alternatives that is performed using the DLIS DST (see Section 6.0).

The inundation reduction benefit is defined as the difference between the value of flood loss without project and the value of flood loss with project:

$$B_{IR} = X_{\text{without}} - X_{\text{with}} \quad (\text{Equation 5-4a})$$

where

X_{without} = flood loss without project (investment)

X_{with} = flood loss with project (investment)

The terms “without project” and “with project” are used in the USACE guidance. However, in the context of the DLIS project, the appropriate terminology is “without state investment” and “with state investment.”

The computation of flood loss is typically based on annualized hydrologic data, hydraulic and geotechnical models, population and asset data, and population and asset vulnerability models. These data and models have natural variability and knowledge uncertainty; hence, flood loss is expressed as an expected (average) annual value; commonly referred to as EAD. An expected or average value is a probability-weighted average of all possible values and inherits variability and uncertainty from the input data and models. The inherited variability and uncertainty of the computed EAD can be estimated from an analysis of the variability and uncertainty of the input components.

For the DLIS project, EAD is computed for existing levee conditions (EAD_{without}) and for future levee conditions, assuming State investments that improve the functioning of the levee, (EAD_{with}) to obtain B_{IR} as:

$$B_{IR} = EAD_{\text{without}} - EAD_{\text{with}} \quad (\text{Equation 5-4b})$$

where

EAD_{without} = expected annual damage without State investment, aside from maintenance

EAD_{with} = expected annual damage with additional State investment

This loss estimation methodology is used in the USACE Flood Damage Assessment (HEC-FDA) software (USACE 2014) and in the FEMA Hazus software (FEMA 2009b). The DLIS team is adapting this methodology in computer models and a DST to calculate EAD with and without State investment for Delta and Suisun Marsh islands and tracts.

Potential direct flood losses due to levee failure in the Delta and Suisun Marsh that can be expressed in monetary terms accrue from damages to residences (structure and contents), businesses (structure and contents), vehicles, crops, industrial facilities, and public infrastructure. Potential indirect flood losses due to levee failure in the Delta and Suisun Marsh include displacement costs, loss of income or revenue, additional cost due to disruption of public infrastructure, and other ripple effects that are not directly the

result of inundation. The EAD calculation in DLIS only considers direct losses based on the best available information.

Flooding has a direct impact on infrastructure and other assets in the Delta. EAD captures current and future losses to Delta infrastructure and other assets in a year. This includes damages to homes and commercial buildings, vehicles, transportation and energy infrastructure, agricultural infrastructure (e.g., buildings, machinery), agricultural land, and the value of lost crops. The contribution of each type of asset to EAD is calculated and summed to obtain a total EAD.

EAD is a monetized metric and is measured in dollars. Calculating EAD requires estimating the dollar value of assets and the fraction of that value that is lost in a flood. Future Delta asset and land values may change depending on population and economic growth, infrastructure improvements, Delta management strategies, and other factors, which are treated as uncertain future economic scenarios.

If an island or tract is inundated because of a levee breach, the choices facing decision-makers and stakeholders would be to (a) rehabilitate the island or tract by repairing the levee breach and pumping the island or tract free of floodwater, or (b) allow the island or tract to remain permanently flooded.

If the choice is option (a) rehabilitate the island or tract, the incremental “cost” or losses from flooding would consist of lives lost (which are not monetized), the cost of repairing or replacing assets, the cost of lost agricultural production, the cost of repairing the levee, and, in some cases, the cost of pumping floodwater out of the island or tract.

If the choice is option (b) allow the island or tract to be permanently flooded, the incremental cost (or losses) of flooding would consist of lives lost, the value of assets lost, and the value of the land lost (reported in both dollars and acres). In the case of agricultural land lost, the land value would include the lost value of future agricultural productivity. However, there would be no cost for repairing the levee and pumping floodwater out of the island or tract.

EAD is calculated under the assumption that option (a) is selected. The concept of annualized damages being applied to the Delta and Suisun Marsh is based on every island and tract being available to survive or fail year after year.

Note that the rehabilitation cost is estimated without regard to the source of rehabilitation funding; the DLIS analysis reflects overall risks, consequences, and costs of flood damages irrespective of who will pay. This enables a more equal evaluation of risks and project impacts across islands and tracts, especially in the case where some islands may be eligible for federal assistance, for example, under USACE’s PL 84-99 program, and other islands might not be eligible.

A review of reported rehabilitation costs, including those costs identified in various Reclamation District’s 5-Year Plans, suggests that the cost of rehabilitating a flooded island or tract has several components, the most significant of which are the costs to mobilize resources for recovery, the cost to repair a levee breach, and the cost to pump out the floodwater (DWR 2008c; Suddeth et al. 2010).

5.2.2.1 Calculating Expected Annual Damage

Different flood levels (depths) have different impacts on infrastructure and assets. Therefore, EAD on a particular island i is calculated as the sum of the product of the annual probability of flooding (Equation 5-2) and the estimated economic losses $damage_{i,d}$ at each potential flood level d :

$$EAD_i = \sum_d p_{flood_{i,d}} \times damage_{i,d} \quad (\text{Equation 5-5})$$

The damage is itself a sum of the products of the value $value_a$ of each asset a multiplied by the percent loss in value $percentloss_{a,d}$ of that asset due to a flood of level d :

$$damage_{i,d} = \sum_a value_a \times percentloss_{a,d} \quad (\text{Equation 5-6})$$

The Delta-wide EAD is the sum of EAD on individual islands.

$$EAD_{delta} = \sum_i EAD_i \quad (\text{Equation 5-7})$$

Levee breach repair costs are estimated to be \$25 million per event (Suddeth et al. 2010), in which case, the annualized repair cost will be annual probability failure times \$25 million. For islands or tracts with significant EAD, the annualized repair cost may only be a small fraction of EAD. For island or tracts with smaller EAD, the annualized repair cost may be as much or more than EAD. With this in mind, annualized repair cost will be reported separately and ranking will be based solely on EAD without the annualized repair cost.

5.2.2.2 Expected Annual Damage Over Time

EAD may change over time principally through the changes in flood risk and changes in population and socioeconomic conditions. These changes may affect the number and nature of assets in the Delta and the types of stage damage curves used in the calculations of value loss. The method for estimating future EAD is discussed in Section 5.2.4.

5.2.2.3 Data Sources for the EAD Metric

Calculating EAD requires data on exposed asset values identified in Section 3.0 and data on assets listed in Appendix A, Asset Inventory. Many of these data were obtained from DWR (2013a). It also requires depth-damage curves, which define the percent of an asset's value that is lost at each flood level for different types of assets. Depth-damage curves are obtained from the USACE for residences and businesses and for other assets from reported flood damage recovery costs.

5.2.2.4 Caveats for the Expected Annual Damage Metric

The DLIS project team recognizes that EAD cannot include all direct and indirect flood consequences in the calculation. For example, costs such as lost business revenue are difficult to accurately identify and quantify; or loss of certain islands or infrastructure may have unique, wide-ranging effects that cannot be readily incorporated into an EAD calculation. Consequently, EAD must be viewed as a first-order metric that considers potential direct consequences to each islands and tracts equally. After EAD is calculated for all islands and tracts, the results can be viewed in conjunction with the unique or more subjective measures of the indirect consequences of flooding.

Uncertainty in the calculated EAD values arises from uncertainty in the discharge-recurrence, stage-discharge, levee hydrologic and hydraulic fragility, seismic recurrence, and levee seismic fragility functions used to compute EAD. Further uncertainty arises from estimates of the protected asset inventory and the flood depth-damage functions used in the EAD calculations. The sources and magnitude of this uncertainty is described more completely in Section 5.3.

5.2.3 Expected Annual Fatalities—Lives in the Delta

The key requirements of CWC section 85305(a) are to reduce risks to the people, property, and State interests in the Delta. This includes specifically reducing risks to those who live, work, and enjoy recreation in the Delta and Suisun Marsh. The risk to this group of people includes potential fatalities and injuries. The number of fatalities is often used as a proxy for fatalities and injuries. Therefore, EAF is an important risk metric.

EAF is a risk-based calculation of the average annual number of flood-related fatalities that would be anticipated in a region for a given set of potential flooding conditions. For example, a region may have a history of levee failures and flood-related fatalities from which the number of flood events per year E/year and fatalities per flood event F/E could be calculated. To put this in perspective, the goal of a strategic investment in this hypothetical region would be to reduce the number of flood events per year (e.g., by improving levees) or reduce the fatalities per event (e.g., by improving evacuation procedures) or a combination of the two.

Under an assumption that all flood events in this region are the same and that levee and river conditions remain unchanged, the calculation would be

$$EAF_i = \frac{E}{\text{year}} \times F/E \quad (\text{Equation 5-8})$$

In practice, of course, not all flood events are the same: there is uncertainty in the historical record of flooding and flood-related fatalities, and there is uncertainty in predicting the impact of strategic investment on reducing the number of flood events per year or fatalities per event. Estimating EAF for the Delta and Suisun Marsh is challenging because, although flood frequencies are reasonably well known, very few, if any, flood-related fatalities have been recorded.

Flood-related fatalities are generally a consequence of one or more of the following flood event characteristics:

- Population at risk
- Water velocity
- Water depth
- Warning time
- Time of day or day of week (day or night, weekday or weekend)
- Floodplain area and topography
- Rate of rise of floodwaters
- Duration of flooding
- Water type (fresh, salt)
- Water temperature.

The population at risk in the Delta and Suisun Marsh includes permanent residents and a variable population of workers, recreation users, and travelers who are at risk only during the time they are in the Delta or Suisun Marsh.

The flood characteristics that lead to most flood-related fatalities are water velocity and depth. In the case of the Delta and Suisun Marsh, there can be a wide range of flood velocities and depths depending on the floodplain (island or tract) area and topography, distance from the levee breach, and size of the breach. The generally low temperature of flood waters in the Delta and Suisun Marsh presents an additional level of hazard to human health and safety.

Warning time is typically the most important factor in limiting fatalities during a flood event. However, the warned population must be able and willing to heed the warning. While warning systems and evacuation procedures are and will likely continue to be in place in the Delta and Suisun Marsh, it is likely that some portion of the population would not receive the warning or would be unable or unwilling to evacuate even if warned in time to do so.

The other flood event characteristics listed above generally have a lesser influence on flood-related fatalities, but may be important for certain islands or tracts in the Delta and Suisun Marsh and are considered in the separate EAF calculations for each island and tract. For example, water velocity may be a more important factor for cases in which homes and businesses are located adjacent to a levee than for cases in which homes and businesses are some distance from a levee. However, the level of detail in the current DLIS analyses does not permit this level of refinement in calculating EAF.

Several methods have been proposed for calculating EAF; for example, methods presented in the CVFPP (DWR 2012c), Delta Risk Management Strategy Risk Report (DWR 2008d), and Journal of Flood Risk Management (Jonkman and Vrijling 2008).

The general approach of each of these and many other methods is to determine the total population that is at risk of flooding (PAR), PAR_i , estimate the percentage of the population who will come in contact with the flood water p_c , and estimate the percentage of fatalities among those who come in contact with the flood water p_f . EAF is then the product of these three values and the probability that a flood event will occur p_e

$$EAF_i = PAR_i \times p_c \times p_f \times p_e \quad (\text{Equation 5-9})$$

The more detailed of these methods, as explained below, considers the various flood levels that may occur and the different probability of each flood level. In this case, p_c , p_f , and p_e are estimated for each flood level and the EAF values that are calculated for each flood level are summed to obtain a total EAF.

The total PAR used in these methods is generally determined from census data, which can account for the permanent resident population and the variable population of workers. Other means must be used to estimate the average number of recreation users and travelers that may be part of the total population at risk. Some of the methods focus only on the permanent resident population; hence, those methods may underestimate EAF.

The procedure used to estimate the percentage of the total PAR who will come in contact with the flood water (p_c) is somewhat different in each of the methods referenced above, but the methods generally consider some combination of the flood warning system effectiveness and evacuation efficiency. The type

of breach (flood, seismic, sunny day), population proximity to a levee breach, time of day of the breach, rate of rise, and similar flood factors are considered when developing an estimate of p_c .

The procedure used to estimate the percentage of fatalities among those who come in contact with the flood water (p_f) is also somewhat different in each of the methods. The factors of water depth and velocity, rate of rise, water temperature, and duration of flooding are typically considered when developing an estimate of p_f .

The probability or probabilities of flood event occurrence (p_e) used for calculation of EAF will be as given in Equations 5-1 and 5-2, the same as those used for calculating EAD.

The method and supporting data used to calculate EAF are described below, and are based on the general procedure outlined above. However, components from each of these methods have been used to estimate PAR, p_c , and p_f rather than strictly following a single method. Each method has certain strengths that can be used to calculate EAF values that are supported by the available flood fatality data and are consistent with the level of detail used elsewhere in the DLIS analysis.

5.2.3.1 Calculating Expected Annual Fatalities

Flood levels have differential impacts on fatalities— in general, the greater the inundation depth, the greater the fatality rate. Therefore, EAF on a particular island i is calculated as the sum of the product of the annual probability of flooding and the estimated fatalities $fatalities_{i,d}$ at each potential flood level d :

$$EAF_i = \sum_d p_{flood_{i,d}} \times fatalities_{i,d} \quad (\text{Equation 5-10})$$

In turn, the number of fatalities on a particular island or tract for a given flood level is a product of the total PAR, the percentage of the PAR that will come in contact with the flood water $p_{contact,d}$, and the percentage of fatalities among those who come in contact with flood water of a given depth $p_{fatalities,d}$:

$$fatalities_{i,d} = PAR \times p_{contact,d} \times p_{fatalities,d} \quad (\text{Equation 5-11})$$

The Delta-wide EAF is the sum of EAF on individual islands.

$$EAF_{delta} = \sum_i EAF_i \quad (\text{Equation 5-12})$$

5.2.3.2 Expected Annual Fatalities Over Time

Trends in the future will affect the expected annual fatalities over time by affecting the PAR, the contact rate, and the fatality rate. Increasing or decreasing Delta population will have a number of effects. First, it will affect the PAR. Second, it may alter the mortality rate by changing age and health demographics and by making evacuation routes more or less effective. Sea level rise may alter the mortality rate through evacuation efficiency by reducing the number or capacity of evacuation routes, thereby affecting the fatality rate. State investments may also alter the mortality rate by improving evacuation efficiency by increasing flood awareness and improving evacuation routes and procedures. The method for estimating future EAF is discussed in Section 5.2.4.

5.2.3.3 Data Sources and Assumptions for Expected Annual Fatalities Metric

The data used for the probability of flooding part of the EAF metric are identical to those used in calculating EAD, and include the hazard-recurrence curves and fragility curves discussed in Section 4.0.

PAR is obtained from 2010 U.S. Census Bureau data for the population within the legal Delta and Suisun Marsh boundaries. An average annual recreation user population, derived from the DPC Economic Sustainability Plan's (DPC 2012) estimate of annual recreation user days (annually 12 million user days), and an average annual traveler population, derived from Caltrans average annual daily traffic data (<http://traffic-counts.dot.ca.gov/>), are added to the census PAR to obtain a total PAR.

The percentage of the total PAR estimated to come in contact with the floodwater is based on the type of breach (flood, seismic, sunny day). The project team assumes that warning systems are effective at some level for flood breaches, but that warning systems will be less timely and less effective for seismic or sunny day breaches. The percentage has been derived by examination of the available studies and data for the Delta and Suisun Marsh and other similar locations, but may be modified by expert opinion.

The mortality function, or percentage of fatalities among those who come in contact with the floodwater, was estimated by examining the available studies and data for the Delta and Suisun Marsh and other similar locations, and this percentage may be modified by expert opinion.

5.2.3.4 Caveats, Uncertainty, and Limitations of the Expected Annual Fatalities Metric

The EAF metric is often used as a proxy for all direct human flood risks (death, injuries, disease, psychological damages, etc.) to the people who live, work, and enjoy recreation in a floodplain. Other direct human risks may not be completely represented by the proxy of fatalities. Furthermore, there are uncertainties in estimates of EAF because of the variability of population counts, the lack of good measurements of the effectiveness of flood warning and evacuation response, and the approximations inherent in applying flood depth vs. fatality relationships from other locations to conditions in the Delta and Suisun Marsh. The sources and magnitude of this uncertainty are described more completely in Section 5.3.

Although not expressed in monetary terms in the DLIS project, loss of life is a potential direct flood loss. The same methodology that is used to compute EAD is also used to compute EAF with and without State investment, except with units of lives rather than dollars.

5.2.4 Calculating Future EAD and EAF

The DLIS project evaluates risks at three time horizons: present day, 2030, and 2050. This section describes the approach to calculating EAD and EAF for 2030 and 2050.

Future EAD was calculated in the same manner as present-day EAD earlier in this section, except that future levee hazards, levee vulnerabilities, and future total asset value for each island/tract were based on the following assumptions:

1. The number and type of infrastructure assets will stay constant over time. This is a reasonable assumption because General Plans generally state that new growth is targeted in areas with existing services and infrastructure, and because there is inconsistent information on planned future infrastructure and developments across all Delta counties.

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2. The future value of infrastructure/assets assumes no inflation over time, and increases only as described in Step 3 below (with population growth). The Office of Management and Budget (OMB) Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, recommends using constant dollars because making assumptions about future inflation is highly uncertain.
3. The project team assumed that the future parcel value and future asset replacement value on each island and tract will increase at the same rate as the population increase on that tract or island. For example, if the population on Tract A increases by 20 percent over a given time period, the project team assumed that the assessed value of assets and parcels on Tract A will also increase by 20 percent.
4. Population growth rate was determined based on the population increase from the California Department of Finance (DOF 2013) population projections for 2030 and 2050, which were used to calculate future EAF. The project team selected DOF projections because they are the only dataset for which 2030 and 2050 projections exist across all five counties in the Delta.
5. A discount rate of 7 percent was applied to total future island/tract value according to guidance in the OMB Circular A-94 because the *“present value of future benefits are often discounted to reflect the time value of money. Benefits and costs are worth more if they are experienced sooner.”* A discount rate is defined in the OMB as “the interest rate used in calculating the present value of expected yearly benefits and costs.”
6. The total future value on each island/tract was calculated as the sum of present-day total asset replacement values plus the total parcel value, determined by the population growth rate and the discount rate (7 percent).
7. All future EAD calculations are reported in today’s dollars.
8. Future levee seismic hazards will be the same as current levee seismic hazards.
9. Future levee hydrologic and hydraulic hazards will be different based on assumptions about potential sea level rise.
10. Future levee vulnerability will be unchanged under the assumption that ongoing maintenance and repair will keep the levees in their current condition, i.e. levee fragility will not change.

Note that this method is based on readily available information and does not capture asset increases in areas that may gain new assets or infrastructure without population growth, e.g., a new industrial zone.

Future EAF was calculated in the same manner as present-day EAF (see Section 5.2.3), except that estimated future population and estimated future stage-frequency curves were used. As appropriate, modified levee fragility curves could also be used. The future population for each island or tract was estimated as described below.

1. Primary zone population was assumed to remain unchanged unless there is information readily available on developments that identify population growth in a specific area that can be readily integrated into the analysis (e.g., future population growth on Bethel Island). This is a reasonable assumption given that the DPC’s Economic Sustainability Plan (2012, p. 25) notes almost no population grown in the past 20 years in the primary zone.

2. Unless otherwise specified, all future population growth was assumed to occur within the secondary zone in areas designated for urban development in the Delta Plan. This is a reasonable assumption supported by narratives in the County General Plans, which state that future growth is anticipated within urban development boundaries where infrastructure and services currently exist.
3. DOF (2013) population projections for 2030 and 2050 were used as explained above.
4. In most cases, population projections are only available at the county level. Since projections are not available at the island or tract level, or by census block, the project team estimated population growth at the island or tract level by following Steps 1 and 2 in the method described below.
5. The boundaries of Urban Areas (and Cities) identified in County General Plans in GIS were obtained from Council staff. These data were used to project the locations of expected future population growth as described below.

Method:

1. Step 1: GIS shapefiles of the urban development footprints were overlain with the Delta Islands shapefile to identify those islands and tracts where population growth is anticipated. Within those islands and tracts, population was distributed as described below in Step 2:
2. Step 2: The total future population in a county (based on DOF data) was distributed proportionally to each Urban Development Footprint within the secondary zone in that county. For example, if there are three cities/urban development footprints of equal size, then each footprint received the same proportion of a county's total projected growth. Alternatively, if city A is 5 square miles, City B is 3 square miles, and City C is 2 square miles, then 50 percent of a county's projected population was assigned to City A, 30 percent into City B, and 20 percent to City C. If a portion of the population needed to be distributed to areas outside the secondary zone of the Delta, this was done by dividing the population increase in proportion to the relative areas inside and outside the secondary zone. This method contains uncertainty because some areas may become more densely infilled than others; however, at the scale of the DLIS, this method provides a reasonable estimate of future risks.

5.2.5 Water Supply Risk

The Delta's complex configuration of waterways and associated levees supports a water supply system that provides water to users within and outside of the Delta. Approximately two-thirds of the state's water supply is routed through the Delta estuary. Freshwater flows from the Sacramento River and San Joaquin River systems mix in the Delta, and a portion of that water is diverted to large pumps in the southern Delta for the DWR SWP and the U.S. Bureau of Reclamation CVP. In an average year, water exports from the southern Delta to central and Southern California for agricultural and municipal use represent approximately 85 percent of the total water supply diversions from the Delta (Council 2013).

Delta islands and levees perform a number of complex functions to support this water supply system that would be threatened by levee breaches and resulting floods. First, certain Delta channels are bound by islands and levees and provide conveyance to intake points for various user groups. If levees on these islands breach, the integrity of freshwater conveyance corridors may be compromised.

Second, in combination with river flows and reservoir releases, Delta islands help keep saline water from San Francisco Bay from impacting water quality in the Delta. Depending on where and how they occur,

levee breaches could allow significant saline water intrusion into the Delta from the San Francisco Bay (DWR 2013b, 2014e; Public Policy Institute of California [PPIC] 2008).

Third, many islands host important water infrastructure, such as intakes, pumps, and aqueducts. This infrastructure may be damaged or become non-operational if these islands flood (DWR 2013e).

These mechanisms are complex and interact with each other in complex ways. For example, depending on its location, a single flooded island may have little impact on water supply reliability, but multiple flooded islands may have significant and complex effects that are not clearly understood. Some evidence suggests that not all islands and associated levees are necessarily beneficial for water supply reliability. Previous modeling has shown that flooding of some islands may actually decrease salinity under some circumstances, which would improve water quality and hence water supply reliability (DWR 2013b).

Ideally, risk from these three mechanisms would be calculated as a product of the probability of an island flooding and the impact of that flooding on water supply for various users.⁷ This impact could be measured in days of water supply disruption, volume of water disrupted, or even the economic impact of water supply disruption (by attaching an economic value to unit of water).

However, the best available information does not support a quantification of the link between islands flooding and the impact on water supply from any of these mechanisms, except for damage to water infrastructure, which can be captured in EAD. It is not possible at this time to quantify the amount of water that would be disrupted or the duration of such a disruption for different users, given a particular configuration of flooded islands; therefore, it is not possible at this time to calculate water supply risk in a classical sense; i.e., as the product of probability and consequence, because the consequence is unknown.

Instead, the best available data can only suggest which islands perform water supply functions for each group of users and which islands are at highest risk of flooding. These data allow us to develop a conceptual assessment of risk by identifying those islands that have a high risk of flooding and play an important role in ensuring a reliable water supply.

5.2.5.1 Assessing Conceptual Water Supply Risk

The first component of conceptual water supply risk (CWSR) is the probability of flooding and has been determined for each island through calculations conducted for EAD and other metrics.

The second component of CWSR is the importance of an island to water supply. This can be measured in a number of ways, and the project team developed several measures of importance so that stakeholders may deliberate over each of them.

The first measure for assessing CWSR is to determine how many of the three water supply functions (conveyance, salinity barrier, or infrastructure) an island performs. An island that supports none of these functions receives a score of zero, while an island that performs all three functions receives a score of

⁷ It has been noted that levees have a greater role in providing a salinity barrier and conveyance function than the islands themselves. That is, if a levee on an island is repaired, salinity barrier and conveyance function could be restored, even if the island itself remains flooded. However, the island and tract are the unit of analysis in this study, not individual levee reaches. Therefore, we refer to islands and tracts, while acknowledging that, for water supply functions, the levees may be more important.

three, one for each function. For example, Holland Tract acts as a key salinity barrier in the Delta, supports conveyance, and contains infrastructure so it receives a total score of three. For simplicity and transparency, this approach treats each function equally, and it treats as equal each island that performs a particular function. The best available science does not provide clear evidence for unequal weightings of water supply functions or of islands.

The second CWSR measure is to assign a level of importance based on the number of water user groups that an island supports through any of the three water supply mechanisms. In consultation with Council and stakeholders, the project team has identified 10 user groups shown in Table 5-1. For example, Holland Tract acts as a salinity barrier for five different user groups (South of Delta Users, Antioch, Stockton, CCWD, and South and Central Delta Users), conveyance for CCWD, and infrastructure for CCWD. Thus it supports five different user groups and receives a score of five.

The third CWSR measure combines the number of functions and the number of users. Importance is determined by the number of functions an island performs for each user group. Thus, Holland Tract receives a score of seven: five as a salinity barrier for five users, one for conveyance for one user, and one for infrastructure for one user.

There are many other possible metrics for assessing the importance of levees for water supply, but the ones described above are the ones that have been developed in consultation with Council and stakeholders.

The measures described above treat all users as equal. However, another approach may be to weight users based on the relative amount of Delta water that they withdraw from the Delta on average each year. An island that does not perform any functions would have an importance of 0 percent; an island that supported all users would have an importance of 100 percent. Table 5-1 shows this information for each user group. Actual annual diversions vary greatly and should not be taken as an absolute volume diverted, but as a relative impact of different user groups. For Holland Tract, the five user groups it supports account, on average, for 91.9 percent of withdrawals from the Delta. This information is available in the DST and is intended to provide a sense of scale of the amount of water diverted by various user groups. However, the weighted approach remains an optional dataset to consider in addition to the metric described above, and it was not integrated into the metric used to assess risk to water supply reliability.

Table 5-1

Water User Groups in the Delta and Their Average Annual Withdrawals (SWRCB 2015)

Water User Group	Water Diverted from Delta, TAF(1)	Water Supply Diversions, % of Total
Antioch	10	0.2%
Contra Costa Water District (CCWD)	115	1.9%
East Bay Municipal Utility District (EBMUD)	364	5.9%
North Delta	less than 1	0.0%
Sacramento	95	1.5%
Solano and Napa Counties	42	0.7%
South and Central Delta	403	6.5%
South-of-Delta	5,100	82.8%
Stockton	33	0.5%
Suisun	less than 1	0.0%
<i>Total</i>	<i>6,162</i>	<i>100%</i>

(1) TAF = thousand acre-feet

5.2.5.2 Water Supply Risk Over Time

The water supply risk metric was developed based on current baseline water supply conditions. The project team did not attempt to project how the importance of islands to water supply might change in the future. Estimates of future water supply disruption risk therefore are based on islands currently deemed important to water supply and the future flooding probabilities used with the other risk metrics.

5.2.5.3 Data Sources for Conceptually Assessing Water Supply Risk

The islands performing the three main functions in the conceptual water supply risk metric were identified using several sources. Those acting as salinity barriers were identified via the Delta Flood Emergency Management Plan (DWR 2014d) and corroborated by other salinity studies performed by DWR (DWR 2013b), the PPIC (2008), and discussions with Council and stakeholders. Islands supporting freshwater corridors were also identified by DWR in its Delta Flood Emergency Management Plan (DWR 2014d), and were validated against and augmented by data from the Economic Sustainability Plan (DPC 2012) and guidelines for funding priorities published by DWR (DWR 2014e), in addition to discussions with Council and stakeholders. Islands protecting water supply infrastructure in the Delta were identified by DWR in its study on Asset Exposure to Support Delta Levee Improvement Prioritization (DWR 2013e) and validated with satellite imagery and discussions with Council and stakeholders. The asset exposure information is also contained in Appendix A, Asset Inventory.

Approximate average annual withdrawals for user groups dependent on the Delta (Table 5-1) are based on the Delta Plan (Council 2013) and water use permits available through the SWRCB's Electronic Water Rights Information Management System (eWRIMS) (SWRCB 2015).

5.2.5.4 Caveats, Limitations, and Uncertainties for Assessing CWSR

This metric does not include the amount of water diverted or the economic and social consequences of water supply disruption, given the large degree of uncertainty related to antecedent conditions and difficulties associated with calculating such impacts. Such impacts would require many assumptions about the water year type (wet or dry), antecedent conditions, the time of year that a levee breach occurs, and potentially any operational constraints associated with those conditions that may affect the availability of water, all of which are highly uncertain from year to year.

This metric also considers each Delta island and its associated levees as one unit whereby a breach event results in the filling of the island. Precise levee breach locations and the size or magnitude of potential breaches are not specified. Given the availability and scope of previous hydrodynamic studies of the Delta, the project team's understanding of potential disruptions, including the duration or the severity of disruption, is limited. Most importantly, there are no existing standard calculations on which this metric can be based. The proposed calculations present risk of water supply disruption in a straightforward and transparent way given the current state of the science.

5.2.6 Ecosystem Risk Metric

According to the Delta Plan, “achieving the coequal goals of protecting, restoring, and enhancing the Delta ecosystem” means successfully establishing a resilient, functioning estuary and surrounding terrestrial landscape capable of supporting viable populations of native resident and migratory species with diverse and biologically appropriate habitats, functional corridors, and ecosystem processes (Council 2013). While the elements that create ecosystem value are complex, the amount of habitat at risk to damage by flooding is a straightforward element that decision-makers and stakeholders can use to understand and evaluate the impacts of projects on the ecosystem.

For the DLIS, the project team considered two types of habitat—“non-tidal habitat” that occurs in areas within or that could be protected by levees, and “tidal habitat” that does not receive flood protection from levees. Our primary ecosystem metric is then the expected flooding of high-value non-tidal habitat. Because levee investments have the potential to reduce flooding on islands that could be restored to include additional high-value non-tidal habitat, the project team considered both existing habitat and potential future habitat. A secondary concern, however, is how potential levee investments could impact “tidal habitat.” To address this, the project team also identified the high-value tidal habitat for all islands and showed how the presence of tidal habitat, both existing and potential, coincides with islands that are also deemed to be at risk due to flooding. For these islands, investment in levees could negatively impact the tidal habitat and these effects should be carefully weighed in the investment strategy. The underlying inventory of existing habitat types are listed in Appendix A, Asset Inventory.

Defining High Value Habitat

The designation of high-value habitat from all natural communities and land uses was based on importance to recovering species (e.g., Opperman 2012; Sommer et al. 2014; Herbold et al. 2014), historical losses (The Bay Institute 1998; Whipple et al. 2012), and priorities from existing conservation plans (CDFW 2014; Council 2013). High-value habitat types include tidal marsh, non-tidal marsh, managed wetlands, riparian forest and scrub, seasonal floodplain, alkaline seasonal wetland, and vernal pools.

The project team then classified habitats as either “non-tidal habitat” or “tidal habitat,” based on that habitat’s hydrological regime and its occurrence on levee-protected lands. Non-tidal habitats either are dependent on levee protection (wildlife-friendly agriculture, managed wetlands) or do not receive regular tidal inundation (riparian, seasonal floodplain, vernal pools, seasonal wetlands). An island or tract could have patches of both tidal and non-tidal habitat, depending on the elevation and the location and condition of its levees.

Non-Tidal Habitat: Existing high-value non-tidal habitat (non-tidal marsh, managed marsh, riparian forest and scrub, vernal pools, and alkaline seasonal wetlands) was quantified for each island. The project team also included protected and managed lands (“conserved lands”) such as Stone Lakes National Wildlife Refuge in Maintenance Area 9, Yolo Bypass Wildlife Area, Grizzly Island Wildlife Management Area, Solano Land Trust’s Rush Ranch Land Trust in Potrero Hills, DWR’s Twitchell and Sherman Islands, and the Nature Conservancy’s Staten Island.

Agricultural lands can also provide surrogate wildlife habitat, depending on the crop and cultivation practices. For example, Swainson’s Hawk is closely associated with agricultural lands as foraging habitat, especially alfalfa and pasture (Estep 1989, 2009; Woodbridge 1998). Rice fields provide surrogate wetland habitat for the Giant Garter Snake during summer (U.S. Fish and Wildlife Service 1999). Grain crop stubble that is flooded in winter supports migratory waterfowl (Central Valley Joint Venture 2006) and sandhill cranes (Littlefield 2008). These habitat values are captured in the DLIS analysis through inclusion of those lands that are subject to conservation easements designed to ensure wildlife-friendly management, such as the United States Department of Agriculture (USDA) Natural Resources Conservation Service’s (NRCS’) Wetland Reserve Program (CRA 2003; Greeninfo 2015b).

The DST also considers potential non-tidal habitat to be restored in the future as part of levee improvements. Non-tidal habitat restoration projects were identified by the State’s EcoRestore program (CRA 2015). Many of the non-tidal habitat projects are planned on conserved lands already described above (Sherman, Twitchell, and Staten Islands). In the Yolo Bypass, proposed modification to the Fremont Weir would increase inundation and thereby increase seasonal wetland habitat.

The total amount of existing high-value habitat for each island equals conserved lands plus any additional high-value habitat areas not already separately protected for tidal and non-tidal habitat. To assess the maximum total impact of flooding on non-tidal habitat, we summed the existing habitat with potential habitat (acres of planned restoration).

Tidal Habitat: As described in Section 3.0, existing tidal habitat was quantified based on habitat mapping of tidal marsh (Council 2011). Tidal marsh can exist either on unleveed islands or on the waterside of levees where elevations are within the intertidal range. This also included conserved lands that included tidal marsh, which occurred on several unleveed islands with public ownership (Liberty Island, Lower Sherman, Potrero Hills, and the south end of Yolo Bypass).

In addition, the impacts of levee investments on potential tidal habitat were assessed. Opportunities for habitat restoration are constrained by elevation. Deeply subsided Delta islands offer few opportunities to recover native ecosystem forms and functions, but may be important to protect for seasonal wetlands and wildlife-friendly agriculture (Council 2013). The most promising restoration opportunities for intertidal and floodplain habitats are found in the areas adjacent to river corridors and less-subsided islands along the Delta’s perimeter.

Potential tidal or other unleveed habitat was quantified in two ways. First, the project team identified tidal wetlands expected for eight proposed restoration projects such as McCormack Williamson, Tule Red on Grizzly Island, and Prospect Island, as tracked by EcoRestore (CRA 2015). This value was added to the existing mapped tidal habitat.

Second, the amount of potential high-value intertidal and floodplain habitat types that could form on an unreclaimed flooded island was quantified based on elevation and modeled sea level rise (CDFG 2011). The Ecosystem Restoration Program's Delta Conservation Strategy map (CDFG 2011; CDFW 2014), which is incorporated into the Delta Plan, identifies broad areas appropriate for habitat restoration within the Delta, primarily based on land elevations, excluding areas with current urban constraints. In accordance with the Delta Vision Strategic Plan and in light of expected sea level rise, the areas of the Delta that are of highest priority for restoration include lands that are in the existing intertidal range, floodplain areas that can be seasonally inundated, and transitional and upland habitats, which in future could become shallow subtidal, floodplain, and intertidal habitats, respectively (CDFW 2014). The project team quantified the amount of high-value habitat (intertidal, seasonal floodplain, transitional) that could result if tracts were unleveed under different scenarios of sea level rise (nominal and high sea level rise projection) for different years (2012 base case, 2030, 2050). Finally, the data were then clipped to show only those acres within the six priority habitat restoration areas, as defined in the Delta Plan (Council 2013).

In sum, the potential high-value habitat that could result from restoration or levee failure was calculated as the maximum of either known proposed restoration (tidal or leveed non-tidal) or elevation-based mapping of habitat potential.

The DST uses the greatest of these three estimates of tidal habitat (existing mapped habitat with conserved unleveed lands, potential from proposed projects, or modeled potential) for each island to screen for considerations about levee investments.

Calculating Expected Flooding of High Value Non-Tidal Habitat

The methodology assumes that, if an island floods, the effect will be uniform for all high value non-tidal habitat on the island. Therefore, Expected Flooding of High Value Non-Tidal Habitat (or EFH) on a particular island i is calculated as the sum of the product of the annual probability of flooding, p_{flood_i} , and the area of existing and potential high value non-tidal habitat, $habitat_i$:

$$EFH_i = p_{flood_i} \times habitat_i \quad (\text{Equation 5-13})$$

As described in Section 6.0, the DST also identifies for further consideration those islands that have a high amount of tidal habitat.

Data Sources for the Ecosystem Metric

As described in Section 3.0, data on the amount of existing habitat were obtained from the Delta Plan land use layer, developed for the Delta Plan EIR (Council 2011). This data layer was based on vegetation and agricultural cropping patterns. Data on conserved and managed lands (including conservation easements) came from the CRA (2003, 2005) and GreenInfo (2015a, 2015b).

Potential habitat that could be restored was identified in the EcoRestore program (CRA 2015). No spatial data were available that had been explicitly generated for the current and proposed restoration activities

covered under the EcoRestore program. The potential amount of floodplain that would be inundated for at least 2 weeks (a duration associated with food web benefits for juvenile salmonids) was digitized from figures of preliminary modeling conducted for the Fishery Enhancement Planning Team (DWR and USBR 2015).

Potential tidal and other unveeved habitat was based on the Delta Conservation Strategy Map, which was developed for the Ecosystem Restoration Program Conservation Strategy (CDFG 2011) and incorporated into the Delta Plan (Council 2013). The data layer was provided to the project team by Council staff. This map identifies broad areas appropriate for habitat restoration within the Delta, primarily based on land elevations, and excludes areas with current urban zoning constraints. Existing non-urban land uses, infrastructure, and other constraints at these locations were not considered for this map. Four categories of habitat relative to current sea level are identified, including upland and transitional areas, intertidal and subtidal areas, floodplains, and open water areas. In accordance with the recommendations in the Delta Vision Strategic Plan and in light of expected sea level rise, the areas of the Delta that are of highest priority for restoration include lands that are in the existing intertidal range, floodplain areas that can be seasonally inundated, and transitional and upland habitats. Assuming a rise in sea level ranging from 30 to 45 centimeters by 2050 (Cayan et al. 2009 in CDFW 2014), these areas would become shallow subtidal, seasonally inundated floodplain, and intertidal habitats, respectively. The project team grouped these three habitats into potential high-value unveeved habitat.

Caveats, Limitations, and Uncertainties in the Ecosystem Metric

The quantification of existing high-value habitat is based on 2006-2007 vegetation mapping. The data precision is fairly good, with a minimum mapping unit of 1 acre per 10-meter width for water and important vegetation features, and 2 acres for other types, occasionally mapped at higher detail at CDFW's and DWR's discretion. Existing high-value habitat typically makes up a very small percentage of total island area; half the islands had no more than 5 percent combined cover of high-value habitats. However, in Suisun Marsh and the western Delta, many islands (18 percent of all DLIS islands) had at least 75 percent cover in managed wetlands.

The estimate of potential seasonal floodplain habitat in Yolo Bypass was not available in GIS, but rather was digitized from preliminary modeling figures and should be considered a rough estimate. Several islands that have planned tidal restoration (Prospect, McCormack-Williamson, and Grizzly Slough) nevertheless have existing non-tidal habitat or land management to be considered in the meantime.

The estimate of future potential tidal or unveeved habitat from the Delta Plan was based solely on modeling and sea level rise projections, which have their own uncertainties, and may not reflect actual landscape conditions. Limiting this projected habitat estimate to the Delta Plan's defined priority restoration areas acknowledges land use and feasibility issues, but is not a complete estimate of inundation on those islands where priority boundaries do not follow topographic contours (e.g., lower San Joaquin River floodplain, Cosumnes/Mokelumne confluence).

5.2.7 Delta as Place

There are many special attributes that make the Delta a unique and special place, including its legacy towns, its winding riverine channels, and its many recreational opportunities. For over 100 years, the Delta's agricultural heritage has also played a large role in defining the region's economic, cultural, and

visual character. Changes to the Delta are inevitable, and any levee investment strategy (no-action or otherwise) will impact legacy towns, the Delta's scenic resources, important farmland in the Delta, and important roads, thereby affecting the "special qualities that distinguish (the Delta) from other places" (23 CCR 5001 (h)(3)), or "Delta as an evolving place." While the EAF and EAD metrics already account for damage to life and property in the Delta, the "Delta as Place" metrics provide an additional way to capture the impacts of levee investments (and flooding) on the Delta's communities, or, put another way, it offers a way to measure potential changes to the Delta's special qualities.

The DLIS "Delta as Place" metrics measure risk to legacy towns, to valued farmland (prime farmland, farmland of statewide importance, and unique farmland) in acres, and important roads. These three metrics offer a reasonable representation of the cultural and agricultural values in the Delta. Together with other metrics, they meet the spirit of CWC section 85054. Some assets in the Delta contribute to its unique character, but are already incorporated into other metrics and are not repeated in the Delta as Place metric. Impacts to recreational values are accounted for in the EAD calculations, which estimate damages to all built assets, including roads, the land side improvements for marinas, parks, and other sites providing opportunities for recreation. Impacts to natural resources are covered in the DLIS ecosystem metric.

Legacy Towns include Bethel Island, Clarksburg, Courtland, Freeport, Hood, Isleton, Knightsen, Rio Vista, Ryde, Locke, and Walnut Grove, which is located on three islands (Public Resources Code section 32301(f)).

The first component of the Delta as Place metric is measured as the annual probability of flooding a Legacy Town, expressed in number of flooded legacy towns per year.

Risk to prime farmland is measured as the annual probability of flooding prime farmland and is expressed in number of acres of prime farmland flooded per year on average. Unlike Legacy Towns, which have a clearly legislated definition, the definition of prime farmland bears further consideration; additional details on the definition of prime farmland are discussed below.

Important roads in DLIS are those of interest to the State and therefore include only county, state, and federal highways that cross the legal Delta, and scenic Highway 160 (which is also a state highway). This third component of the Delta as Place metric is measured as the annual probability of flooding an island that has an important road.

Defining Prime Farmland

Prime farmland has multiple definitions, the most common of which are derived from the Land Conservation Act of 1965 (Williamson Act) and the California Farmland Mapping and Monitoring Program (FMMP). The Williamson Act defines prime agricultural land as follows in Government Code §51201 (c):

"(c) 'Prime agricultural land' means any of the following:

- (1) All land that qualifies for rating as class I or class II in the Natural Resource Conservation Service land use capability classifications.
- (2) Land which qualifies for rating 80 through 100 in the Storie Index Rating.

- (3) Land which supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture.
- (4) Land planted with fruit- or nut-bearing trees, vines, bushes, or crops which have a nonbearing period of less than five years and which will normally return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than two hundred dollars (\$200) per acre.
- (5) Land which has returned from the production of unprocessed agricultural plant products an annual gross value of not less than two hundred dollars (\$200) per acre for three of the previous five years.”

The Williamson Act was developed to preserve open space and agricultural land by offering special tax options to owners of that land in exchange for a contract binding the landowner to maintain the property as open space or agricultural land. The Prime Agricultural Land designation aims to highlight and preserve land with high production value for protection via these tax reduction contracts.

The FMMP is administered by the California Department of Conservation (DOC), and was established in 1982 for the explicit purpose of “analyzing impacts on California’s agricultural resources” over time (DOC 2015). The FMMP provides definitions for three categories of agricultural land -- “prime farmland,” “farmland of statewide importance,” and “unique farmland.” According to the FMMP, prime farmland is defined based on land use and soil criteria. Regarding land use, the area must have been used for irrigated agricultural production at some time during the 4 years prior to the FMMP map date. Soil standards (physical and chemical) are set by the USDA NRCS. Land meeting both of these criteria is deemed “prime farmland” according to the FMMP. There are relaxed land use and soil criteria for “farmland of statewide importance,” and a more subjective land use criterion (and no soil requirement) for “unique farmland.” All three of these categories can be considered contributors to the cultural nature of the Delta as an evolving place.

For the DLIS, the FMMP categories (defined in GC 51201(c)) were used, and data for the five Delta counties were downloaded from the DOC website. The FMMP definition was chosen because it is more recent than the Williamson Act definition, and it was developed with the intent of identifying the location, quality, and quantity of agricultural lands in the state and their conversion over time. These goals also better align with preserving and protecting the Delta as Place values that emphasize not only agricultural production but also the visual character of the region. In addition to the Delta’s winding waterways, agriculture, which is the primary zone’s dominant land use, plays a leading role in defining the landscape and visual attributes. Furthermore, the California Environmental Quality Act (CEQA) defines Agricultural Land using the categories from the USDA, which are identical to the FMMP categories (Public Resources Code §21060).

In summary, the DLIS uses the categories defined by the FMMP (prime farmland, farmland of statewide importance, and unique farmland) because the source is more recent, is defined for this purpose, and is used in other critical California legislation (i.e., CEQA). Because so much of the Delta’s historical and cultural values center on its rich farmland and agricultural heritage, the location of prime farmland, farmland of statewide importance, and unique farmland functions as a strong proxy and an appropriate metric by which to measure impacts to the Delta as an evolving place.

Data Sources for the Delta as Place Metric

Data on farmland were taken from the FMMP; data for important roads are identical to those collected for Appendix A, Asset Inventory and identified in Section 3.0.

Caveats, Limitations, and Uncertainty with the Delta as Place Metric

Any uncertainty in the Delta as Place metric would result from the combination of uncertainty in the probability of island flooding (previously described in Section 5.2.1) and any uncertainty inherent in the farmland or roads data layers which could affect either the acreage of prime farmland attributed to any particular island or tract, or could affect whether a road crosses a particular island. To date, however, there are no previously expressed limitations of these data.

5.3 Sensitivity and Uncertainty

5.3.1 Introduction

The risk metrics EAD and EAF are the result of a series of calculations with each step having its own input variables. Output from one calculation step becomes input to the next calculation. For example, calculation of a stage-recurrence curve for an island depends on the results of a calculation of a discharge-recurrence curve for the Delta and a stage-discharge curve for the island. Because of the complex interaction between the series of calculations, it is essential to understand how the results (EAD, EAF, or other risk metrics) may be sensitive to changes in input values at any step and how the uncertainty associated with the input data and calculation models affects the uncertainty of the end result.

To achieve this understanding, it is necessary to complete a sensitivity analysis and uncertainty analysis. A sensitivity analysis is used to quantify the effects of small or large input changes on the result. An uncertainty analysis uses probabilistic methods to assess the uncertainty of the result. For example, seismic levee fragility curves are uncertain estimates of levee performance under seismic load because of natural variability and knowledge uncertainty about the magnitude and frequency of the seismic events and the performance of the levees when the event occurs. The goals of sensitivity and uncertainty analyses are to understand how input variations affect the result, quantify the total uncertainty in the result, and, if possible, identify which uncertain input(s) contribute most to the total uncertainty.

An analysis of the sensitivity and uncertainty of the DLIS risk metrics is critical to understanding the accuracy of any ranking of islands and tracts that is based on one or more of the DLIS risk metrics. Consider, for example, the six hypothetical islands in Table 5-2. The EAD for these six islands ranges from \$1.3 to \$7.0 million, and the ranking from greatest to least risk appears to be straightforward. However, if the uncertainty in the EAD values is, say, $\pm\$500,000$, the ranking of islands C, D, and E becomes less definite. The EAD-based risk ranking is still valid; however, consideration of the uncertainty may lead to the conclusion that islands D and E, and perhaps C, all have the same rank.

Table 5-2
Prioritization Uncertainty

Island	EAD millions	Risk Rank
A	\$7.0	1
B	\$6.0	2
C	\$4.3	3
D	\$3.4	4
E	\$3.1	5
F	\$1.3	6

There likely will be more than one case among the Delta and Suisun Marsh leveed islands and tracts in which the distinct ranking among a group of islands will be similar to this hypothetical case. The knowledge gained from the sensitivity and uncertainty analyses should be used to inform all ranking of islands and tracts based on the DLIS metrics.

5.3.2 Uncertainty Types

The metrics used in the prioritization of levee investments are calculated using data and models that have natural variability and knowledge uncertainty that contribute to the uncertainty of the risk metrics. The uncertainty in each of the variables that are used to calculate EAD, EAF, or other risk metrics can be used to estimate the uncertainty in the metric result. For example, data and knowledge uncertainty in the total inflow to the Delta is expressed as an estimated lower and upper range about an average value. The average value is used in the calculation of expected annual damage; however, the range of total inflow can be used to estimate uncertainty in EAD and other risk metrics.

From an investment decision-makers' perspective, the difference between natural variability and knowledge uncertainty may not be significant; they both contribute to uncertainties in the data and metrics used in the decision-making process. However, from the perspective of identifying and quantifying the impact of variability and uncertainty on the calculated metric values and prioritization algorithms, it is useful to distinguish between natural variability and knowledge uncertainty.

Natural variability, also known as aleatory variability, refers to the natural randomness of a condition or event. The range of the condition or event is assumed to be known; only additional data can reduce the impact that natural variability has on predictive analyses.

An example of natural variability is the annual peak flow in, say, the San Joaquin River at the Vernalis Gauging Station. Annual peak flow at this station can be predicted from the historical record, but the natural variability in the historical record introduces variability in the prediction. Assuming that precipitation and flow conditions remain similar in the San Joaquin drainage basin, additional measurements in future years will improve the predictions of annual peak flow at this station.

Knowledge uncertainty, also known as epistemic uncertainty, refers to the limitations of data and models. Data can be uncertain because it is difficult to obtain and/or accurately measure. Data uncertainty can only be reduced by improving data measurement and collection methods. Models can be uncertain because our knowledge of the exact nature of a physical process is limited. Model uncertainty can only be reduced by further advances in science and engineering.

An example of data and model uncertainty is the calculation of levee fragility. The probabilities of levee failure for a series of water elevations that make up a levee fragility curve are typically based on limited knowledge of the frequency of recurrence of each water elevation; limited exploration and testing of levee and levee foundation materials; and models of levee performance that are only approximations, albeit the best available approximations, of the physical processes of levee failure.

5.3.3 Sources of Variability and Uncertainty

The major sources and, where possible, the estimated magnitude of the variability and uncertainty that will impact EAD, EAF, and other risk metrics used in the prioritization of levee investments are described in the following sections. The relationship between source and result uncertainty is also described in this section.

5.3.3.1 Discharge-Recurrence

A discharge-recurrence curve defines the relationship between frequency of recurrence and annual peak flows in a river or stream. A discharge-recurrence relationship is typically developed from a historical record of stream flows using a statistical curve fitting procedure. However, for analysis of the Delta and Suisun Marsh levees, it is necessary to consider annual peak flows from each of the major rivers and streams flowing into the Delta rather than flows in a single stream.

A discharge-recurrence relationship for the Delta was developed during the DRMS study (DWR 2009b) from an analysis of a 50-year historical record of total annual peak inflows as shown on Figure 5-1. The solid line on Figure 5-1 is the best fit to the relationship between discharge and recurrence using a Log-Pearson Type III curve fitting procedure (USGS 1982). The dashed lines are an illustration of the uncertainty in the relationship due to the natural variability of the measurements of total Delta inflow (discharge). The 90 percent confidence limits are interpreted as “we are 90% confident that the true relationship lies between the upper and lower limits.” The uncertainty in the relationship between the frequency and magnitude of annual peak flows leads to uncertainty in the frequency of each potential river stage elevation at each levee and, consequently, uncertainty in the frequency and depth of flooding.

The uncertainty analysis described later in this section is based on a one standard deviation interval rather than a 90 percent confidence interval; hence, the DRMS results shown on Figure 5-1 were modified to reflect the one standard deviation interval. The total Delta inflows used in the uncertainty analysis are shown on Figure 5-2, which has the same best fit relationship as on Figure 5-1, but with a range of plus and minus one standard deviation from the best fit curve.

An additional amount of knowledge uncertainty is introduced by the selection of the curve fitting procedure; for example, a Weibull or logarithmic curve fitting procedure might be used to obtain a similar result. However, in this relationship, natural variability is the source of greater uncertainty than the curve fitting procedure selected.

The uncertainty in the discharge-recurrence curve will contribute to the uncertainty in the stage-discharge and stage-recurrence curves developed for each island tract in the Delta and Suisun Marsh and, subsequently, to the uncertainty in frequency and depth of flooding.

Figure 5-1
Discharge Recurrence Curve with 90% Confidence Interval

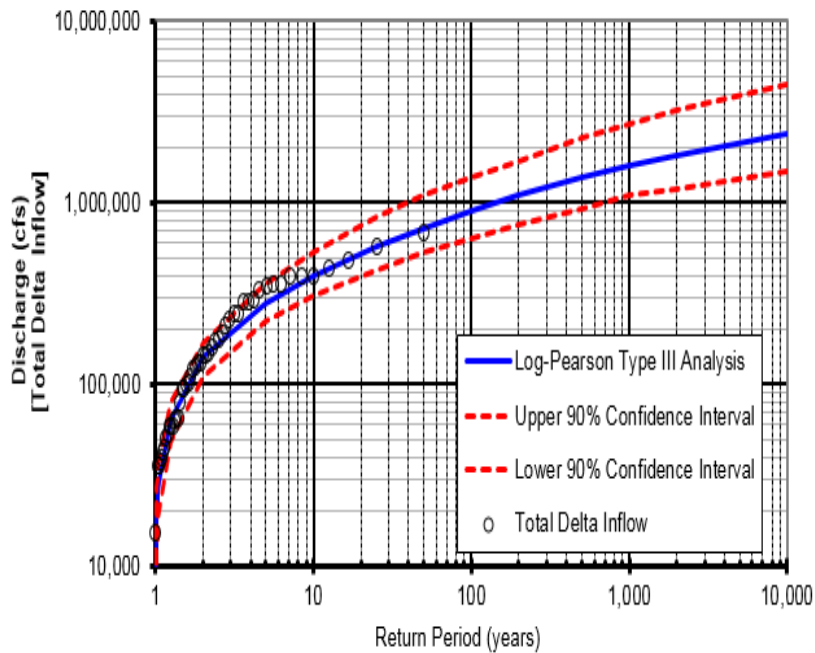
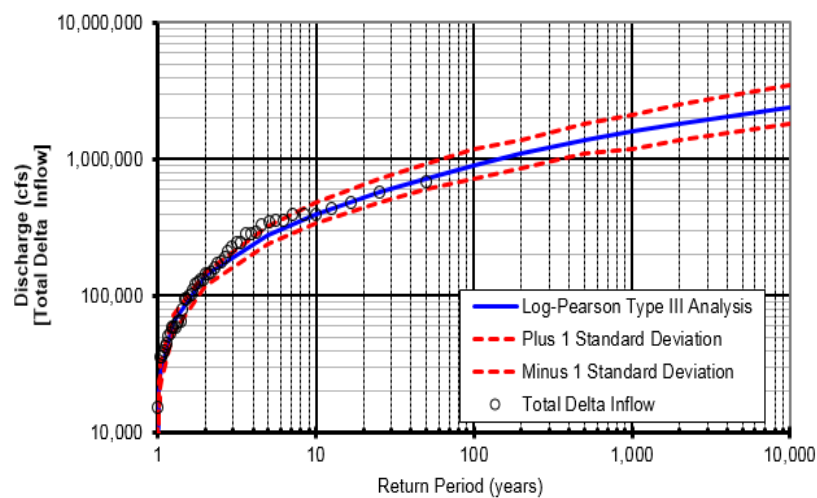


Figure 5-2
Discharge Recurrence Curve +/- 1 Standard Deviation



5.3.3.2 Stage-Discharge

Stage-discharge is a location-specific relationship between the volume rate of flow in a channel and the elevation of the water in the channel. A stage-discharge relationship can be developed from direct measurements of stage at a channel cross-section with a known profile, or from hydraulic theory and estimates of flow rate and channel hydraulic characteristics. Stage-discharge curves for the Delta and Suisun Marsh were developed using the latter method.

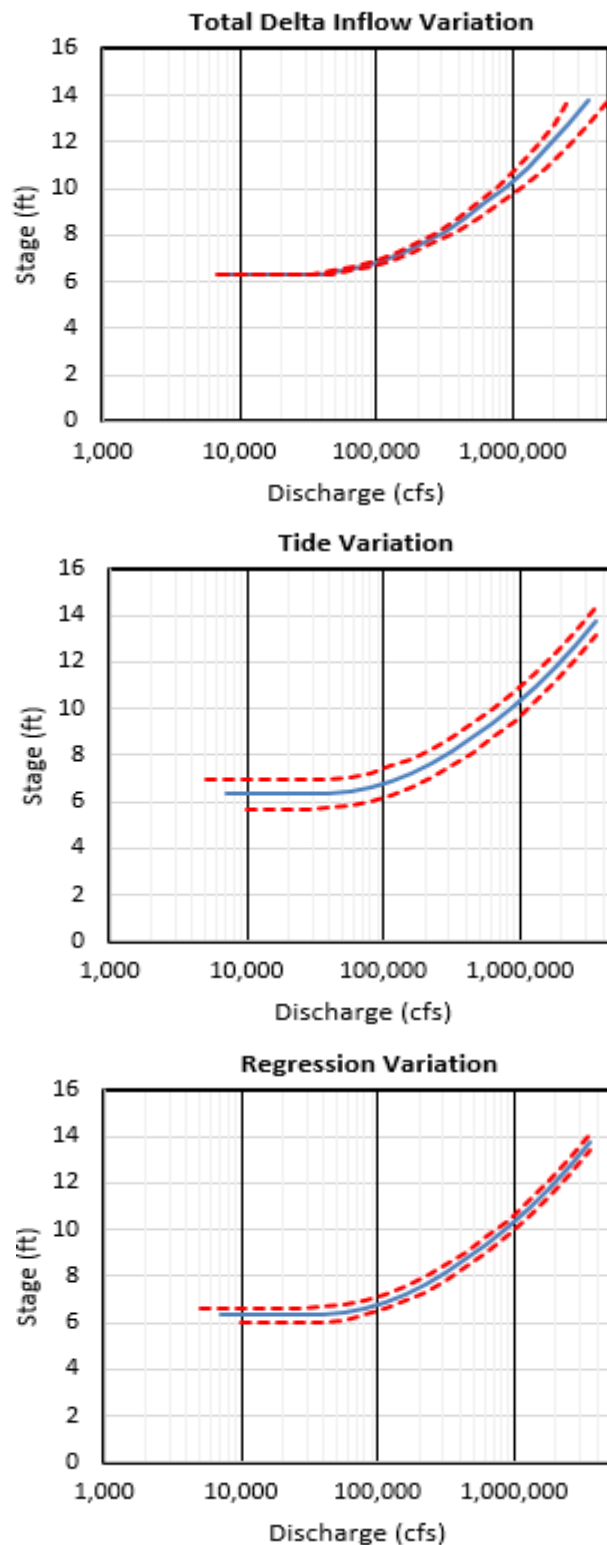
Developing stage-discharge curves for Delta and Suisun Marsh locations is challenging because there are multiple inflow sources and water levels are influenced by tailwater tide levels. The DRMS approach (DWR 2009b) was to use hydraulic theory and a multiple regression analysis of tide level at Golden Gate, total Delta inflows, and observed stages at 15 gauging stations in the Delta and Suisun Marsh to develop equations to predict water levels at the gauging stations. The DLIS team used the DRMS equations and a planar interpolation method to develop stage-discharge curves for locations between the 15 gauging stations.

The uncertainty in the stage-discharge curves at the 15 gauging station locations (shown in the DRMS report as root mean square [RMS] error) ranges from 0.15 to 1.54 feet with an average RMS error of 0.42 foot. The stage-discharge curves at interpolated locations will inherit the uncertainty from the DRMS regression analysis and have an additional, but indeterminate, uncertainty because the channel gradient and hydraulic characteristics between gauging stations may not vary in a planar fashion.

The impacts of inflow, tidal, and regression model uncertainty are illustrated on Figure 5-3 for the Venice Island (VNI) gauging station. The stage uncertainties due to tidal and regression models are constant over the discharge range, whereas the stage uncertainty due to inflow increases with increasing discharge. The inflow, tidal, and regression model uncertainties vary throughout the Delta and Suisun Marsh due to location-specific differences in the influence of inflow, tide, and regression variation on stage-discharge.

The uncertainties in the method used to develop the DLIS stage-discharge curves are knowledge uncertainties that arise from the use of a simplified hydraulic theory and the necessity of interpolating between the 15 gauging stations to develop stage-discharge curves for all islands and tracts in the Delta and Suisun Marsh. Data uncertainties arise from the inflow, tide, and gauging station measurements used in stage-discharge curve development. Uncertainty in the stage-discharge curves will contribute to uncertainty in the stage-recurrence curves and, subsequently, to the uncertainty in frequency and depth of flooding.

Figure 5-3 Stage-Discharge Uncertainty, Venice Island

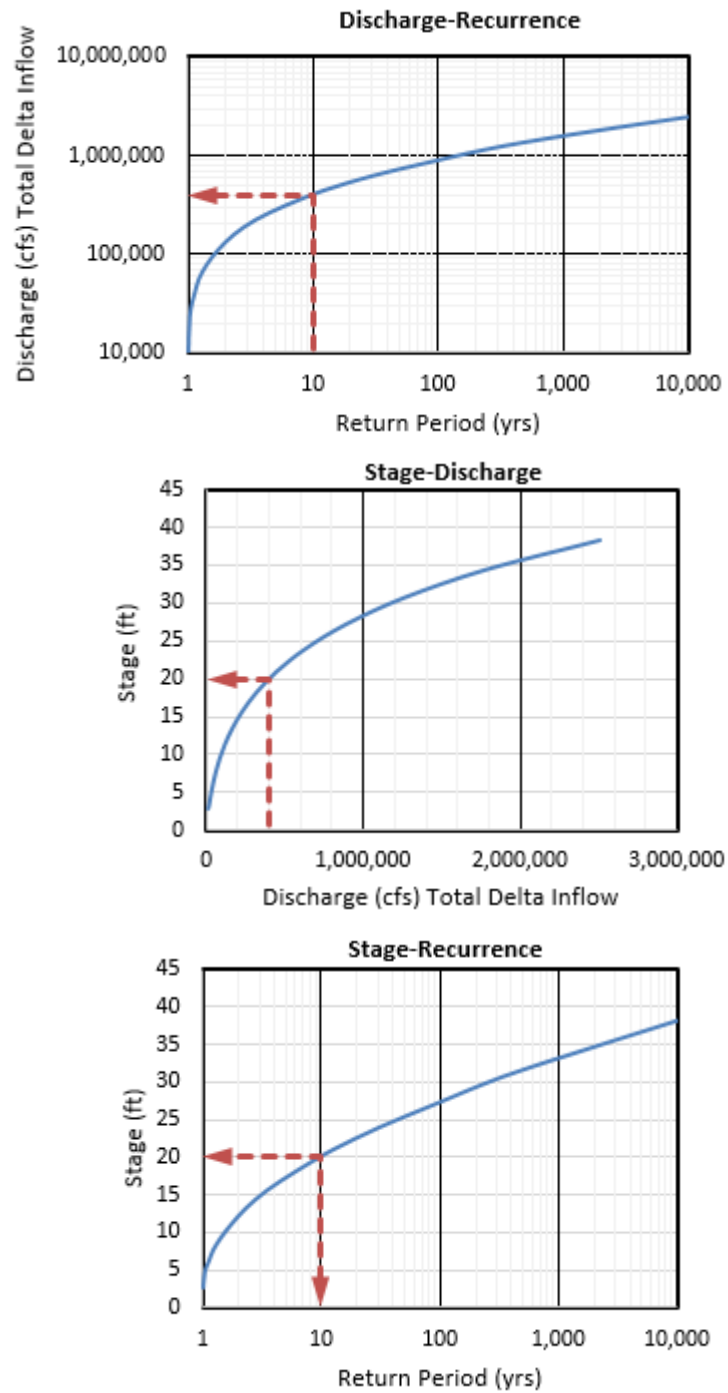


5.3.3.3 Stage-Recurrence

Stage-recurrence is the relationship between frequency of occurrence and water elevation (stage) at a specific location. The relationship is derived directly from discharge-recurrence and stage-discharge relationships; hence, variability and uncertainty in the discharge-recurrence and stage-discharge relationships contribute to the uncertainty in the calculated stage-recurrence relationship.

An example of the development of a stage-recurrence curve is shown on Figure 5-4. In this example, the dashed line on the discharge-recurrence graph shows that the total Delta inflow (discharge) for a 10-year return period is about 400,000 cfs. The stage-discharge graph shows that a flow of 400,000 cfs at the Lisbon District gauging station results in a river stage (elevation) of about 20 feet. Hence, it follows that a river stage of 20 feet would have a return period of about 10 years. The same logic is applied to build a complete stage-recurrence curve for the location.

Figure 5-4
Stage-Recurrence Development, Lisbon District



The uncertainty in a stage-recurrence curve is a function of the uncertainties in the discharge-recurrence curve and stage-discharge curves used to generate stage-recurrence. The uncertainties in the Lisbon District stage-recurrence curve are shown on Figure 5-5. At this location, the tidal and regression model variations are small compared to the variation due to total Delta inflow; hence, the aggregated variation shown on Figure 5-6 is dominated by the variation of total Delta inflow. The aggregated variation at any return period is the square root of the sum of the squared variation from each uncertainty source. At some locations in the Delta and Suisun Marsh, the tidal and regression model variations have a greater influence on the aggregated variation.

Uncertainty in the stage-recurrence curves will contribute to uncertainty in frequency and depth of flooding.

Figure 5-5
Stage-Recurrence Uncertainty by Source, Lisbon District

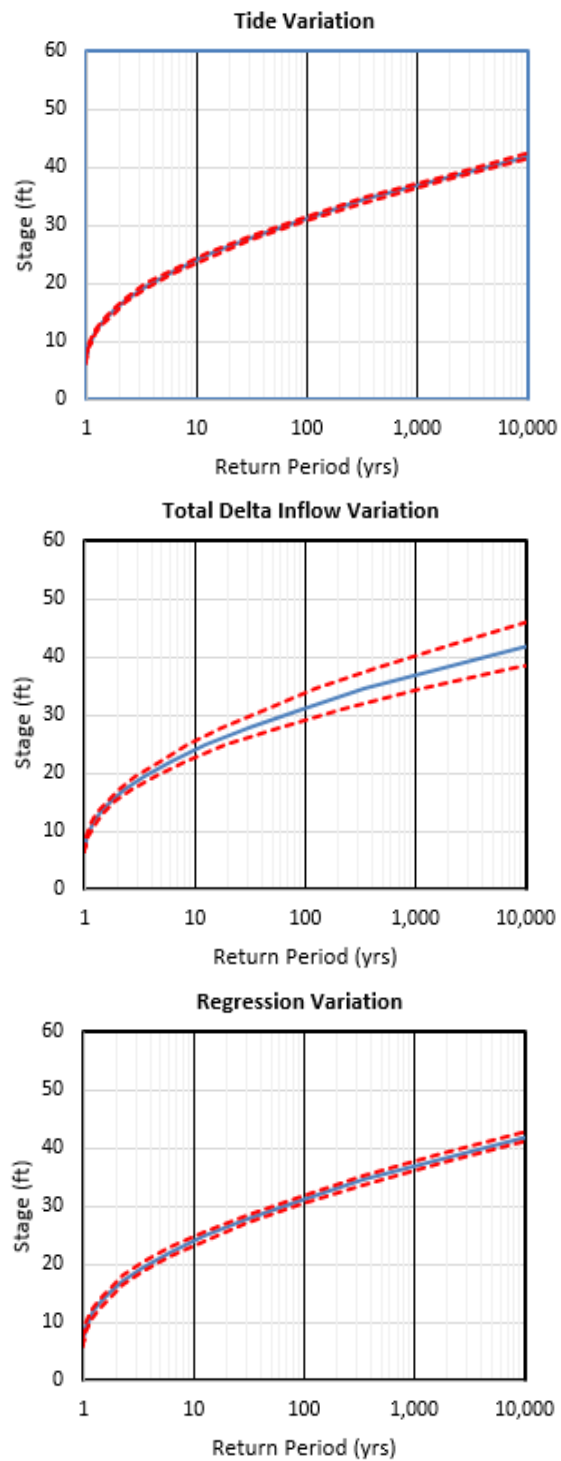
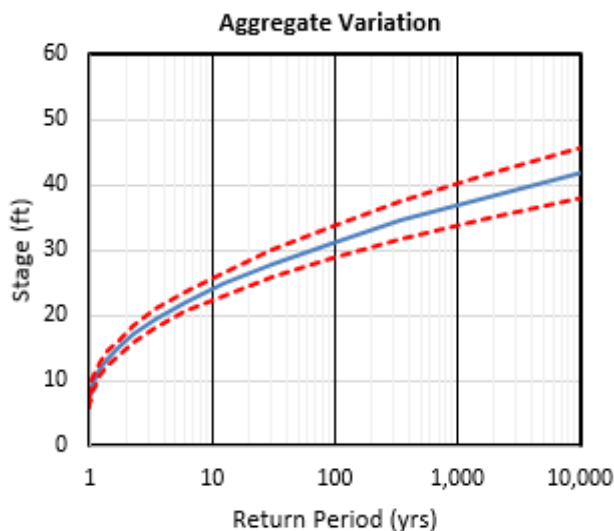


Figure 5-6
Aggregated Stage-Recurrence Uncertainty, Lisbon District



5.3.3.4 Sea Level and Water Level Prediction

The prediction of future water levels in the Delta and Suisun Marsh based on potential sea level rise at Golden Gate has several sources of uncertainty including: uncertainty in predicting the future sea levels at Golden Gate, uncertainty in predicting the hydrodynamic effects between Golden Gate and the Delta and Suisun Marsh, and uncertainty in predicting the hydrodynamic and hydraulic changes in the Delta and Suisun Marsh.

The primary source of uncertainty in predicting future sea levels is illustrated on Figure 5-7. The predicted increase in sea level in the year 2100 (NRC 2012) applicable to Golden Gate ranges from 50 to 140 centimeters (approximately 20 to 55 inches) with an average predicted rise of about 82 centimeters (approximately 32 inches). The uncertainties in sea level rise predictions for the years 2030 and 2050 (DLIS analysis years) are less than in year 2100, but will contribute approximately 6 inches (year 2030) to 12 inches (year 2050) of uncertainty to the prediction of water levels in the Delta and Suisun Marsh.

A snapshot of the hydrodynamic effects between Golden Gate and the Delta and Suisun Marsh is shown on Figure 5-8. This graph shows the relationship between tide ranges at Golden Gate and at Martinez-Amorco Pier near the eastern end of Carquinez Strait. The plotted data are the differences between daily high-high and low-low tide levels for the months of December 2014 and June 2015. Total Delta inflows for December 2014 were above median December inflows, but below flood stage. Total Delta inflows for June 2015 were only about 30 percent of median June inflows. While these data have a relatively high correlation coefficient ($r \geq 0.97$), flood-level inflows to the Delta and extreme tide levels at Golden Gate will introduce additional uncertainty into this relationship.

Figure 5-7
Sea Level Rise Predictions Applicable to Golden Gate

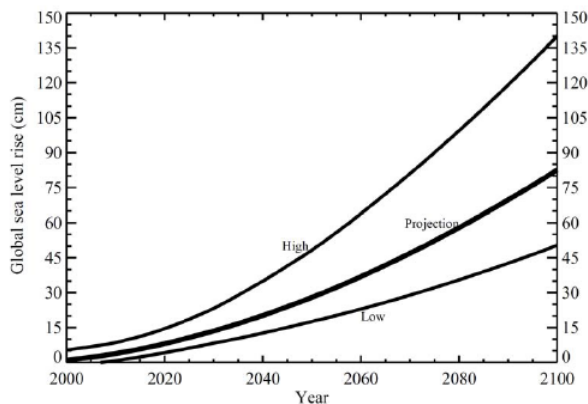
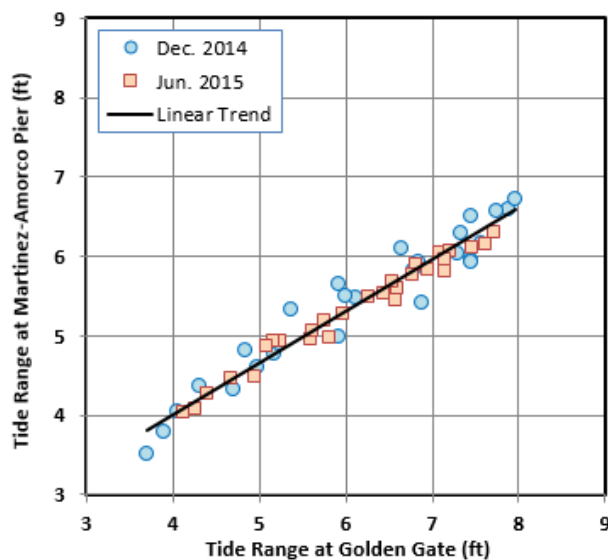


Figure 5-8
Golden Gate and Carquinez Strait Tide Relationship



The key take-away from this graph is that the tide range in Carquinez Strait is 60 to 65 percent of the tide range at Golden Gate for the two months shown. While this small sample is not a definitive measure of the hydrodynamic effects between Golden Gate and the Delta and Suisun Marsh, it does illustrate the order of magnitude that the hydrodynamic effects will have on predictions of water levels in the Delta and Suisun Marsh.

It is also important to note that this relationship is only applicable to current sea level. Increases in average sea level at Golden Gate may alter the hydrodynamic effects between Golden Gate and the Delta and Suisun Marsh. Additional studies of the influence of sea level rise on the hydrodynamics of San Francisco Bay are currently being discussed by members of the San Francisco Bay Regional Coastal Hazards Adaptation Resiliency Group (CHARG 2015) and the City of San Francisco (San Francisco, City of 2014). However, until the results are published, the DLIS team will use the method described in

Appendix C to evaluate sea level rise effects on the prediction of water levels in the Delta and Suisun Marsh.

5.3.3.5 Seismic-Recurrence

For the DLIS analyses, seismic event recurrence is expressed as pga recurrence. Uncertainty in the pga-recurrence curves will contribute to uncertainty in the frequency and depth of flooding.

The data uncertainty in pga recurrence curves includes limited knowledge of the seismic event sources, source propagation, magnitude, and frequency; and limited knowledge of ground response to seismic events. The knowledge uncertainty of this element of a risk calculation is in the models used to generate pga-recurrence curves. The models, whether site-specific or regional models, must necessarily rely on the currently available knowledge, assumptions, and generalizations about ground response to known and predicted seismic events.

There is no general method of determining the degree of uncertainty in a pga-recurrence curve, but the literature suggests (e.g., Ake 2008, Figure 5-9) that the estimated probability of exceedance or return period for a given pga at a site could vary by as much as an order of magnitude, with greater uncertainty at larger pga values. The variability shown on Figure 5-9 is due to seismic source characterization.

Figure 5-9
PGA-Recurrence Uncertainty Source
Characterization (Source: Ake 2008)

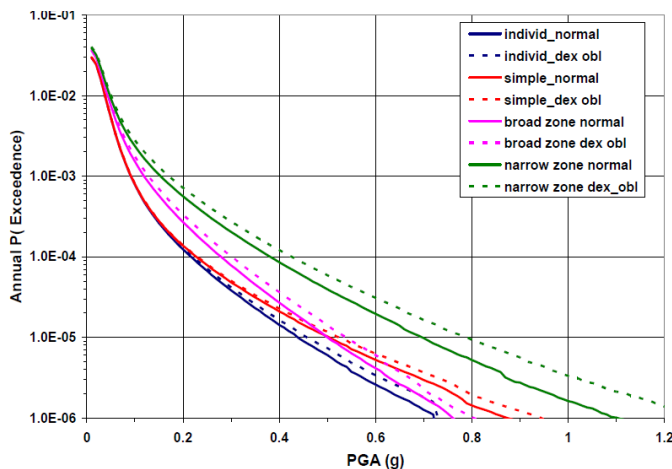


Figure 4. Comparison of mean PGA hazard curves for a site in north-central California illustrating the uncertainty due to source characterization. The different models in the caption refer to source geometry (discrete individual faults (indicated by “individ”), longer simplified representations of the faults (“simple”), either a broad or narrow zone of distributed deformation (“broad or narrow zone”) and sense of slip on the faults (“normal” or “dextral-oblique”).

The pga uncertainty due to the seismic source characterization and model that are presented in the DRMS reports generally show a similar magnitude of uncertainty and pattern of greater uncertainty at larger pga values (see Figures 5-10, 5-11, and 5-12).

Figure 5-10
pga-Recurrence Uncertainty Source Characterization, Delta Cross Channel
 (Source: DWR 2009c)

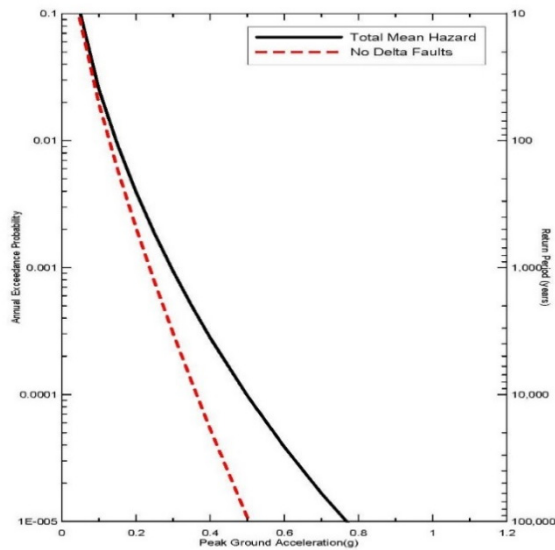


Figure 5-11
pga-Recurrence Uncertainty Seismic Model, Delta Cross Channel
 (Source: DWR 2009c)

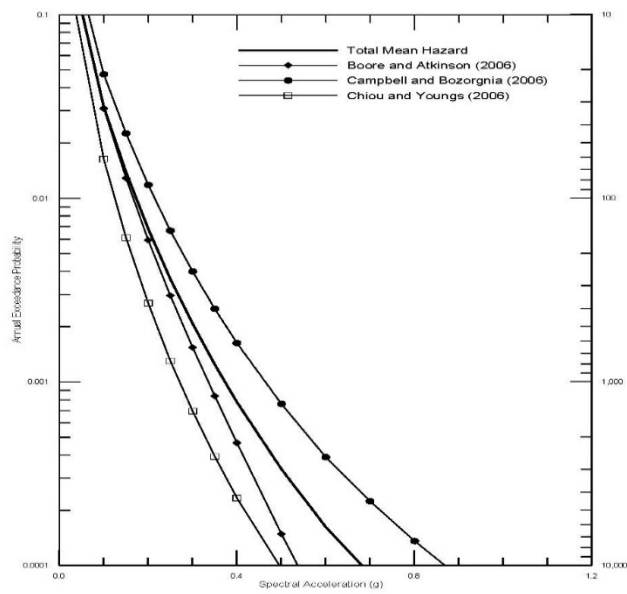
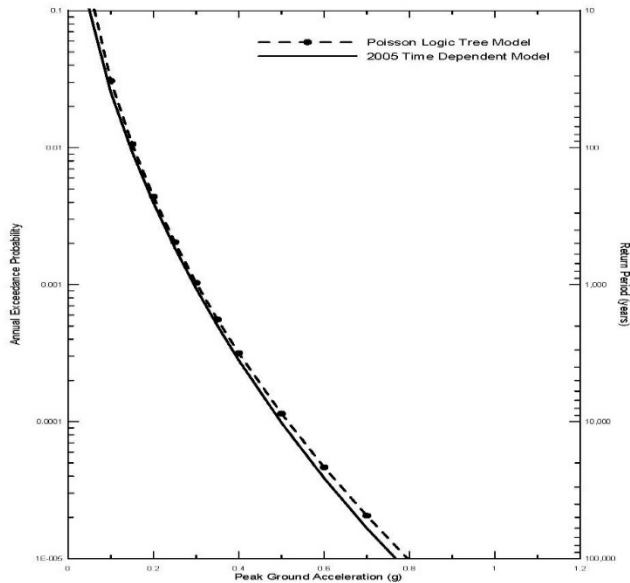


Figure 5-12
pga-Recurrence Uncertainty Time Dependent Model, Delta Cross Channel
 (Source DWR 2009c)



5.3.3.6 Hydrologic and Hydraulic Levee Fragility

Hydrologic and hydraulic levee fragility curves have data and model uncertainties as illustrated on Figure 5-13. Data uncertainties include limited knowledge of the range and spatial distribution of levee material and foundation properties and limited knowledge of the spatial variability of levee geometry. Knowledge uncertainty is found in the models used to calculate a probability of failure for a given hydrologic and hydraulic load. The models typically used to calculate probability of failure for hydrologic and hydraulic loading include limit equilibrium and numerical slope stability methods, and analytical and numerical seepage methods. These methods incorporate the best available procedures for modeling, but are limited to the current understanding of the behavior of levee performance under hydrologic and hydraulic loading. In the extreme, the uncertainty in a hydrologic and hydraulic fragility curve can be as large as shown on Figure 5-14.

There is little mention of hydrologic and hydraulic fragility curve uncertainty in the previous studies of Delta and Suisun Marsh, with the exception of the uncertainty in overtopping failure as described earlier. However, the consistent shape of the published hydrologic and hydraulic fragility curves may indicate that the uncertainty in the Delta and Suisun Marsh hydrologic and hydraulic fragility curves is not as extreme as the example shown on Figure 5-14.

Figure 5-13
Fragility Curve Uncertainty (Adapted from Simm 2011)

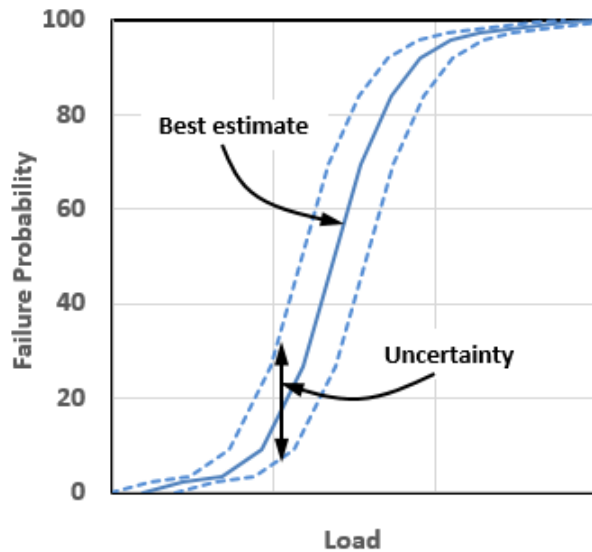


Figure 5-14
Extreme Fragility Curve Uncertainty (NRC 2013)

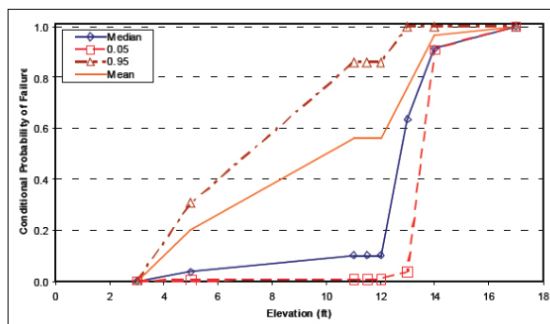
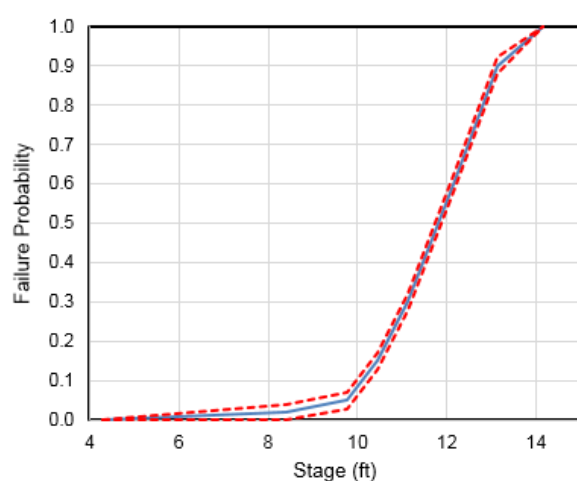


FIGURE I-4 Uncertainty in the estimate of levee fragility for a levee in New Orleans. Dashed lines correspond to the 0.05 and 0.95 uncertainty levels in the estimate of the conditional probability of failure.
SOURCE: IPET (2009).

The DLIS team, using engineering judgment and our experience with developing fragility curves for other locations, concluded that the probable maximum error in estimating probability of hydrologic and hydraulic failure would be 2 percent. For example, Figure 5-15 shows a 2 percent error applied to the Bacon Island hydrologic and hydraulic fragility curve. The solid line is the most likely estimate of hydrologic and hydraulic fragility and the dashed lines are plus and minus 2 percent from the most likely value. The uncertainty analysis described later is based on plus and minus one standard deviation rather than extreme values; thus, the “six sigma rule” (USACE 2006) was applied to obtain an estimated standard deviation from the estimated probable maximum error.

Figure 5-15
Bacon Island Curve with Maximum Uncertainty

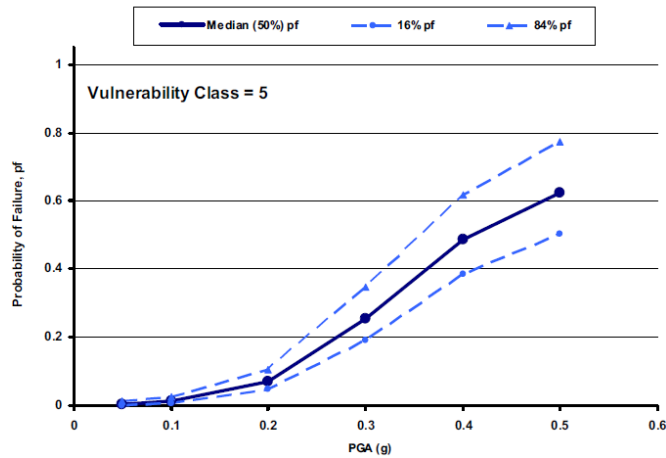


5.3.3.7 Seismic Levee Fragility

Seismic levee fragility curves have data and model uncertainties similar to those for hydrologic and hydraulic fragility curves. Data uncertainties include limited knowledge of the range and spatial distribution of levee material and foundation properties and limited knowledge of the spatial variability of levee geometry. Knowledge uncertainty is found in the models used to calculate a probability of failure for a given seismic load.

The seismic fragility curves used in the DLIS study were obtained from the DRMS study (DWR 2009d) in which uncertainty was explicitly analyzed. Each of the DRMS seismic fragility curves for the 22 seismic vulnerability classes has uncertainty identified as shown on Figure 5-16. The dashed lines on this figure represent a 68 percent confidence interval about the median probability of failure (solid line), which corresponds to approximately plus and minus one standard deviation.

Figure 5-16 Seismic Fragility Curve (DWR 2009d)



5.3.3.8 Protected Population

The size of the population protected by the Delta and Suisun Marsh levees has data uncertainty arising from the challenges of obtaining accurate counts of the resident population. While periodic census data are readily available, the resident population of the Delta and Suisun Marsh is not static. For example, some residents may be out of the protected area and non-residents (day workers, recreational users, and travellers) may be in the protected area when a flood occurs. The source and uncertainties associated with the Delta and Suisun Marsh population are described in Section 3.0 of this report. Population uncertainties will contribute to uncertainty in the EAF calculated for each island and tract.

5.3.3.9 Population-at-Risk, Warning, Time and Evacuation Response

The population-at-risk (PAR) are those individuals who are in danger of coming in contact with flood waters. Depending on warning time and evacuation response, PAR can be much less than the protected population. In the DLIS calculations of EAF, PAR is computed as:

$$PAR = (\text{protected population}) * P_R * P_A * P_W \quad (\text{Equation 5-14})$$

where

P_R = percentage of the protected population receiving a warning

P_A = percentage of the protected population able to evacuate

P_W = percentage of the protected population willing to evacuate

The uncertainties associated with these elements of a risk analysis are primarily knowledge uncertainties. Little hard data from Delta flood events are available on the effectiveness of warning times, percent of the population receiving the warning, percent of the population able to evacuate, and percent of the population willing to evacuate. Consequently, empirical relationships for these variables based on experience in other, similar leveed areas are used in the DLIS analysis; for example, relationships presented in the CVFPP (DWR 2012d), Delta Risk Management Strategy Risk Report (DWR 2008d), and Journal of Flood Risk Management (Jonkman and Vrijling 2008).

Warning time and evacuation uncertainties are generally described in the literature as ranges rather than standard deviations; hence, the range of warning times and evacuation response used in the uncertainty analyses are based on engineering judgment rather than statistical evaluation. Warning time and evacuation response uncertainties will contribute to uncertainty in the EAF calculated for each island and tract.

5.3.3.10 Flood Mortality Relationship

A flood mortality relationship describes the expected number of fatalities per foot of inundation. This relationship has data uncertainty because flood mortality data are inconsistently recorded, and models have uncertainty due to the challenges of identifying the factors that lead to flood deaths (e.g., flood depth, rate of rise, water velocity, water temperature).

The mortality relationship used in the DLIS analyses is

$$m(d) = \Phi((\ln(d) - \mu)/\sigma) \quad (\text{Equation 5-15})$$

where

$m(d)$ = mortality function

d = depth of inundation

Φ = normal distribution with mean = 0 and standard deviation = 1

μ = log-normal mean

σ = log-normal standard deviation

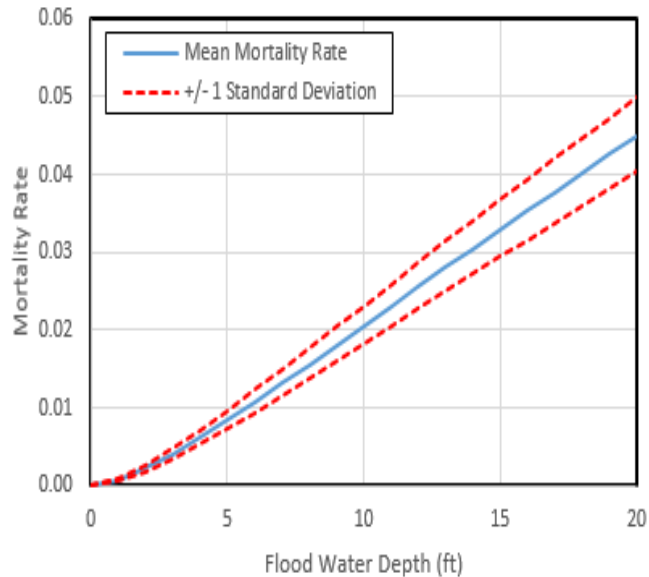
and

μ and σ are determined by a regression analysis of reported flood mortality (Jonkman 2007).

Jonkman's most likely values of $\mu = 5.2$ and $\sigma = 2.0$ are used in the DLIS mortality function. Using engineering judgment and inspection of a graph of the Jonkman regression, the DLIS team determined that a variation of μ of 0.1 would generate mortality functions approximately plus and minus one standard deviation from the mean function (see Figure 5-17).

Mortality function uncertainties will contribute to uncertainty in the EAF calculated for each island and tract.

Figure 5-17
Mortality Function Uncertainty



5.3.3.11 Protected Assets

Data and knowledge uncertainty is associated with the inventory of protected assets. Data uncertainty arises from the challenges of cataloguing all of the structures, structure contents, vehicles, and equipment that might be in the Delta and Suisun Marsh during a flood event. Valuation of these assets adds data and knowledge uncertainty as valuation can change with time. The quantity and value of field, vine, and tree crops in the Delta and Suisun Marsh are a further source of data and knowledge uncertainty. Crop and land values are subject to change with time and market forces that create a continual change in the type and acreage of crops. A further description of specific asset uncertainties is provided in Section 3.0 of this report.

Because a statistical evaluation of uncertainties for the inventory and value of the protected assets is not available, the DLIS team has evaluated only the sensitivity of the risk metrics to asset uncertainty. In the analysis described later in this section, asset values are varied by plus and minus 10 percent. Uncertainty in asset inventory and value will contribute to uncertainty in the EAD computed for each island and tract.

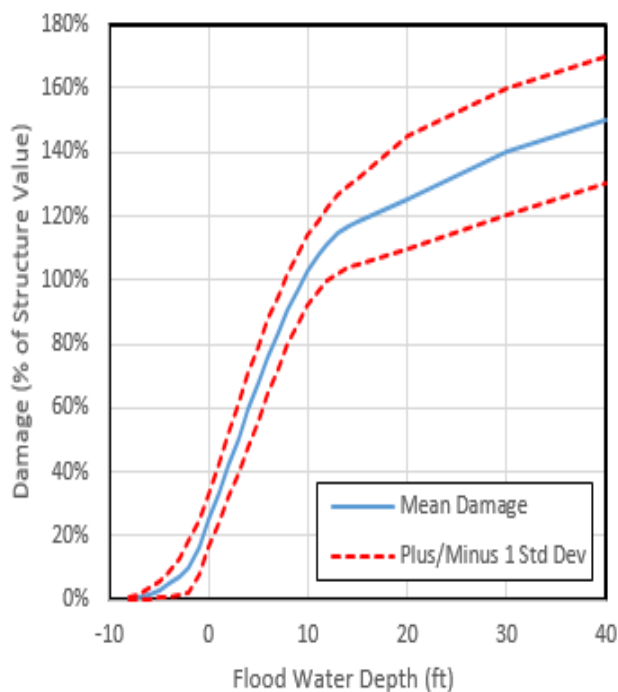
5.3.3.12 Depth-Damage

A depth-damage curve relates the depth of flooding to the expected damage for a given asset type. Because there is no known depth-damage data from previous Delta and Suisun Marsh flooding events, the data uncertainty associated with depth-damage curves can be considered to be knowledge uncertainty. Depth-damage curves from other, similar leveed areas (USACE 2000, 2003; FEMA 2009b) were used in the DLIS analysis and any uncertainty identified in those curves is applicable to an uncertainty analysis of EAD.

An example of depth-damage uncertainty for residential structures is shown on Figure 5-18. Note that the percent damage can exceed 100 percent of the value of the structure because the relationship includes

the damage to structure contents as well as to the structure. The residential depth-damage relationship published by the USACE considers flood water depths up to 16 feet. Engineering judgment was used to extend the functions to the greater depths of flooding that may occur at some locations in the Delta and Suisun Marsh. Similar depth-damage curves for commercial and other structures are used in the DLIS analysis. In some cases, for example roads and railroads, damages are expressed as dollars of damage per mile per depth of flood water rather than as a percentage of asset value. Some level of uncertainty accompanies all depth-damage curve types. Uncertainty in depth-damage relationships contributes to uncertainty in the EAD computed for each island and tract.

Figure 5-18
Depth-Damage Uncertainty Residential Structures (USACE 2003)



5.3.3.13 Ecosystem, Water Supply, and Delta-as-Place Risk Uncertainty

The risk metrics used in the DLIS study for ecosystem, water supply, and Delta-as-Place are calculated based on the estimated annual probability of levee failure rather than an integration of hazard and consequence as is done for EAD and EAF. Consequently, the uncertainty in each of these metrics will depend on uncertainty in the estimated annual probability of levee failure and the uncertainty in the data used to compute the ecosystem, water supply, or Delta-as-Place risk metrics.

Annual Probability of Levee Failure

The annual probability of hydrologic/hydraulic levee failure for island i is computed as:

$$p_{H,i} = \int p_S \times p_{fH,s} \quad (\text{Equation 5-16})$$

where

p_S = probability of stage (water level elevation)

$p_{fH,S}$ = conditional probability of levee failure at stage

and the integral is over all potential stages at island i .

The annual probability of seismic levee failure is computed as:

$$p_{E,i} = \int p_E \times p_{fE,S} \quad (\text{Equation 5-17})$$

where

p_S = probability of peak ground acceleration (pga)

$p_{fH,S}$ = conditional probability of levee failure at stage pga

and the integral is over all potential peak ground accelerations at island i .

Because the occurrence of a flood and an earthquake are assumed to be independent events and very unlikely to occur simultaneously, the joint annual probability of levee failure due to flood or earthquake can be computed as:

$$p_{f,i} = p_{H,i} + p_{E,i} - p_{H,i} \times p_{E,i} \quad (\text{Equation 5-18})$$

The uncertainty in $p_{f,i}$ is a function of uncertainties in total Delta inflow (discharge recurrence), stage-discharge, tide effects, levee hydrologic and hydraulic fragility, pga recurrence, and levee seismic fragility.

Ecosystem Risk

Ecosystem risk for island i is defined as

$$EFH_i = p_{f,i} \times \text{habitat}_i \quad (\text{Equation 5-19})$$

where

$p_{f,i}$ = estimated annual probability of levee failure of island i

habitat_i = area of existing and potential high value non-tidal habitat on island i

Thus, the uncertainty in EFH_i will be a function of the uncertainty in $p_{f,i}$ and habitat_i . The uncertainty in $p_{f,i}$ is described above and the uncertainty in habitat_i is estimated to be approximately ± 5 percent of the area of existing and potential high value non-tidal habitat on island i .

Water Supply Risk

The water supply risk metric is based on counts of water supply functions (conveyance, salinity barrier, and infrastructure), relative water quantity used, and number of water user groups served. These elements of water supply risk have no defined uncertainties; hence, the uncertainty in this risk metric is assumed to be equal to the uncertainty in the annual probability of levee failure for those islands that can affect water supply.

Delta-as-Place Risk

The Delta-as-Place risk metric considers legacy towns, prime farmland, and roads of state interest as three separate metrics. The definition of legacy town is well documented; hence, the uncertainty of the legacy town metric is equal to the uncertainty of the annual probability of levee failure for those islands with legacy towns. Likewise, roads of state interest are well defined; hence, the uncertainty of the roads of state interest metric is equal to the uncertainty of the annual probability of levee failure for those islands with roads of state interest. The estimate of prime farmland acreage, however, has some uncertainty

Prime farmland risk for island i is defined as

$$EPF_i = p_{f,i} \times PFacreage_i \quad (\text{Equation 5-20})$$

where

$p_{f,i}$ = estimated annual probability of levee failure of island i

$PFacreage_i$ = area of prime farmland on island i

Thus, the uncertainty in EPF_i will be a function of the uncertainty in $p_{f,i}$ and $PFacreage_i$. The uncertainty in $p_{f,i}$ is described above and the uncertainty in $PFacreage_i$ is estimated to be approximately ± 5 percent of the area of prime farmland on island i .

5.3.3.14 Expected Annual Fatalities

The uncertainty in EAF is a function of the uncertainties in the risk calculations that precede this calculation; i.e., discharge-recurrence, stage-discharge, stage-recurrence, levee fragility, population count, warning time, evacuation response, and flood mortality.

5.3.3.15 Expected Annual Damages

The uncertainty in EAD is a function of the uncertainties in the risk calculations that precede this calculation; i.e., discharge-recurrence, stage-discharge, stage-recurrence, levee fragility, and depth-damage.

5.3.4 Sensitivity and Uncertainty Analysis Method

The sensitivity and uncertainty analysis used in the DLIS study is a first order, second moment (FOSM) method also known as Taylor's Series Mean Value Method. The method is based on a Taylor series expansion of a function about its mean value. The mean value of the function is calculated using the mean values of the function's input parameters. The variance (standard deviation squared) is the sum of the products of the partial derivatives of the function taken at the mean parameter values and the variances of the input parameters.

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For EAD the inputs are a discharge-recurrence (total Delta inflow), stage-discharge regression, tide, levee hydrologic and hydraulic fragility, seismic-recurrence, seismic fragility, asset inventory and value, and depth-damage functions. The mean value of each function is used to compute the mean value of EAD. The partial derivatives are taken as plus and minus one standard deviation from the mean value to calculate EADv (expected annual damage at plus or minus one standard deviation from an input mean value). EADv is calculated for one input function at a time. Because there are eight input functions to EAD, 16 EADv values are calculated. The square of the differences in EADv values is summed to obtain an estimate of EAD variance.

An example of this calculation is shown in Table 5-3. In this example, the mean EAD is approximately \$3.2 million with an estimated standard deviation of about \$0.9 million. This result implies that an estimated 68 percent confidence interval about the mean EAD would be \$2.3 to \$4.1 million and a 90 percent confidence interval would be \$1.7 to \$4.7 million. The rightmost column in Table 5-3 shows the percentage of the total variation in EAD that is due to each source of uncertainty. In this example, a little more than 50 percent of the variation is due to seismic fragility and depth-damage uncertainties. The other islands and tracts in the Delta and Suisun Marsh may have different levels of contributing factors. For example, the variation in EAD or other risk metrics may be primarily due to levee hydrologic and hydraulic fragility on some islands.

The coefficient of variation of EAD is also shown in the last row of Table 5-3. The coefficient of variation is the estimated standard deviation divided by the mean EAD and provides a dimensionless estimated of variation about the mean. The coefficient of variation can be used to compare the relative magnitude of risk metric uncertainty among the Delta and Suisun Marsh islands and tracts.

The same procedure is used to estimate the uncertainty in EAF except there are nine input functions (discharge-recurrence [total Delta inflow], stage-discharge regression, tide, levee hydrologic and hydraulic fragility, seismic-recurrence, seismic fragility, population, warning time and response, and mortality functions) and, therefore, 18 EAFv values are calculated.

The complete output from the uncertainty analysis of the DLIS risk metrics is included in Appendix E.

Table 5-3
Taylor Series Analysis, EAD, Bethel Island

Total Asset Value	\$141,982,575
Mean EAD	\$3,235,062

Uncertainty Source	EAD _v	Intermediate Calculation ⁽¹⁾	% of Total Variation
Total Delta Inflow (discharge) + 1 Std Dev	\$3,357,245		
Total Delta Inflow (discharge) - 1 Std Dev	\$3,160,751	9.65E+09	1%
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$3,355,084		
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$3,063,568	2.12E+10	2%
Tide +1 Std Dev	\$3,530,023		
Tide -1 Std Dev	\$2,905,601	9.75E+10	11%
Fragility, hydrologic and hydraulic + 1 Std Dev	\$3,516,642		
Fragility, hydrologic and hydraulic - 1 Std Dev	\$2,953,482	7.93E+10	9%
pga Recurrence + 1 Std Dev	\$3,658,443		
pga Recurrence -1 Std Dev	\$2,877,365	1.53E+11	17%
Fragility, Seismic + 1 Std Dev	\$3,795,778		
Fragility, Seismic - 1 Std Dev	\$2,791,401	2.52E+11	28%
Asset Count & Value +1 Std Dev	\$3,558,569		
Asset Count & Value -1 Std Dev	\$3,073,309	5.89E+10	7%
Depth Damage +1 Std Dev	\$3,760,104		
Depth Damage -1 Std Dev	\$2,817,569	2.22E+11	25%
EAD Standard Deviation	\$945,165	Sum = 8.93E+11	Sum = 100%
EAD Coefficient of Variation	29%		

(1) Intermediate Calculation = $([EAD_v(\text{at } +1 \text{ Std Dev}) - EAD_v(\text{at } -1 \text{ Std Dev})]/2)^2$

5.3.5 Sensitivity and Uncertainty Impacts

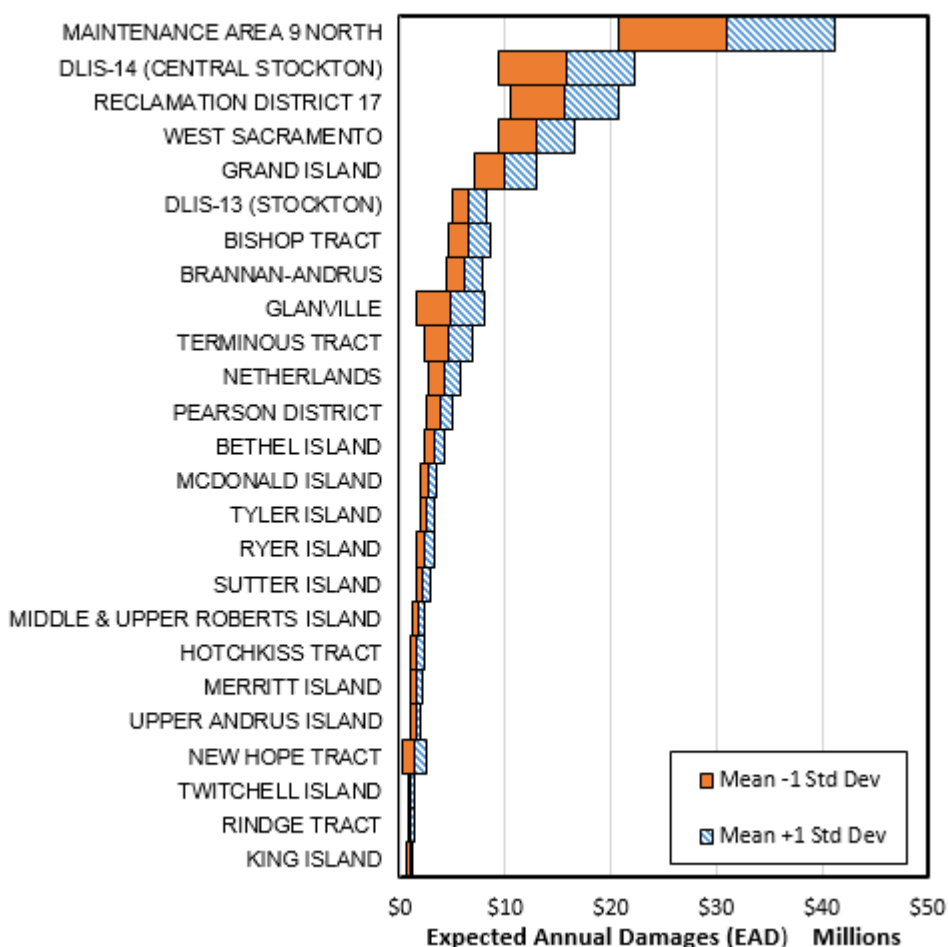
Results of the sensitivity and uncertainty analyses are presented in the following sections as mean value plus and minus one standard deviation and as coefficient of variation. A standard deviation is in the same units as the mean value; for example, an EAD of \$4 million \pm \$1 million. The range of minus one standard deviation to plus one standard deviation from the mean also provides an approximate 68 percent confidence interval about the mean value. The coefficient of variation ($C_v = 100 \times \text{standard deviation}/\text{mean}$) is a statistic that can be used to compare the relative uncertainty of two or more results. For example, an EAD with C_v equal to 25 percent is more precisely known than an EAD with C_v equal to 40 percent.

The following sections also include a discussion of the relative importance of the source uncertainties to the overall uncertainty in each risk metric. For example, the EAD for an island that is especially vulnerable to seismic failure will likely have a higher percentage of uncertainty due to the island's seismic levee fragility curve than an island that is less vulnerable to seismic events.

5.3.5.1 Impacts of Uncertainty on EAD

The impact of uncertainty on EAD is illustrated on Figure 5-19, which shows EAD plus (striped bar) and minus (solid bar) one standard deviation from the mean for 25 of the 26 islands and tracts with the largest EAD.

Figure 5-19
Expected Annual Damages with Uncertainty

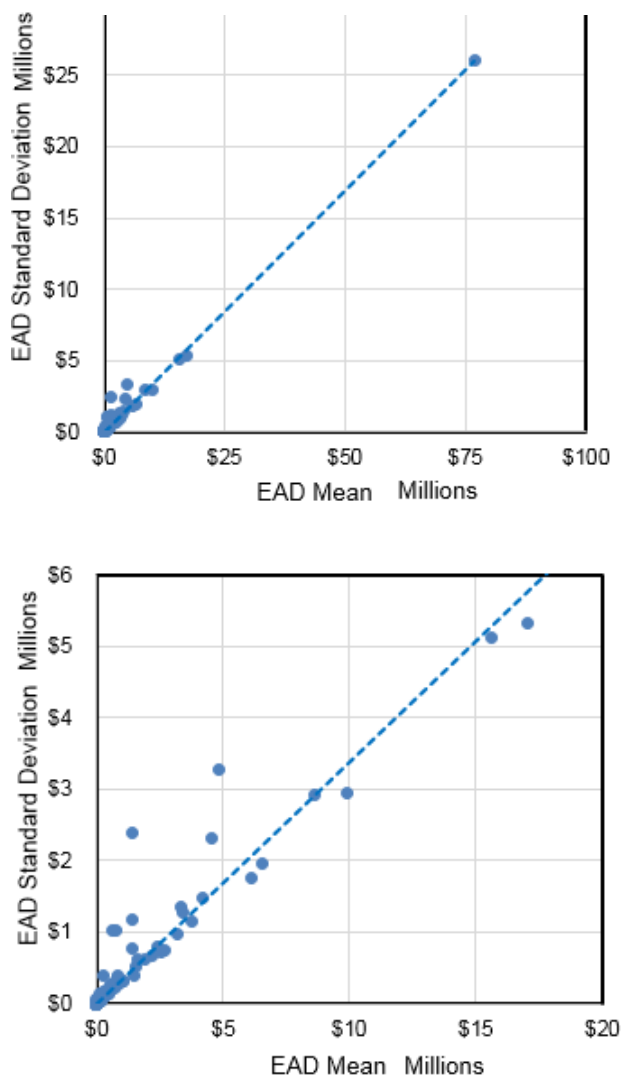


The mean EAD values for the islands and tracts not shown on Figure 5-19 are progressively smaller, are all less than about \$1 million, and have uncertainties that are approximately proportional to EAD. The complete EAD uncertainty analysis results are presented in Appendix E.

The relative EAD uncertainty among all islands and tracts is shown on Figure 5-20. On this figure, the standard deviation of EAD is plotted versus the mean EAD. The best-fit line (dashed line) has a slope of about 34 percent, indicating that the average EAD coefficient of variation is about 34 percent. Points that plot above the best-fit line have a coefficient of variation greater than 34 percent and points that plot below the line have a coefficient of variation less than 34 percent.

The upper graph on Figure 5-20 shows the data for all islands and tracts. The lower graph is an enlargement of the upper graph to more clearly show the range of EAD coefficients of variation. Several of the islands and tracts with very high coefficients of variation also have very low mean EAD values. For example, Bixler Tract ($C_v = 177\%$) and DLIS-07 ($C_v = 254\%$) have mean EAD values of less than \$500. In these cases, the smaller mean EAD is more sensitive to the range of variability in the functions used in calculating EAD.

Figure 5-20
Coefficient of Variation, EAD



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The greatest source of uncertainty in EAD varies from location to location as shown in Table 5-4. This table lists, for each uncertainty source, the eight islands and tracts whose uncertainty is most influenced by each uncertainty source. For example, the EAD uncertainty attributed to total Delta inflow is greatest at Yolano, whereas tide uncertainty is the largest part of the EAD uncertainty at DLIS-63. The percentage of EAD uncertainty by source is provided in Appendix E for all islands and tracts. The range of EAD coefficients of variation is 27 to 258 percent; however, approximately 80 percent of the Cv values are less than 75 percent.

Table 5-4
Top Influence by Source of Variability, EAD

Total Delta Inflow		Stage-Discharge		Tide	
% Var	Island	% Var	Island	% Var	Island
95%	YOLANO	47%	GLANVILLE	77%	DLIS-63 (GRIZZLY ISLAND AREA)
91%	DLIS-08 (DISCOVERY BAY AREA)	41%	MCCORMACK-WILLIAMSON TRACT	74%	WINTER ISLAND
88%	DLIS-10	39%	BRACK TRACT	71%	DLIS-27
82%	DLIS-19 (GRIZZLY SLOUGH AREA)	39%	SHIN KEE TRACT	69%	DLIS-01 (PITTSBURG AREA)
80%	CLIFTON COURT FOREBAY	38%	NEW HOPE TRACT	69%	DLIS-36
77%	BIXLER TRACT	37%	CANAL RANCH TRACT	68%	DLIS-33
73%	DLIS-17	35%	EHRHEARDT CLUB	65%	DLIS-34
72%	DLIS-18	35%	TERMINOUS TRACT	63%	DLIS-32

Hydrologic and Hydraulic Fragility		pga Recurrence		Seismic Fragility	
% Var	Island	% Var	Island	% Var	Island
54%	MIDDLE & UPPER ROBERTS ISLAND	17%	MCDONALD ISLAND	52%	VICTORIA ISLAND
52%	NORTH STOCKTON	17%	WOODWARD ISLAND	30%	WOODWARD ISLAND
45%	PEARSON DISTRICT	17%	UNION ISLAND WEST	27%	UNION ISLAND WEST
41%	MAINTENANCE AREA 9 NORTH	16%	SHERMAN ISLAND	27%	BETHEL ISLAND
41%	GRAND ISLAND	16%	BETHEL ISLAND	26%	PALM-ORWOOD
41%	SUTTER ISLAND	14%	VICTORIA ISLAND	26%	SHERMAN ISLAND
38%	MERRITT ISLAND	14%	WRIGHT-ELMWOOD TRACT	26%	LOWER ROBERTS ISLAND
37%	RANDALL ISLAND	13%	CONEY ISLAND	24%	SUNRISE CLUB

Table 5-4
Top Influence by Source of Variability, EAD

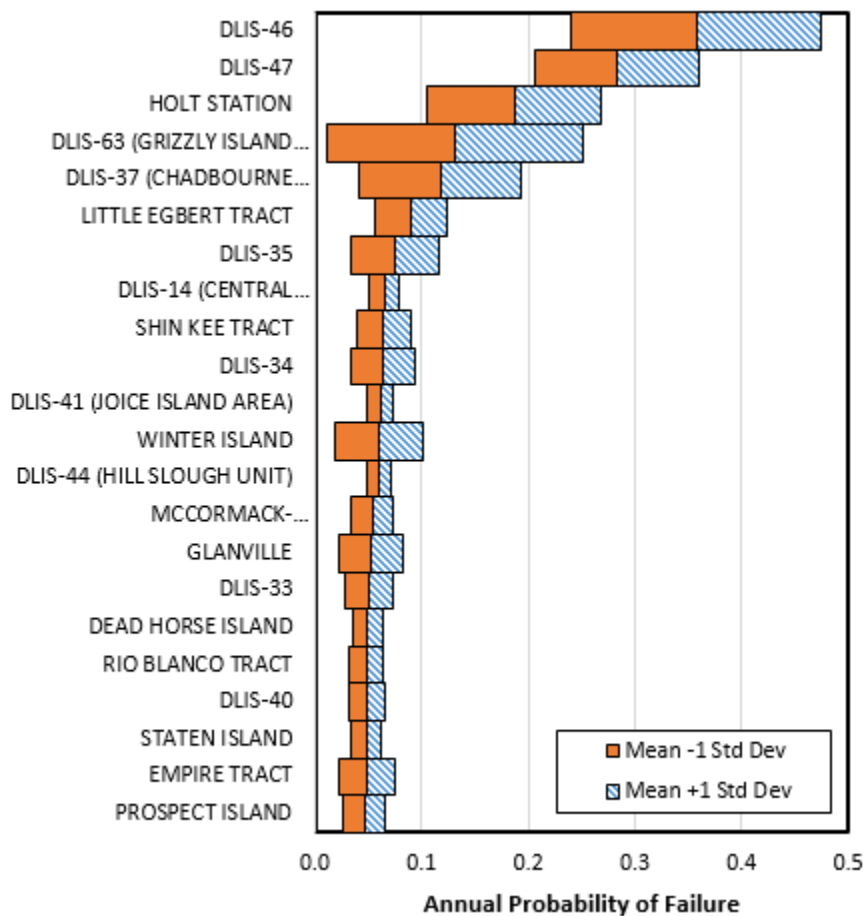
Asset Count and Value		Depth Damage	
% Var	Island	% Var	Island
21%	MAINTENANCE AREA 9 SOUTH	91%	DLIS-41 (JOICE ISLAND AREA)
18%	DLIS-14 (CENTRAL STOCKTON)	89%	DLIS-55
15%	DLIS-13 (STOCKTON)	89%	DLIS-56
14%	UPPER ANDRUS ISLAND	82%	DLIS-46
14%	MCDONALD ISLAND	77%	DLIS-14 (CENTRAL STOCKTON)
13%	WEST SACRAMENTO	76%	DLIS-44 (HILL SLOUGH UNIT)
13%	TYLER ISLAND	74%	DLIS-47
12%	BRANNAN-ANDRUS	72%	DLIS-62

5.3.5.2 Impacts of Uncertainty on EAF

The impact of uncertainty on EAF is illustrated on Figure 5-21, which shows EAF plus (striped bar) and minus (solid bar) one standard deviation from the mean for 25 of the 26 islands and tracts with the largest EAF. Note that Maintenance Area 9 has the largest EAF, which is 5 to 6 times greater than the largest EAF shown on Figure 5-21; as a consequence, Maintenance Area 9 is not shown.

The mean EAF values for the islands and tracts not shown on Figure 5-21 are progressively smaller, are all less than about 0.015, and have uncertainties that are approximately proportional to EAF. The complete EAF uncertainty analysis results are presented in Appendix E.

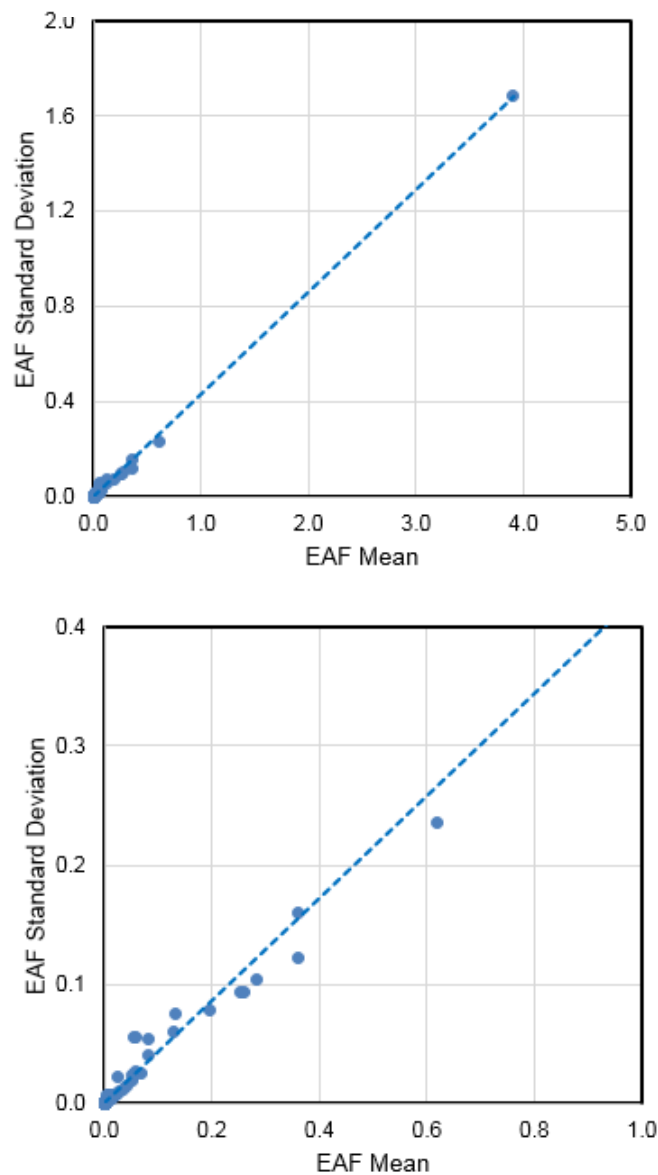
Figure 5-21
Expected Annual Fatalities with Uncertainty



The relative EAF uncertainty among all islands and tracts is shown on Figure 5-22. On this figure, the standard deviation of EAF is plotted versus the mean EAF. The best-fit line (dashed line) has a slope of about 43 percent, indicating that the average EAF coefficient of variation is about 43 percent. Points that plot above the best-fit line have a coefficient of variation greater than 43 percent, and those that plot below the line have a coefficient of variation less than 43 percent.

The upper graph on Figure 5-22 shows the data for all islands and tracts. The lower graph is an enlargement of the upper graph to more clearly show the range of EAF coefficients of variation. Several of the islands and tracts with very high coefficients of variation also have very low mean EAF values. For example, DLIS-06 ($C_v = 249\%$) and Weber Tract ($C_v = 225\%$) have mean EAF values of 0.0003 and 0.0007, respectively. In these cases, the smaller mean EAF is more sensitive to the range of variability in the functions used in calculating EAF. The range of EAF coefficients of variation is 33 to 249 percent; however, the coefficient of variation is less than 75 percent for 89 of the 109 populated islands and tracts.

Figure 5-22 Coefficient of Variation, EAF



The greatest source of uncertainty in EAF varies from location to location as shown in Table 5-5. This table lists, for each uncertainty source, the eight islands and tracts whose uncertainty is most influenced by each uncertainty source. For example, the EAF uncertainty attributed to total Delta inflow is greatest at DLIS-19, whereas tide uncertainty is the largest part of the EAF uncertainty at DLIS-63. The percentage of EAF uncertainty by source is provided in Appendix E for all islands and tracts

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Table 5-5
Top Influence by Source of Variability, EAF

Total Delta Inflow		Stage-Discharge		Tide	
% Var	Island	% Var	Island	% Var	Island
81%	DLIS-19 (GRIZZLY SLOUGH AREA)	41%	GLANVILLE	79%	DLIS-63 (GRIZZLY ISLAND AREA)
72%	DLIS-18	37%	MCCORMACK-WILLIAMSON TRACT	76%	DLIS-27
67%	BIXLER TRACT	33%	EHRHEARDT CLUB	70%	DLIS-37 (CHADBOURNE AREA)
66%	DLIS-08 (DISCOVERY BAY AREA)	33%	NEW HOPE TRACT	63%	DLIS-34
64%	DLIS-06 (OAKLEY AREA)	31%	DLIS-22 (RIO VISTA)	59%	DLIS-26 (MORROW ISLAND)
62%	PESCADERO DISTRICT	28%	DLIS-15	50%	DLIS-28
58%	NEW HOPE TRACT	24%	LITTLE EGBERT TRACT	50%	HOLT STATION
58%	PARADISE JUNCTION	23%	DLIS-18	50%	DLIS-46

Hydrologic and Hydraulic Fragility		pga Recurrence		Seismic Fragility	
% Var	Island	% Var	Island	% Var	Island
31%	PEARSON DISTRICT	23%	PICO-NAGLEE	42%	RIVER JUNCTION
29%	HONKER LAKE TRACT	17%	SHERMAN ISLAND	34%	DLIS-53
28%	GRAND ISLAND	14%	PESCADERO DISTRICT	14%	SHERMAN ISLAND
27%	SUTTER ISLAND	12%	BETHEL ISLAND	13%	DLIS-08 (DISCOVERY BAY AREA)
26%	DLIS-56	12%	MCDONALD ISLAND	11%	RYER ISLAND
26%	RANDALL ISLAND	10%	HOLLAND TRACT	11%	BETHEL ISLAND
25%	MERRITT ISLAND	10%	UNION ISLAND EAST	9%	HOLLAND TRACT
25%	DLIS-54	10%	BACON ISLAND	9%	UNION ISLAND EAST

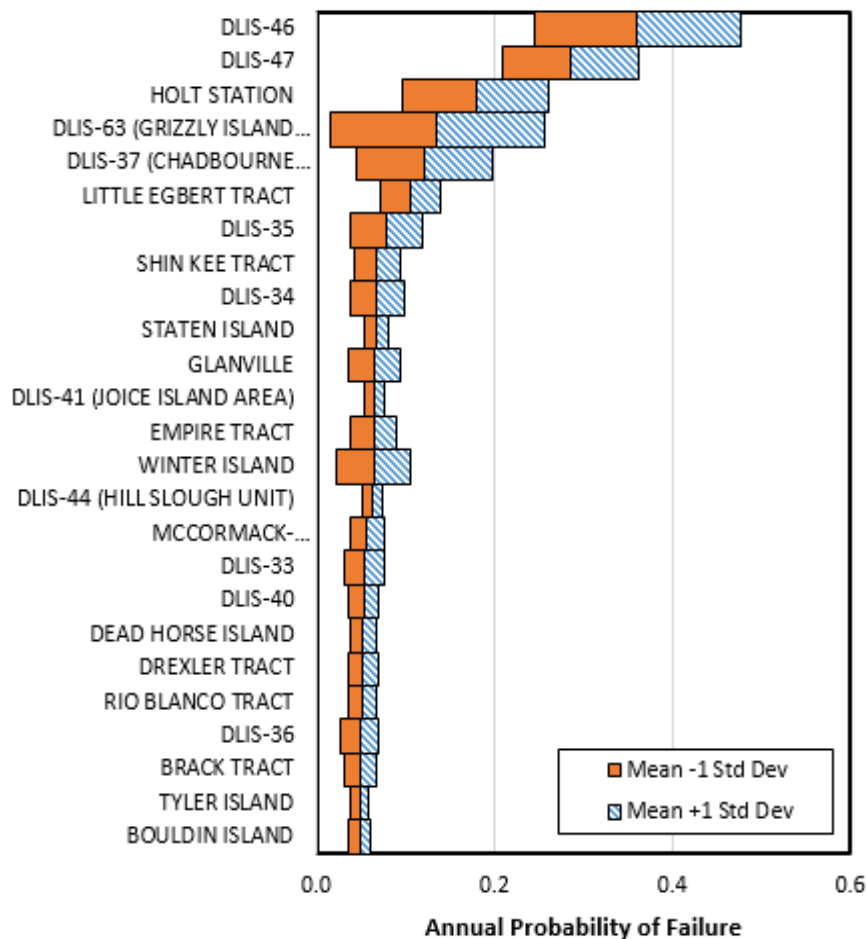
Table 5-5
Top Influence by Source of Variability, EAF

Population		Mortality		Warning and Evacuation	
% Var	Island	% Var	Island	% Var	Island
100%	STARK TRACT	3%	UNION ISLAND EAST	64%	DLIS-41 (JOICE ISLAND AREA)
100%	CACHE HAAS AREA	3%	RECLAMATION DISTRICT 17	61%	SHERMAN ISLAND
100%	CLIFTON COURT FOREBAY	3%	BISHOP TRACT	59%	MCDONALD ISLAND
100%	BYRON TRACT	3%	DLIS-41 (JOICE ISLAND AREA)	55%	BETHEL ISLAND
100%	VENICE ISLAND	3%	FABIAN TRACT	54%	DLIS-62
99%	DLIS-10	3%	BETHEL ISLAND	52%	DLIS-56
99%	STATEN ISLAND	3%	SHERMAN ISLAND	52%	DLIS-57
98%	BOULDIN ISLAND	3%	MEIN'S LANDING	50%	TWITCHELL ISLAND

5.3.5.3 Impacts of Uncertainty on Calculating the Annual Probability of Failure

The impact of uncertainty on annual probability of failure (Pf) is illustrated on Figure 5-23, which shows mean Pf plus (striped bar) and minus (solid bar) one standard deviation from the mean for 25 islands and tracts with the largest Pf. The importance of Pf uncertainty is demonstrated by the Pf for DLIS-63 and DLIS-37. Although they have distinct mean Pf values, a statistical analysis of the difference between them, which would consider their uncertainties, would lead to the conclusion that the Pf values for these two tracts are essentially the same. Similar conclusions can be drawn for other islands and tracts.

Figure 5-23
Annual Probability of Failure with Uncertainty

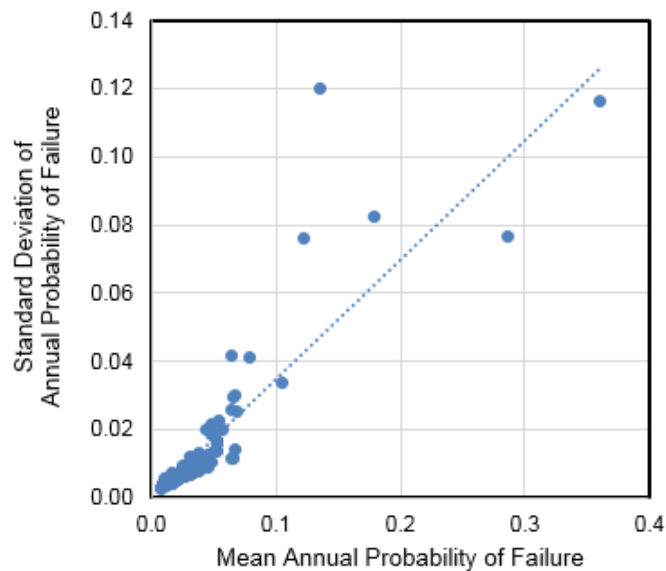


The mean Pf values for the islands and tracts not shown on Figure 5-23 are progressively smaller, are all less than about 0.015, and have uncertainties that are approximately proportional to Pf. The complete Pf uncertainty analysis results are presented in Appendix E.

The relative Pf uncertainty among all islands and tracts is shown on Figure 5-24. On this figure, the standard deviation of Pf is plotted versus the mean Pf. The best-fit line (dashed line) has a slope of about 35 percent, indicating that the average Pf coefficient of variation is about 35 percent. Points that plot above the best fit line have a coefficient of variation greater than 35 percent and those that plot below the line have a coefficient of variation less than 35 percent. The range of Pf coefficients of variation is 18 to 88 percent; however, all but six are less than 50 percent.

The greatest source of uncertainty in Pf varies from location to location as shown in Table 5-6. This table lists, for each uncertainty source, the eight islands and tracts whose uncertainty is most influenced by each uncertainty source. For example, the Pf uncertainty attributed to total Delta inflow is greatest at Peter's Pocket, whereas tide uncertainty is the largest part of the Pf uncertainty at DLIS-63. The percentage of Pf uncertainty by source is provided in Appendix E for all islands and tracts.

Figure 5-24 Coefficient of Variation Annual Probability of Failure



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Table 5-6
Top Influence by Source of Variability
Annual Probability of Failure

Total Delta Inflow		Stage-Discharge		Tide	
% Var	Island	% Var	Island	% Var	Island
62%	PETERS POCKET	49%	GLANVILLE	84%	DLIS-63 (GRIZZLY ISLAND AREA)
57%	DLIS-18	42%	MCCORMACK-WILLIAMSON TRACT	79%	DLIS-37 (CHADBOURNE AREA)
47%	GLANVILLE	39%	BRACK TRACT	78%	WINTER ISLAND
47%	DLIS-19 (GRIZZLY SLOUGH AREA)	38%	SHIN KEE TRACT	78%	DLIS-35
46%	NEW HOPE TRACT	38%	TERMINOUS TRACT	77%	DLIS-46
46%	DLIS-17	35%	CANAL RANCH TRACT	76%	DLIS-47
43%	MCCORMACK-WILLIAMSON TRACT	34%	EHRHEARDT CLUB	75%	DLIS-34
43%	WETHERBEE LAKE	34%	LITTLE EGBERT TRACT	70%	DLIS-33

Hydrologic and Hydraulic Fragility		pga Recur		Seismic Fragility	
% Var	Island	% Var	Island	% Var	Island
83%	NORTH STOCKTON	54%	STARK TRACT	96%	PICO-NAGLEE
75%	MIDDLE & UPPER ROBERTS ISLAND	54%	UNION ISLAND WEST	89%	DLIS-13 (STOCKTON)
64%	HONKER LAKE TRACT	52%	DLIS-01 (PITTSBURG AREA)	82%	DLIS-06 (OAKLEY AREA)
64%	DLIS-14 (CENTRAL STOCKTON)	51%	RIVER JUNCTION	82%	DLIS-08 (DISCOVERY BAY AREA)
64%	GRAND ISLAND	51%	BIXLER TRACT	82%	DLIS-22 (RIO VISTA)
63%	PEARSON DISTRICT	50%	YOLANO	82%	DLIS-07 (KNIGHTSEN AREA)
62%	MAINTENANCE AREA 9 NORTH	47%	WEST SACRAMENTO	80%	DLIS-53
62%	DLIS-56	37%	FABIAN TRACT	75%	PESCADERO DISTRICT

5.3.5.4 Impacts of Uncertainty on Water Supply, Prime Farmland, and Ecosystem Risk

The uncertainties associated with the consequence factors used to develop water supply, prime farmland, and ecosystem risk are not well defined and, in some instances, would be based on professional judgment. Consequently, uncertainty was not calculated for these risk metrics. However, because these risk metrics are based on annual probability of levee failure, it is reasonable to assume that the risk metric uncertainty is at least proportional to the uncertainty in the annual probability of failure (Section 5.3.5.3).

6.0 DECISION SUPPORT TOOL

6.1 Overview

The flood risks facing the Delta are complex and varied. Some islands are at highest risk from flood damage to structures and property, whereas others are at risk of impacting the state's water supply or flooding important habitat. The possible investments are numerous, and they will affect Delta risks differently.

Understanding which islands are at most risk provides a starting point for considering how to invest in reducing risk. The ranking of islands by risk alone, however, cannot identify where the State should focus its investments to advance State interests. Alternative views about the importance of different types of risks will affect how one might prioritize investments. It is also critical to account for the cost effectiveness of various investments. As resources are limited, a guiding principle for allocation should be those investments where the most benefit can be achieved. Lastly, uncertainty about future risks could lead to ambiguity about the best ways to prioritize investments.

A DST has been developed to help the Council understand the risks of flooding that the Delta levees face from flooding, and then develop a strategy to reduce these risks through levee investments. The DST is designed to support a deliberation-with-analysis process by which quantitative analysis is used not to provide a single answer but rather to frame and illuminate key policy trade-offs (NRC 2009). The DST uses a methodology successfully deployed to support the development of Louisiana Coastal Protection and Restoration Agency's 2012 Coastal Master Plan (Groves and Knopman 2012; Groves and Sharon 2013).

The DST is supporting the Council in developing a levee investment strategy through four key steps:

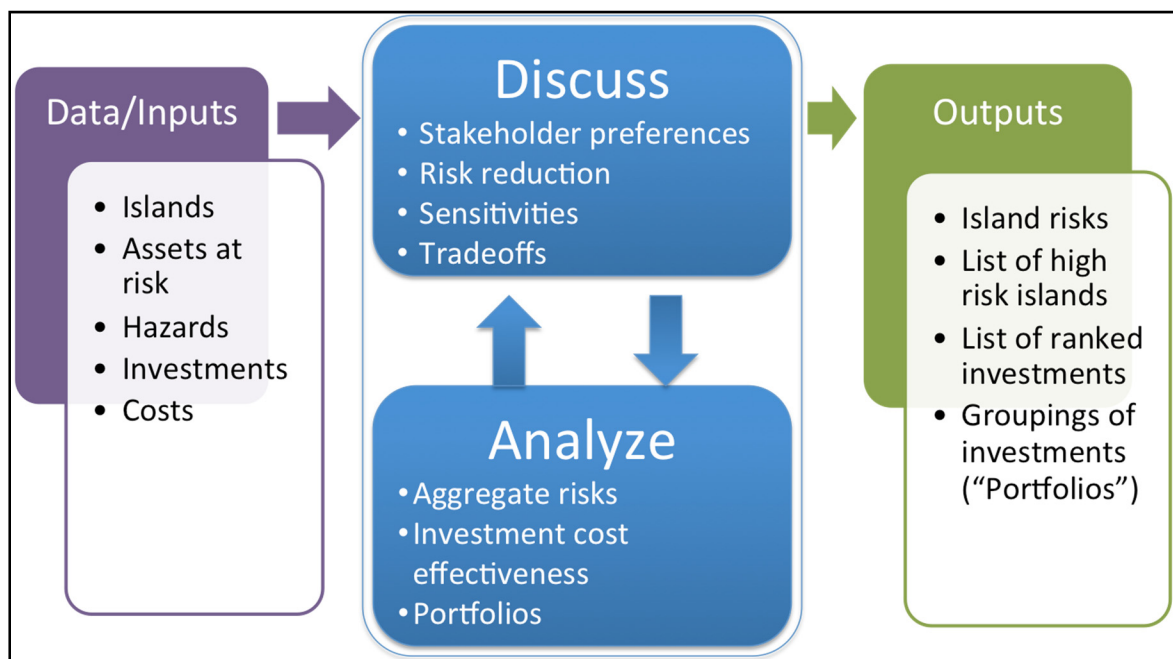
1. Assimilating and displaying information about assets at risk and the projected risks for each island over time (as defined above).
2. Providing interactive visualizations that support deliberations over how to weigh different types of risks to define high risk islands.
3. Assimilating and displaying results of analyses of how different levee investments would reduce risk.
4. Interactively developing various portfolios of investments based on user preferences to support deliberations over different levee investment approaches.

To support these steps, the DST assimilates information about assets at risk and model estimates of risks for each island and tract with and without levee investments. The DST provides interactive visualizations of this information. The DST then performs some basic calculations to summarize risk information and allows users to specify weights for different risk metrics, such as EAD or ecosystem risk, to aggregate risks for each island. Lastly, the DST provides different ways to develop portfolios of investments that best reduce risk to state interests given various planning constraints. For example, the DST enables the user to specify budgets and then evaluate which of those investments reduce the different risks the most across the Delta.

All risk calculations (described in previous sections) are performed for current conditions (using year-2012 sea levels, population estimates, and asset inventories, including habitat and agricultural land); for near-term future conditions in the year 2030 (using two estimates of sea level rise and a single projection of lives, assets, and land use); and for longer-term future conditions in the year 2050 (using two estimates of sea level rise and a single projection of lives, assets, and land use).

The output of the DST is a series of interactive visualizations in which the user can specify information of interest (e.g., risks with respect to a particular performance metric or time period), set metric weights for island rank and investment rankings, define portfolios of levee investments, and explore different tradeoffs across the portfolios. Figure 6-1 summarizes the inputs, discussion and analysis, and outputs of the DST. Inputs include the information and data used to calculate risks as described above, including physical island and tract sizes, elevations, levee conditions, etc.; the assets and replacement values on each island; and hazard information. Inputs also include information about proposed investments (or projects that reduce flood risk) as well as the costs in terms of both flood losses and costs of investments to reduce flood risks.

Figure 6-1
Overview of Decision Support Tool



The DST visualizations are made available via an interactive website (Figure 6-2). Different versions of the DST have been developed to support internal analysis by the Council, review by technical stakeholders, and review by the general public. To date, the DST has been used to assist the Council in understanding the range of possible risks facing the Delta.

Figure 6-2
Decision Support Tool Welcome Screen



6.2 Theoretical Basis of the Decision Support Tool

The DST supports deliberations by summarizing information about baseline risks and the effects of different investments on baseline risk, and then identifying portfolios of investments that reflect State interests. The user (e.g., the State) can specify preferences over the different performance metrics and assumptions about future risks to enable a transparent comparison of results across varying metrics. Such an exploratory modeling approach is suited for long-term policy questions in which uncertainty is significant, there are a variety of views on desirable outcomes, and there is disagreement about how the system will respond to future stressors (Lempert et al. 2003). The DST seeks to define portfolios that reduce risk to state interests while satisfying a wide range of constraints.

To develop investment portfolios, the DST defines a simple objective function based on a small set of weighted risk performance metrics according to multi-criteria decision analysis methods (Keeney and Raiffa 1993; Lahdelma et al. 2000; Kiker et al. 2005; Linkov et al. 2006). Then the DST maximizes the objective function subject to funding and other implementation constraints. Importantly, the analysis seeks to use a simple and easily understood objective function made up of only a few key performance metrics.

6.3 Key Functions of the Decision Support Tool

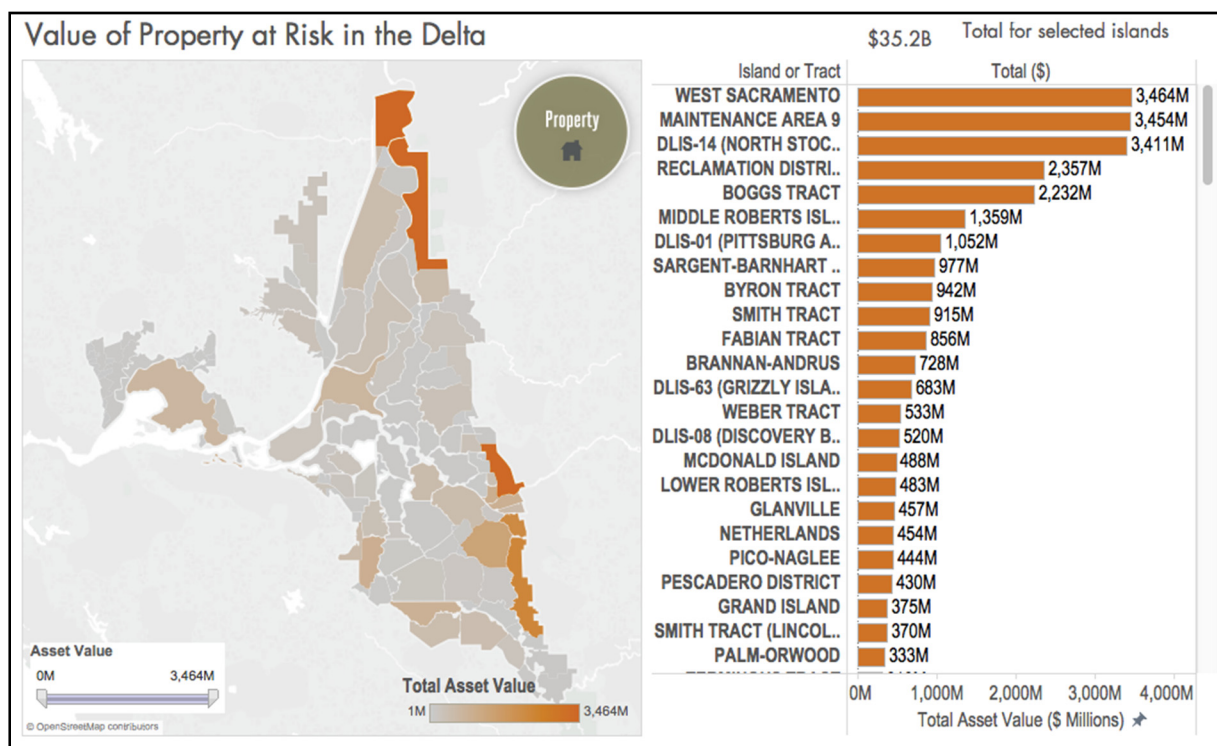
The current version of the DST is organized around the following sections:

1. Assets and Hazards
2. Assessing Risk (Risk Maps)
3. Defining High Risk Islands
4. Aggregating Risk (Composite Risk Map)
5. Tiered Ranking of Islands
6. Levee Investments and Portfolios

6.3.1 Assets and Hazards

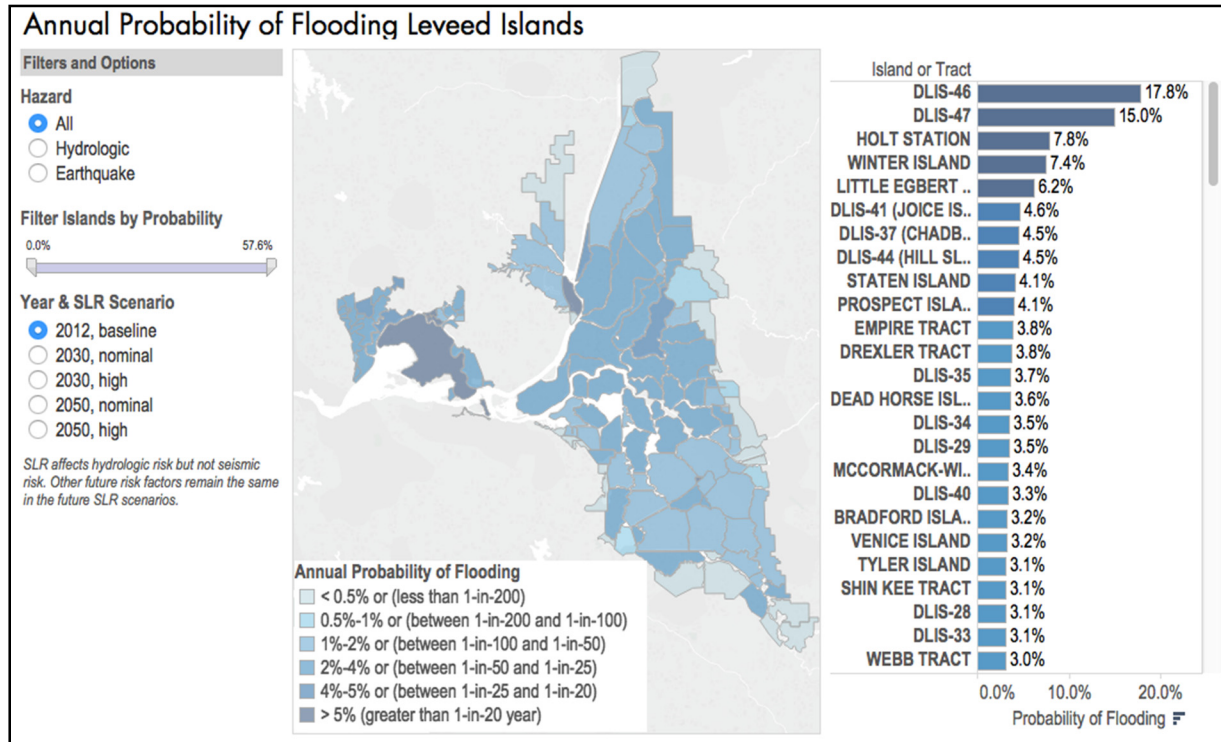
In this first section of the DST, interactive visualizations summarize the key assets (described in Section 3.0) at risk, including: population, property, islands important for protecting water supply, high value habitat, and Delta as Place assets. Figure 6-3, for example, shows the total value of assets at risk of flooding by island.

Figure 6-3
Value of Property at Risk in the Delta



This section of the DST also shows the calculated probability of flooding for each island under the different scenarios (Figure 6-4).

Figure 6-4
Annual Probability of Flooding Leveed Islands for the 2012 Baseline Condition



6.3.2 Assessing Risk (Risk Maps)

The DST allows the user to specify different performance metrics, maps, and lists showing risk for different time periods and for the future. For example, the DST shows the risk results for EAD on each island.

6.3.2.1 Defining High Risk Islands

As the first step to aggregating risk, the tool helps users define which islands are deemed high risk with respect to each of the following objectives and metrics:

- Risk to Life (expected annual fatalities, EAF)
- Risk to Property (expected annual damage, EAD)
- Risk to Water Supply Disruption
- Risk to High Value, Non-Tidal Habitat
- Risk to Delta as Place Assets (Legacy Towns, Agricultural Land, Important Roads).

For each of these metrics, the DST enables the user to specify a risk threshold, above which an island is deemed “high risk.” Different thresholds can be defined to explore the effect of the thresholds and the islands specified as high risk.

6.3.2.2 Aggregating Risk (Composite Risk Map)

The DST next supports the development of an aggregate risk score for each island. Since there is no consensus among stakeholders about the relative importance of different risks, the DST helps different users understand the risks based on their preferences by calculating weighted risk scores based on *user-specified* weightings of the metrics. The aggregate risk score for each island, i , is based on the identified high risk islands and user-specified weights for each metric, m :

$$\text{aggregate risk score}_i = \frac{\sum_m (\text{high risk island (1 or 0)}_{i,m} \times \text{weight}_m)}{\sum_m (\text{weight}_m)} \quad (\text{Equation 6-1})$$

At this stage of the analysis, the DST includes an option to highlight high risk islands that also have significant potential high value tidal habitat, as described in Section 5.2.6. In this way, the users are alerted to those islands that are at high risk of flooding, but which may provide an opportunity for tidal habitat restoration. In these cases, levee improvements might be designed so that the tidal habitat opportunities are not overlooked or eliminated.

A key output of the DST for this step is a map showing the aggregate risk for each island. The user can modify metric weights on this display and see how aggregate risk varies in response to different metric weights. Through visual exploration, users can better understand the different Delta risks over time and which islands or tracts are most vulnerable.

6.3.2.3 Tiered Ranking of Islands

Using the aggregate risk score for each island, the DST then develops a single ranking of islands by risk. This list can be further disaggregated into different risk tiers by specifying different risk cutoffs for the three tiers. Again, islands with high value tidal habitat potential can be identified.

6.3.2.4 Levee Investments and Portfolios

The DST compares levee investments based on their cost-scaled effect with respect to each metric. To calculate the cost-scaled effect, or cost effectiveness, of a levee investment, p , the DST first calculates an investment effect score for each metric m . The investment effect score is the net change to the metric across all islands, i , due to the levee investment. In other words, it is the difference between the risk with and without the investment, summed over all islands:

$$\text{investment effect score}_{p,m} = \sum_i (\text{risk score}_{p,i,m}^{\text{investment}} - \text{risk score}_{i,m}^{\text{base}}) \quad (\text{Equation 6-2})$$

The cost effectiveness score is then calculated by dividing the investment effect score by the project cost in present dollars:

$$\text{cost effectiveness score}_{p,m} = \frac{\text{investment effect score}_{p,m}}{\text{project cost}_p} \quad (\text{Equation 6-3})$$

Using the cost effectiveness score, the DST can rank investments based on each individual metric.

Different investments will affect different types of risks (e.g., life, property, habitat); rankings of investments are significantly different depending on which performance metrics are considered. Therefore, the DST calculates an aggregate cost effectiveness score for each investment to enable a single ranking of investments based on user-specified weightings of the metrics.

First, the cost effectiveness scores for each metric are adjusted to a common scale. Next, the scaled cost effectiveness scores for an investment, p , are combined using a set of weights specified within the DST:

$$\text{aggregate cost effectiveness score}_p = \frac{\sum_m (\text{scaled cost effectiveness score}_{p,m} \times \text{weight}_m)}{\sum_m (\text{weight}_m)} \quad (\text{Equation 6-4})$$

The weighted scaled cost-effectiveness scores for each investment can then be compared and used to rank the projects.

The DST will assimilate information on potential investments and then support the development of various levee investment portfolios. The basic approach will be to select the combination of levee investments that maximizes an objective function representing the State's interests for a particular set of constraints and future. A unique portfolio of investments is identified for each user-specified set of risk metric weights and implementation constraints and, for each future, representing uncertain assumptions about future risk factors.

Specifically, the DST will use an optimization calculation to identify the set of investments that together leads to the highest benefit to State interests. State benefit is represented by an objective function set to be the sum of the weighted scaled cost-effectiveness score (Equation 6-4) for all investments in the portfolio:

The goal is to maximize:

$$\sum_p (\text{aggregate cost effectiveness score}_p) \quad (\text{Equation 6-5})$$

such that the total cost of each included investment does not exceed a specified total budget:

$$\sum_p (\text{project cost}_p) \leq \text{specified total budget.} \quad (\text{Equation 6-6})$$

The DST can address other constraints as well, including:

- Mutually exclusive investments—only one of a set of investments that target the same locations can be selected.
- Performance minimums—some risks, such as EAF, could be specified to be required to be reduced beyond a tolerable risk threshold.

The DST can be used to develop a large set of portfolios representing the optimal investment strategies under (a) different scenarios; (b) for different weights over metrics, and (c) for different budgets. The DST then presents visualizations that compare the included investments across the portfolios. This shows those investments that are frequently included, which can be interpreted as high priority, robust options. The DST also shows how risks change over the islands and tracts under the implementation of the various portfolios. Lastly, the DST shows trade-offs as graphs that summarize how performance varies across the metrics for the different portfolios.

6.4 Components of the Decision Support Tool

The DST comprises three key components:

- Spreadsheet database
- R-based risk models and optimization engine

- Tableau-based visualization software.

6.4.1 Spreadsheet Database

All data used for the DST visualizations are stored in an Excel-based spreadsheet database.

6.4.2 R-based Risk Models and Optimization Engine

The risk models are all implemented in R, an open source statistical programming language. The risk models read in data about islands and tracts, risks and hazards, and levee fragility from .csv files and a Microsoft Access database that includes the data described in Sections 3.0 and 4.0. The risk models calculate risks with and without investments for each performance metric, time period, and future. They export these results into the spreadsheet database. R will also be used to support optimization calculations, depending upon the specific approach used.

6.4.3 Tableau-based Visualization Software

Interactive visualizations are developed using the Tableau Desktop software (version 8.3) and made available to the Council, State agencies, stakeholders, and the public by posting them to a custom-built website using the Tableau Public offering. Under the direction of the Council staff, visualizations can be updated as necessary, ensuring that the most appropriate results are shared at any given time. This enables any user with the appropriate credentials to access the website to interact with the results and export snapshots of visualizations. To protect the integrity of the data and analysis, the underlying Tableau workbook is not available for download to the website users.

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APPENDIX A

Asset Exposure on Islands and Tracts



ATLAS TRACT

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: Yes
Non-project Levees: Yes
RD Number: 2126

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	11
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	16
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	302
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	318.3
Mean Elevation (ft)	2.9
Agricultural lands (acres)	301.9
Total Levees (miles)	2.9
PL 84-99 Levees (miles)	2.9
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BACON ISLAND		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	41	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2028	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	4.2
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	7.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	276
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5291
Public Safety: Private Property	Commercial parcels	28
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	14
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY		
Area (acres)	5580.4	
Mean Elevation (ft)	-12.5	
Agricultural lands (acres)	5290.8	
Total Levees (miles)	14.4	
PL 84-99 Levees (miles)	4.4	
HMP Levees (miles)	7.1	
Levees Below HMP or Unknown (miles)	2.9	

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.6
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	11.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	1.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	2.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	12.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	8.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BETHEL ISLAND		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	2137	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	BIMID	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	5
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	50.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1622
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1232
Public Safety: Private Property	Commercial parcels	847
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	685
Public Safety: Private Property	Urban areas (acres)	612
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3464.9
Mean Elevation (ft)	-5.3
Agricultural lands (acres)	1231.6
Total Levees (miles)	11.5
PL 84-99 Levees (miles)	6.0
HMP Levees (miles)	4.4
Levees Below HMP or Unknown (miles)	1.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	7

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	123.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	1.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	87.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	132.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BIG BREAK

County:	CONTRA COSTA
Delta Zone:	Primary Delta
Population (2010):	0
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1000
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1000.0
Mean Elevation (ft)	-2.9
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	1.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	9.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BISHOP TRACT

County:	SAN JOAQUIN
Delta Zone:	Secondary Delta
Population (2010):	4543
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	2042

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	1
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	21.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	114
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1964
Public Safety: Private Property	Commercial parcels	20
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1463
Public Safety: Private Property	Urban areas (acres)	71
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2149.4
Mean Elevation (ft)	0.0
Agricultural lands (acres)	1964.3
Total Levees (miles)	5.5
PL 84-99 Levees (miles)	5.2
HMP Levees (miles)	0.4
Levees Below HMP or Unknown (miles)	0.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	11.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BIXLER TRACT

County:	CONTRA COSTA
Delta Zone:	Primary Delta
Population (2010):	14
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2121

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.3
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	236
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	373
Public Safety: Private Property	Commercial parcels	7
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	608.9
Mean Elevation (ft)	8.6
Agricultural lands (acres)	372.5
Total Levees (miles)	3.9
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	2.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	7.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	3.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	1.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BOULDIN ISLAND

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	31
Project Levees:	No
Non-project Levees:	Yes
RD Number:	756

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	4.3
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	573
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5454
Public Safety: Private Property	Commercial parcels	7
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	2
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6029.0
Mean Elevation (ft)	-12.5
Agricultural lands (acres)	5454.1
Total Levees (miles)	18.0
PL 84-99 Levees (miles)	3.8
HMP Levees (miles)	7.7
Levees Below HMP or Unknown (miles)	6.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	1.1
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	15.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	36.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	5.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	18.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	8.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BRACK TRACT

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	14
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2033

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	12.3
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	379
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4328
Public Safety: Private Property	Commercial parcels	15
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	5
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	4711.3
Mean Elevation (ft)	-3.6
Agricultural lands (acres)	4327.5
Total Levees (miles)	11.6
PL 84-99 Levees (miles)	1.0
HMP Levees (miles)	5.4
Levees Below HMP or Unknown (miles)	5.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	158.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	17.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	5.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	66.9
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	191.3

Quantities shown are counts unless otherwise noted.

BRADFORD ISLAND		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	13	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2059	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	11.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1447
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	652
Public Safety: Private Property	Commercial parcels	34
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	26
Public Safety: Private Property	Urban areas (acres)	37
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2136.0
Mean Elevation (ft)	-9.5
Agricultural lands (acres)	651.8
Total Levees (miles)	7.4
PL 84-99 Levees (miles)	2.3
HMP Levees (miles)	2.1
Levees Below HMP or Unknown (miles)	3.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	4.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	12.3
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	482.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	49.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	152.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	190.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BRANNAN-ANDRUS		
County:	SACRAMENTO	
Delta Zone:	Primary Delta	
Population (2010):	1586	
Project Levees:	Yes	
Non-project Levees:	Yes	
RD Number:	BALMD	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	13.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	79
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	18.1
Infrastructure: Energy & Telcom	Natural gas stations	7
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	40
Infrastructure: Energy & Telcom	Transmission lines (miles)	5.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	33.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	5.5
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	9.6
Public Resources: Ecosystem	Natural lands (acres)	1053
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0.5
Public Safety: Private Property	Agricultural lands (acres)	11375
Public Safety: Private Property	Commercial parcels	443
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	424
Public Safety: Private Property	Urban areas (acres)	531
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	1
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	12938.2
Mean Elevation (ft)	-10.5
Agricultural lands (acres)	11374.7
Total Levees (miles)	29.4
PL 84-99 Levees (miles)	10.9
HMP Levees (miles)	16.7
Levees Below HMP or Unknown (miles)	1.8

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	9.5
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	9

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	20.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	12.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	99.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	109.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	8.6
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BROWNS ISLAND		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	0	
Project Levees:	No Data	
Non-project Levees:	No Data	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	1
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	695
Public Resources: Public Lands/Recreation	County parks	1
Public Resources: Public Lands/Recreation	Regional parks	1
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	694.5
Mean Elevation (ft)	7.0
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.7
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	38.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	563.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

BYRON TRACT

County:	CONTRA COSTA
Delta Zone:	Secondary Delta
Population (2010):	55
Project Levees:	No
Non-project Levees:	Yes
RD Number:	800

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.7
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	77
Infrastructure: Energy & Telcom	Transmission lines (miles)	11.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	12.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	644
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4176
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	17
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	4833.6
Mean Elevation (ft)	-3.1
Agricultural lands (acres)	4176.0
Total Levees (miles)	10.6
PL 84-99 Levees (miles)	8.0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	1.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	108.4
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	13.1
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

CACHE HAAS AREA

County:	SOLANO
Delta Zone:	Primary Delta
Population (2010):	16
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	2098

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	4.6
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	7.1
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	12
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	55.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1521
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4583
Public Safety: Private Property	Commercial parcels	24
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	33
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6135.6
Mean Elevation (ft)	7.6
Agricultural lands (acres)	4582.7
Total Levees (miles)	6.8
PL 84-99 Levees (miles)	4.9
HMP Levees (miles)	1.8
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	15.3
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	117.3
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	32.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	26.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	6.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	58.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	771.4
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	17.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	606.7

Quantities shown are counts unless otherwise noted.

CANAL RANCH TRACT

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	46
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2086

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.5
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	91
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2843
Public Safety: Private Property	Commercial parcels	6
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2934.2
Mean Elevation (ft)	-3.7
Agricultural lands (acres)	2843.5
Total Levees (miles)	7.5
PL 84-99 Levees (miles)	2.1
HMP Levees (miles)	5.0
Levees Below HMP or Unknown (miles)	0.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	3.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.8
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	3.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

CENTRAL STOCKTON

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: Yes
Non-project Levees: Yes
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.8
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	5.1
Infrastructure: Energy & Telcom	Operational power plants	3
Infrastructure: Energy & Telcom	Substations	9
Infrastructure: Energy & Telcom	Terminals 2012	2
Infrastructure: Energy & Telcom	Transmission line towers	30
Infrastructure: Energy & Telcom	Transmission lines (miles)	14.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.5
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	202.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	6.2
Infrastructure: Transportation, Water	Ports	1
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	6
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	212
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	111
Public Safety: Private Property	Commercial parcels	1152
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	5
Public Safety: Private Property	Residential parcels	13062
Public Safety: Private Property	Urban areas (acres)	6320
Public Safety: Public Facilities	Fire stations	3
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	1
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	13
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	772.7
Mean Elevation (ft)	11.1
Agricultural lands (acres)	111.1
Total Levees (miles)	12.7
PL 84-99 Levees (miles)	11.7
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0.9

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	1.5
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	1.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	78.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	9.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

CHIPPS ISLAND

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 47904
Project Levees: No Data
Non-project Levees: No Data
RD Number: 404, 1614, 828

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	381
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	10
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6640.7
Mean Elevation (ft)	8.8
Agricultural lands (acres)	0
Total Levees (miles)	3.3
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	291.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	67.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

CHIPPS ISLAND SOUTH

County: SOLANO
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	513
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	381.1
Mean Elevation (ft)	5.5
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	30.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	440.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

CLIFTON COURT FOREBAY

County: SOLANO
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.3
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	23
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.2
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.3
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	19.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2758
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	642
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	20
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	513.1
Mean Elevation (ft)	5.4
Agricultural lands (acres)	641.8
Total Levees (miles)	23.2
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	7.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	16.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	19.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

CONEY ISLAND		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	8	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.3
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	23
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.2
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.3
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	19.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	43
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	914
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	2
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3418.9
Mean Elevation (ft)	-1.3
Agricultural lands (acres)	914.0
Total Levees (miles)	5.5
PL 84-99 Levees (miles)	2.8
HMP Levees (miles)	2.5
Levees Below HMP or Unknown (miles)	0.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	8.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	1.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DEAD HORSE ISLAND

County: CONTRA COSTA
Delta Zone: Primary Delta
Population (2010): 2
Project Levees: No
Non-project Levees: Yes
RD Number: 2117

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	13
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	192
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	958.9
Mean Elevation (ft)	-4.9
Agricultural lands (acres)	191.8
Total Levees (miles)	2.6
PL 84-99 Levees (miles)	0.2
HMP Levees (miles)	1.6
Levees Below HMP or Unknown (miles)	0.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DECKER ISLAND

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 4
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2111

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	577
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	48
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	1
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	205.0
Mean Elevation (ft)	0.1
Agricultural lands (acres)	48.2
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	82.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	7.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	55.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	23.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	20.8

Quantities shown are counts unless otherwise noted.

DLIS-01 (PITTSBURG AREA)

County: SOLANO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.1
Infrastructure: Energy & Telcom	Operational power plants	3
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	45
Infrastructure: Energy & Telcom	Transmission lines (miles)	8.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	12.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	1
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	683
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	9
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	98
Public Safety: Private Property	Urban areas (acres)	401
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	625.6
Mean Elevation (ft)	16.9
Agricultural lands (acres)	0
Total Levees (miles)	2.6
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	11.4
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	545.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	5.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	40.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-02 (ANTIOCH AREA)

County: CONTRA COSTA
Delta Zone: Secondary Delta
Population (2010): 261
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.6
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.6
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	101
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	10
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	28
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1083.8
Mean Elevation (ft)	4.4
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	2.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	4.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	4.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	9.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	54.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-03 (LOWER SHERMAN ISLAND)

County: CONTRA COSTA
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2425
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	128.9
Mean Elevation (ft)	7.8
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	37.8
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	15.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	4.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	127.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1567.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	29.5

Quantities shown are counts unless otherwise noted.

DLIS-04 (WEST ISLAND)

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	2
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	155
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2425.5
Mean Elevation (ft)	4.8
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	35.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	64.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-05 (DONLON ISLAND)

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	7
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	250
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	155.0
Mean Elevation (ft)	5.6
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	19.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	89.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-06 (OAKLEY AREA)

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.7
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.6
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	6
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.2
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.8
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	23.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0.6
Public Resources: Ecosystem	Natural lands (acres)	521
Public Resources: Public Lands/Recreation	County parks	2
Public Resources: Public Lands/Recreation	Regional parks	2
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	717
Public Safety: Private Property	Commercial parcels	48
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	556
Public Safety: Private Property	Urban areas (acres)	241
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	2
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	249.5
Mean Elevation (ft)	1.5
Agricultural lands (acres)	717.2
Total Levees (miles)	0.5
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	2

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	1.5
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	16.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	3.7
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	3.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	80.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	162.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-07 (KNIGHTSEN AREA)

County:	CONTRA COSTA
Delta Zone:	Secondary Delta
Population (2010):	2028
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.1
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	15
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.2
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	292
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	219
Public Safety: Private Property	Commercial parcels	32
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	44
Public Safety: Private Property	Urban areas (acres)	62
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1479.1
Mean Elevation (ft)	9.7
Agricultural lands (acres)	219.3
Total Levees (miles)	1.4
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-08 (DISCOVERY BAY AREA)

County: CONTRA COSTA
Delta Zone: Secondary Delta
Population (2010): 216
Project Levees: No
Non-project Levees: Yes
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.9
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	19
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.4
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	51.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	2.9
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	1.3
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1495
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	918
Public Safety: Private Property	Commercial parcels	263
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	4293
Public Safety: Private Property	Urban areas (acres)	1377
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	573.1
Mean Elevation (ft)	10.8
Agricultural lands (acres)	918.3
Total Levees (miles)	8.8
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	12.5
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	28.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	6.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	2.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	4.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-09 (BYRON AREA)

County:	CONTRA COSTA
Delta Zone:	Secondary Delta
Population (2010):	10383
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	3.9
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	3.9
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	2
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.8
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	19.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.3
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	356
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2027
Public Safety: Private Property	Commercial parcels	129
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	218
Public Safety: Private Property	Urban areas (acres)	275
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	2
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	3789.1
Mean Elevation (ft)	9.6
Agricultural lands (acres)	2027.0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	79.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	28.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	14.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	10.2
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-10

County: CONTRA COSTA
Delta Zone: Secondary Delta
Population (2010): 1175
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.9
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	2.2
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	8
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.4
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	453
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	184
Public Safety: Private Property	Commercial parcels	12
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	48
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2658.6
Mean Elevation (ft)	32.6
Agricultural lands (acres)	183.7
Total Levees (miles)	1.6
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	111.7
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	142.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	3.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-12 (PARADISE CUT)

County: CONTRA COSTA
Delta Zone: Suisun
Population (2010): 5
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.3
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	2
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.8
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.2
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	150
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	620
Public Safety: Private Property	Commercial parcels	5
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	4
Public Safety: Private Property	Urban areas (acres)	2
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	685.1
Mean Elevation (ft)	18.2
Agricultural lands (acres)	619.8
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	42.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	3.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	90.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	21.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	3.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-14 (NORTH STOCKTON)

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 16750
Project Levees: No
Non-project Levees: No
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	11
Infrastructure: Energy & Telcom	Transmission lines (miles)	5.6
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	60.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	204
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	214
Public Safety: Private Property	Commercial parcels	270
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	1
Public Safety: Private Property	Residential parcels	4843
Public Safety: Private Property	Urban areas (acres)	1528
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	6
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1945.0
Mean Elevation (ft)	9.0
Agricultural lands (acres)	214.0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	180.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-15

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 61
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	40
Infrastructure: Energy & Telcom	Transmission lines (miles)	10.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	6.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	76
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2052
Public Safety: Private Property	Commercial parcels	12
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	5
Public Safety: Private Property	Urban areas (acres)	52
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2180.3
Mean Elevation (ft)	8.7
Agricultural lands (acres)	2052.3
Total Levees (miles)	2.3
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	10.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	42.8

Quantities shown are counts unless otherwise noted.

DLIS-16 (LODI)

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 1
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	1
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	23
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	102
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	723
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	123
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	2

GEOMETRY	
Area (acres)	947.0
Mean Elevation (ft)	8.7
Agricultural lands (acres)	722.8
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	10.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	2.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	56.2

Quantities shown are counts unless otherwise noted.

DLIS-17

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	9
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.2
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	286
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	356
Public Safety: Private Property	Commercial parcels	11
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	53
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	695.0
Mean Elevation (ft)	8.5
Agricultural lands (acres)	356.3
Total Levees (miles)	2.3
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	71.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	52.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	18.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	18.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	75.8

Quantities shown are counts unless otherwise noted.

DLIS-18

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 125
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	7.4
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	20.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	290
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4454
Public Safety: Private Property	Commercial parcels	42
Public Safety: Private Property	Confined animal facilities	3
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	7
Public Safety: Private Property	Urban areas (acres)	137
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	4879.4
Mean Elevation (ft)	7.9
Agricultural lands (acres)	4453.6
Total Levees (miles)	2.1
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	11.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	9.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	13.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	15.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	189.5

Quantities shown are counts unless otherwise noted.

DLIS-19 (GRIZZLY SLOUGH AREA)

County: SACRAMENTO
Delta Zone: Secondary Delta
Population (2010): 50
Project Levees: No
Non-project Levees: Yes
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	2.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	7.0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	11
Infrastructure: Energy & Telcom	Transmission lines (miles)	5.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.5
Infrastructure: Transportation, Public Surface	County highways (miles)	1.1
Infrastructure: Transportation, Public Surface	Local roads (miles)	8.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.1
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	3079
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4196
Public Safety: Private Property	Commercial parcels	30
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	72
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	7345.9
Mean Elevation (ft)	13.4
Agricultural lands (acres)	4195.7
Total Levees (miles)	7.5
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	4.4
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	636.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	272.7
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	840.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	177.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	68.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	2233.3

Quantities shown are counts unless otherwise noted.

DLIS-20 (YOLO BYPASS)

County: YOLO
Delta Zone: Primary Delta
Population (2010): 38
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	10.6
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	16.6
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	20.4
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	140
Infrastructure: Energy & Telcom	Transmission lines (miles)	19.6
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	3.2
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	39.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.2
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	15851
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	20527
Public Safety: Private Property	Commercial parcels	140
Public Safety: Private Property	Confined animal facilities	1
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	142
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	38758.2
Mean Elevation (ft)	13.1
Agricultural lands (acres)	20527.0
Total Levees (miles)	17.0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	17.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	4215.5
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	5793.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	285.7
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	338.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	247.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	51.4
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	495.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	12797.3

Quantities shown are counts unless otherwise noted.

DLIS-21

County:	SOLANO
Delta Zone:	Secondary Delta
Population (2010):	84
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	5.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	3
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	6.8
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	9.3
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	30
Infrastructure: Energy & Telcom	Transmission lines (miles)	9.8
Infrastructure: Transportation, Private Surface	Airstrips	1
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	62.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1162
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	9203
Public Safety: Private Property	Commercial parcels	95
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	29
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	10392.2
Mean Elevation (ft)	22.0
Agricultural lands (acres)	9203.4
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	69.2
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	9.6
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	5.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	9.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	19.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	1.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	478.6
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-22 (RIO VISTA)

County: SOLANO
Delta Zone: Primary Delta
Population (2010): 158
Project Levees: Yes
Non-project Levees: Yes
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.9
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	777
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	30
Public Safety: Private Property	Commercial parcels	18
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	11
Public Safety: Private Property	Urban areas (acres)	61
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	1
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	867.9
Mean Elevation (ft)	9.8
Agricultural lands (acres)	30.1
Total Levees (miles)	1.9
PL 84-99 Levees (miles)	1.3
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0.6

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.9
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	160.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	11.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	10.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	55.2
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	9.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-23 (GEORGIANA OXBOW)

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 117
Project Levees: No Data
Non-project Levees: No Data
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	7
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	7
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	78
Public Safety: Private Property	Urban areas (acres)	21
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	28.2
Mean Elevation (ft)	6.9
Agricultural lands (acres)	0.2
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-24 (GOODYEAR SLOUGH)

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	345
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	2
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	347.0
Mean Elevation (ft)	6.4
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	255.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	79.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	1.8

Quantities shown are counts unless otherwise noted.

DLIS-25

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.4
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	410
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	410.0
Mean Elevation (ft)	4.7
Agricultural lands (acres)	0
Total Levees (miles)	3.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	358.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	30.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	5.4

Quantities shown are counts unless otherwise noted.

DLIS-26 (MORROW ISLAND)

County: SOLANO
Delta Zone: Suisun
Population (2010): 1
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2138

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	11.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2372
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	8
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2371.7
Mean Elevation (ft)	4.8
Agricultural lands (acres)	0
Total Levees (miles)	7.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2111.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	191.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	2.8

Quantities shown are counts unless otherwise noted.

DLIS-27

County:	SOLANO
Delta Zone:	Suisun
Population (2010):	1
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
	Flood Risk Assets	
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	3.3
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.8
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.5
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	275
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	8
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	34
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	308.7
Mean Elevation (ft)	6.7
Agricultural lands (acres)	0
Total Levees (miles)	2.9
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
	Flood Risk Assets	
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
	Habitat Assets	
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	193.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	49.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-28

County: SOLANO
Delta Zone: Suisun
Population (2010): 3
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	3.8
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.5
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1336
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	8
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	15
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1351.6
Mean Elevation (ft)	4.7
Agricultural lands (acres)	0
Total Levees (miles)	5.3
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1233.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	30.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	3.6

Quantities shown are counts unless otherwise noted.

DLIS-29

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	4.0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	14.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2578
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	12
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2578.2
Mean Elevation (ft)	2.9
Agricultural lands (acres)	0
Total Levees (miles)	13.0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2344.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	93.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-30

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1124
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1124.3
Mean Elevation (ft)	4.6
Agricultural lands (acres)	0
Total Levees (miles)	6.5
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	759.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	308.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-31 (GARABALDI UNIT)

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.6
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	485
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	7
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	491.2
Mean Elevation (ft)	6.0
Agricultural lands (acres)	0
Total Levees (miles)	2.8
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	450.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	25.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	3.0

Quantities shown are counts unless otherwise noted.

DLIS-32

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.1
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	224
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	6
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	229.9
Mean Elevation (ft)	2.7
Agricultural lands (acres)	0
Total Levees (miles)	2.5
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	184.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	7.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-33

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.1
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	576
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	7
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	576.1
Mean Elevation (ft)	4.5
Agricultural lands (acres)	0
Total Levees (miles)	4.6
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	538.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	15.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-34

County: SOLANO
Delta Zone: Suisun
Population (2010): 3
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	334
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	131
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	35
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	500.4
Mean Elevation (ft)	8.7
Agricultural lands (acres)	131.1
Total Levees (miles)	3.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	284.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	13.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	1.5

Quantities shown are counts unless otherwise noted.

DLIS-35

County:	SOLANO
Delta Zone:	Suisun
Population (2010):	0
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
	Flood Risk Assets	
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.4
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	5
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.1
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	505
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2
Public Safety: Private Property	Commercial parcels	9
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	22
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	527.8
Mean Elevation (ft)	17.5
Agricultural lands (acres)	1.7
Total Levees (miles)	1.2
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
	Flood Risk Assets	
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
	Habitat Assets	
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	47.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	2.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-36

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.6
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	7
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.2
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.6
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	11.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1806
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	139
Public Safety: Private Property	Commercial parcels	19
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	3
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1948.6
Mean Elevation (ft)	6.8
Agricultural lands (acres)	139.3
Total Levees (miles)	9.9
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1334.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	20.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	3.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	48.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-37 (CHADBOURNE AREA)

County: SOLANO
Delta Zone: Suisun
Population (2010): 2
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2034

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	2.1
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.6
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	9.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1793
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	101
Public Safety: Private Property	Commercial parcels	14
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	4
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1897.7
Mean Elevation (ft)	1.7
Agricultural lands (acres)	100.5
Total Levees (miles)	5.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	756.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	38.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-38

County: SOLANO
Delta Zone: Suisun
Population (2010): 3
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.6
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.4
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	7
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.8
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	7.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	788
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	707
Public Safety: Private Property	Commercial parcels	15
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	22
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1516.1
Mean Elevation (ft)	10.2
Agricultural lands (acres)	706.9
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	52.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	6.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	1.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	138.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-39

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	3.0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.7
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1336
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	7
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1342.6
Mean Elevation (ft)	5.7
Agricultural lands (acres)	7.0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1051.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	215.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	4.4

Quantities shown are counts unless otherwise noted.

DLIS-40

County: SOLANO
Delta Zone: Suisun
Population (2010): 4
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.6
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1716
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1716.2
Mean Elevation (ft)	4.2
Agricultural lands (acres)	0
Total Levees (miles)	9.9
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1518.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	79.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-41 (JOICE ISLAND AREA)

County: SOLANO
Delta Zone: Suisun
Population (2010): 1
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	14.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2639
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2639.2
Mean Elevation (ft)	3.2
Agricultural lands (acres)	0
Total Levees (miles)	11.1
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2417.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	137.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	5.8

Quantities shown are counts unless otherwise noted.

DLIS-42 (PEYRONIA ECO PRSRV)

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.7
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	2
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	264
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	9
Public Safety: Private Property	Urban areas (acres)	9
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	272.8
Mean Elevation (ft)	7.8
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	245.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	8.7

Quantities shown are counts unless otherwise noted.

DLIS-43 (PETRETO HILLS AREA)		
County:	SOLANO	
Delta Zone:	Suisun	
Population (2010):	3487	
Project Levees:	No Data	
Non-project Levees:	No Data	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.1
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	7
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	40.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	9432
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	73
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1218
Public Safety: Private Property	Urban areas (acres)	601
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY		
Area (acres)	10032.6	
Mean Elevation (ft)	76.8	
Agricultural lands (acres)	0	
Total Levees (miles)	0	
PL 84-99 Levees (miles)	TBD	
HMP Levees (miles)	TBD	
Levees Below HMP or Unknown (miles)	TBD	

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	44.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	103.5
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	138.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	7.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	4.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	74.7
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1961.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	1118.5

Quantities shown are counts unless otherwise noted.

DLIS-44 (HILL SLOUGH UNIT)

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	7
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.1
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	874
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	1
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	875.7
Mean Elevation (ft)	4.5
Agricultural lands (acres)	0
Total Levees (miles)	6.4
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	496.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	327.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	8.6

Quantities shown are counts unless otherwise noted.

DLIS-45

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	5
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	236
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	236.3
Mean Elevation (ft)	7.6
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	85.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	145.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-46

County: SOLANO
Delta Zone: Suisun
Population (2010): 6
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2139

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	399
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	399.4
Mean Elevation (ft)	6.1
Agricultural lands (acres)	0
Total Levees (miles)	4.4
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	309.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	28.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-47

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2139

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	613
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	613.1
Mean Elevation (ft)	5.2
Agricultural lands (acres)	0
Total Levees (miles)	6.3
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	457.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	106.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-48

County: SOLANO
Delta Zone: Suisun
Population (2010): 4
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2139

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	712
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	3
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	714.8
Mean Elevation (ft)	7.2
Agricultural lands (acres)	0
Total Levees (miles)	4.2
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	537.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	122.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-49

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	84
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	84.5
Mean Elevation (ft)	5.0
Agricultural lands (acres)	0
Total Levees (miles)	1.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	71.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	5.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-50

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	73
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	73.1
Mean Elevation (ft)	5.1
Agricultural lands (acres)	0
Total Levees (miles)	1.4
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	67.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	3.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-51

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	73
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	72.5
Mean Elevation (ft)	8.4
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	50.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-52

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2134

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1693
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	5
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1692.7
Mean Elevation (ft)	6.7
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	83.5
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1486.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	55.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-53

County: SOLANO
Delta Zone: Suisun
Population (2010): 2
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	63
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	3
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	66.5
Mean Elevation (ft)	13.1
Agricultural lands (acres)	0
Total Levees (miles)	1.6
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	24.3
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	9.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-54

County: SOLANO
Delta Zone: Suisun
Population (2010): 10
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1378
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	9
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1386.3
Mean Elevation (ft)	19.8
Agricultural lands (acres)	8.7
Total Levees (miles)	4.3
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	220.1
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	179.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	33.4
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	158.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-55

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	7.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	766
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	6
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	766.0
Mean Elevation (ft)	13.2
Agricultural lands (acres)	0
Total Levees (miles)	4.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	486.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	116.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-56

County:	SOLANO
Delta Zone:	Suisun
Population (2010):	8
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	342
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	4
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	342.2
Mean Elevation (ft)	15.3
Agricultural lands (acres)	0.1
Total Levees (miles)	1.2
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	131.2
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	84.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	59.1
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	9.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-57

County: SOLANO
Delta Zone: Suisun
Population (2010): 8
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	397
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	400.1
Mean Elevation (ft)	16.2
Agricultural lands (acres)	3.2
Total Levees (miles)	1.2
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	168.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	153.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	7.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	12.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-58

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	83
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	82.8
Mean Elevation (ft)	5.5
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	73.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-59

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	433
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	433.3
Mean Elevation (ft)	4.9
Agricultural lands (acres)	0
Total Levees (miles)	2.0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.5
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	302.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	5.1
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	48.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-60

County: SOLANO
Delta Zone: Suisun
Population (2010): 12
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.6
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	12.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2061
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	289
Public Safety: Private Property	Commercial parcels	14
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	8
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2357.4
Mean Elevation (ft)	64.4
Agricultural lands (acres)	288.6
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	133.5
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	46.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	35.8
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	13.6
Ecosystem: Protected Areas	Additional conserved lands (acres)	1.0

Quantities shown are counts unless otherwise noted.

DLIS-61

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.9
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	349
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	349.1
Mean Elevation (ft)	6.8
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	189.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.3
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	87.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-62

County:	SOLANO
Delta Zone:	Secondary Delta
Population (2010):	62
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
	Flood Risk Assets	
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	1
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	16.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	4018
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	191
Public Safety: Private Property	Commercial parcels	45
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	22
Public Safety: Private Property	Urban areas (acres)	50
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	4260.2
Mean Elevation (ft)	13.5
Agricultural lands (acres)	191.5
Total Levees (miles)	1.0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
	Flood Risk Assets	
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
	Habitat Assets	
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	129.8
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1765.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	8.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	13.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	65.4
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	41.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DLIS-63 (GRIZZLY ISLAND AREA)

County: SOLANO
Delta Zone: Suisun
Population (2010): 32
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2136

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.8
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	10
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	9.5
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.9
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	138.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	25004
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	478
Public Safety: Private Property	Commercial parcels	95
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	27
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	25509.0
Mean Elevation (ft)	2.3
Agricultural lands (acres)	478.3
Total Levees (miles)	7.5
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	24372.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	603.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	216.5

Quantities shown are counts unless otherwise noted.

DREXLER POCKET		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	29	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	2
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	27
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	472
Public Safety: Private Property	Commercial parcels	5
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	498.8
Mean Elevation (ft)	2.9
Agricultural lands (acres)	471.6
Total Levees (miles)	1.5
PL 84-99 Levees (miles)	0.8
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0.6

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	1.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	19.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DREXLER TRACT

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 33
Project Levees: No
Non-project Levees: Yes
RD Number: Drexler

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	29
Infrastructure: Energy & Telcom	Transmission lines (miles)	12.6
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	1.5
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.7
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	62
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3073
Public Safety: Private Property	Commercial parcels	6
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	3
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3137.8
Mean Elevation (ft)	-3.2
Agricultural lands (acres)	3073.3
Total Levees (miles)	9.5
PL 84-99 Levees (miles)	3.2
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	4.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	4.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

DUTCH SLOUGH

County: CONTRA COSTA
Delta Zone: Secondary Delta
Population (2010): 4
Project Levees: No
Non-project Levees: Yes
RD Number: 2137

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	8.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	93
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	673
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	766.9
Mean Elevation (ft)	2.2
Agricultural lands (acres)	673.4
Total Levees (miles)	5.4
PL 84-99 Levees (miles)	2.2
HMP Levees (miles)	2.6
Levees Below HMP or Unknown (miles)	0.6

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	5.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	25.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	4.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	6.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	714.3

Quantities shown are counts unless otherwise noted.

EGBERT TRACT

County:	SOLANO
Delta Zone:	Primary Delta
Population (2010):	10
Project Levees:	Yes
Non-project Levees:	No
RD Number:	536

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	5.7
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	43
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	7.8
Infrastructure: Energy & Telcom	Natural gas stations	7
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	12
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	39.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	534
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5814
Public Safety: Private Property	Commercial parcels	29
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	9
Public Safety: Private Property	Urban areas (acres)	14
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6360.2
Mean Elevation (ft)	5.3
Agricultural lands (acres)	5813.7
Total Levees (miles)	10.6
PL 84-99 Levees (miles)	9.0
HMP Levees (miles)	1.5
Levees Below HMP or Unknown (miles)	0.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	28.4
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	353.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	24.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	17.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	469.4
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	40.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

EHRHEARDT CLUB

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 28
Project Levees: Yes
Non-project Levees: Yes
RD Number: 813

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	11
Infrastructure: Energy & Telcom	Transmission lines (miles)	5.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	1.9
Public Resources: Ecosystem	Natural lands (acres)	121
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2234
Public Safety: Private Property	Commercial parcels	26
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	7
Public Safety: Private Property	Urban areas (acres)	2
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2356.3
Mean Elevation (ft)	6.0
Agricultural lands (acres)	2234.0
Total Levees (miles)	9.5
PL 84-99 Levees (miles)	5.5
HMP Levees (miles)	0.9
Levees Below HMP or Unknown (miles)	3.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	9.8
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	3.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	10.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	12.4

Quantities shown are counts unless otherwise noted.

EMPIRE TRACT

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	18
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2029

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	202
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3423
Public Safety: Private Property	Commercial parcels	16
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	3
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3627.1
Mean Elevation (ft)	-13.6
Agricultural lands (acres)	3422.7
Total Levees (miles)	10.5
PL 84-99 Levees (miles)	0.5
HMP Levees (miles)	1.7
Levees Below HMP or Unknown (miles)	8.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	1.3
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	75.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	33.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	27.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	4.9
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	287.3

Quantities shown are counts unless otherwise noted.

FABIAN TRACT

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	160
Project Levees:	No
Non-project Levees:	Yes
RD Number:	773

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	1
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	12
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	1.0
Infrastructure: Transportation, Public Surface	Local roads (miles)	7.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	78
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	6393
Public Safety: Private Property	Commercial parcels	31
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	6
Public Safety: Private Property	Urban areas (acres)	21
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6492.2
Mean Elevation (ft)	3.8
Agricultural lands (acres)	6393.0
Total Levees (miles)	18.8
PL 84-99 Levees (miles)	18.8
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	6.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	20.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	7.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

FAY ISLAND

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No
Non-project Levees: Yes
RD Number: 2113

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	27
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	62
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	88.6
Mean Elevation (ft)	-3.6
Agricultural lands (acres)	62.0
Total Levees (miles)	1.6
PL 84-99 Levees (miles)	0.4
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	1.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	6.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

FRANK'S TRACT

County: CONTRA COSTA
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	3318
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	5.0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	26
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	4
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3318.2
Mean Elevation (ft)	-4.9
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

GLANVILLE

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 66
Project Levees: No
Non-project Levees: Yes
RD Number: 1002

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.6
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	2
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	4.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	3.3
Infrastructure: Transportation, Public Surface	Local roads (miles)	12.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	4.4
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	725
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0.0
Public Safety: Private Property	Agricultural lands (acres)	6228
Public Safety: Private Property	Commercial parcels	51
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	167
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	7116.8
Mean Elevation (ft)	7.8
Agricultural lands (acres)	6228.5
Total Levees (miles)	12.9
PL 84-99 Levees (miles)	3.0
HMP Levees (miles)	0.8
Levees Below HMP or Unknown (miles)	6.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	6.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	6.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	87.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	56.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	275.6

Quantities shown are counts unless otherwise noted.

GLIDE DISTRICT

County: YOLO
Delta Zone: Primary Delta
Population (2010): 11
Project Levees: Yes
Non-project Levees: No
RD Number: 765

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	7
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	94
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1209
Public Safety: Private Property	Commercial parcels	14
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	2
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1304.3
Mean Elevation (ft)	11.1
Agricultural lands (acres)	1208.7
Total Levees (miles)	1.9
PL 84-99 Levees (miles)	1.9
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	10.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	39.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	18.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

GRAND ISLAND

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 1388
Project Levees: Yes
Non-project Levees: Yes
RD Number: 3

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	4.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.0
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	71
Infrastructure: Energy & Telcom	Transmission lines (miles)	9.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0.0
Infrastructure: Transportation, Public Surface	Local roads (miles)	39.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.1
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	13.9
Public Resources: Ecosystem	Natural lands (acres)	658
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	16051
Public Safety: Private Property	Commercial parcels	254
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	289
Public Safety: Private Property	Urban areas (acres)	210
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	16877.2
Mean Elevation (ft)	-4.0
Agricultural lands (acres)	16051.4
Total Levees (miles)	29.5
PL 84-99 Levees (miles)	29.5
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.3
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	3

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	7.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	142.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	152.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.6
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

HASTINGS TRACT		
County:	SOLANO	
Delta Zone:	Primary Delta	
Population (2010):	52	
Project Levees:	Yes	
Non-project Levees:	Yes	
RD Number:	2060	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.9
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	3
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	5.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.4
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	13
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.4
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	60.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2797
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	6961
Public Safety: Private Property	Commercial parcels	31
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	10
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	9736.6
Mean Elevation (ft)	7.6
Agricultural lands (acres)	6961.1
Total Levees (miles)	15.7
PL 84-99 Levees (miles)	9.3
HMP Levees (miles)	0.8
Levees Below HMP or Unknown (miles)	5.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	205.1
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	100.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	136.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	30.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	107.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	748.6
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	203.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	311.3

Quantities shown are counts unless otherwise noted.

HOLLAND TRACT		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	18	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2025	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	11.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	756
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3462
Public Safety: Private Property	Commercial parcels	31
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	6
Public Safety: Private Property	Urban areas (acres)	14
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	4231.9
Mean Elevation (ft)	-8.5
Agricultural lands (acres)	3461.7
Total Levees (miles)	11.0
PL 84-99 Levees (miles)	6.8
HMP Levees (miles)	3.8
Levees Below HMP or Unknown (miles)	0.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	2

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	22.1
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1390.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	65.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	97.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	85.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	3.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	172.0

Quantities shown are counts unless otherwise noted.

HOLT STATION

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	23
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	2116

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.8
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0.4
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	21
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	129
Public Safety: Private Property	Commercial parcels	9
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	8
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	158.5
Mean Elevation (ft)	-0.9
Agricultural lands (acres)	129.4
Total Levees (miles)	1.3
PL 84-99 Levees (miles)	0.2
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	0.9

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

HONKER BAY

County: SOLANO
Delta Zone: Suisun
Population (2010): 0
Project Levees: No
Non-project Levees: Yes
RD Number: 2130

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.6
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.9
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	763
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	6
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	763.3
Mean Elevation (ft)	3.0
Agricultural lands (acres)	0
Total Levees (miles)	4.6
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	749.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

HONKER LAKE TRACT

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	36
Project Levees:	No
Non-project Levees:	Yes
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.8
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.2
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	28
Infrastructure: Energy & Telcom	Transmission lines (miles)	10.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.6
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	2.2
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	1.6
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	73
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1920
Public Safety: Private Property	Commercial parcels	28
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	7
Public Safety: Private Property	Urban areas (acres)	26
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2018.9
Mean Elevation (ft)	-1.2
Agricultural lands (acres)	1919.7
Total Levees (miles)	6.0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	6.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	6.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	11.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	12.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	12.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

HOTCHKISS TRACT

County: CONTRA COSTA
Delta Zone: Secondary Delta
Population (2010): 1490
Project Levees: No
Non-project Levees: Yes
RD Number: 799

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.5
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	5
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	6.1
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	38
Infrastructure: Energy & Telcom	Transmission lines (miles)	8.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	30.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1204
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1505
Public Safety: Private Property	Commercial parcels	592
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	658
Public Safety: Private Property	Urban areas (acres)	236
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2945.2
Mean Elevation (ft)	-0.3
Agricultural lands (acres)	1505.1
Total Levees (miles)	8.9
PL 84-99 Levees (miles)	5.8
HMP Levees (miles)	3.0
Levees Below HMP or Unknown (miles)	0.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	3

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	16.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	5.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	40.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	12.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	393.7

Quantities shown are counts unless otherwise noted.

IDA ISLAND

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 92
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	1.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	37
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	26
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	63.1
Mean Elevation (ft)	8.0
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	4.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	3.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

JERSEY ISLAND		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	3	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	830	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	10
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	7.3
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	43
Infrastructure: Energy & Telcom	Transmission lines (miles)	9.8
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	18.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	838
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2625
Public Safety: Private Property	Commercial parcels	24
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3463.4
Mean Elevation (ft)	-8.1
Agricultural lands (acres)	2624.9
Total Levees (miles)	15.5
PL 84-99 Levees (miles)	11.0
HMP Levees (miles)	4.0
Levees Below HMP or Unknown (miles)	0.6

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	3.8
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	125.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	20.7
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	28.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	7.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	3276.3

Quantities shown are counts unless otherwise noted.

JONES TRACT

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	218
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	2
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.2
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	5.2
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	5.2
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	14.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	15.5
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	564
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	11470
Public Safety: Private Property	Commercial parcels	19
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	68
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	13149.7
Mean Elevation (ft)	-2.4
Agricultural lands (acres)	11470.5
Total Levees (miles)	18.0
PL 84-99 Levees (miles)	7.2
HMP Levees (miles)	8.5
Levees Below HMP or Unknown (miles)	2.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	26.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	41.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	117.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

KASSON DISTRICT

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 82
Project Levees: Yes
Non-project Levees: Yes
RD Number: 2038,2039

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	13.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	197
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1741
Public Safety: Private Property	Commercial parcels	65
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	402
Public Safety: Private Property	Urban areas (acres)	245
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	12102.2
Mean Elevation (ft)	-8.6
Agricultural lands (acres)	1740.7
Total Levees (miles)	12.3
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	6.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	4.1
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	28.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.9
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

KING ISLAND

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 441
Project Levees: No
Non-project Levees: Yes
RD Number: 2085

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	3
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.2
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	8.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	83
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3095
Public Safety: Private Property	Commercial parcels	12
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	27
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2182.5
Mean Elevation (ft)	28.6
Agricultural lands (acres)	3094.6
Total Levees (miles)	9.1
PL 84-99 Levees (miles)	1.9
HMP Levees (miles)	5.1
Levees Below HMP or Unknown (miles)	2.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

KINGS ISLAND

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	81
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	2044

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	2
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	4
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3203.9
Mean Elevation (ft)	-7.7
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	3.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

LIBBY MCNEIL		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	0	
Project Levees:	Yes	
Non-project Levees:	Yes	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	1
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	2
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	1
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	599
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0.6
Public Safety: Private Property	Agricultural lands (acres)	93
Public Safety: Private Property	Commercial parcels	40
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	29
Public Safety: Private Property	Urban areas (acres)	29
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	5.9
Mean Elevation (ft)	27.0
Agricultural lands (acres)	92.8
Total Levees (miles)	4.1
PL 84-99 Levees (miles)	3.2
HMP Levees (miles)	0.9
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	9.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	39.8
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	140.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	145.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	29.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	89.3

Quantities shown are counts unless otherwise noted.

LIBERTY ISLAND		
County:	SACRAMENTO	
Delta Zone:	Primary Delta	
Population (2010):	108	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	369	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	9.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	993
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3703
Public Safety: Private Property	Commercial parcels	13
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY		
Area (acres)	720.5	
Mean Elevation (ft)	7.0	
Agricultural lands (acres)	3703.0	
Total Levees (miles)	11.0	
PL 84-99 Levees (miles)	0	
HMP Levees (miles)	0.3	
Levees Below HMP or Unknown (miles)	10.6	

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	1.3
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	83.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	36.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	77.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	703.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	182.7

Quantities shown are counts unless otherwise noted.

LISBON DISTRICT

County: SOLANO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: Yes
Non-project Levees: No
RD Number: 2093

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	3
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	3.2
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	23
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.2
Infrastructure: Transportation, Private Surface	Airstrips	1
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	2.8
Infrastructure: Transportation, Public Surface	Local roads (miles)	20.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	227
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5780
Public Safety: Private Property	Commercial parcels	93
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	27
Public Safety: Private Property	Urban areas (acres)	6
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	4696.1
Mean Elevation (ft)	1.9
Agricultural lands (acres)	5780.1
Total Levees (miles)	6.5
PL 84-99 Levees (miles)	6.5
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	170.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	24.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

LITTLE EGBERT TRACT

County:	YOLO
Delta Zone:	Primary Delta
Population (2010):	163
Project Levees:	No
Non-project Levees:	Yes
RD Number:	307

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.6
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	11.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0.0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	91
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2810
Public Safety: Private Property	Commercial parcels	8
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6006.4
Mean Elevation (ft)	7.8
Agricultural lands (acres)	2809.8
Total Levees (miles)	4.8
PL 84-99 Levees (miles)	0.2
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	4.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	3.6
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

LITTLE FRANK'S TRACT

County: SOLANO
Delta Zone: Primary Delta
Population (2010): 4
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2084

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	356
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0.6
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2899.8
Mean Elevation (ft)	-1.8
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	10.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	9.6
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

LITTLE MANDEVILLE ISLAND

County:	CONTRA COSTA
Delta Zone:	Primary Delta
Population (2010):	0
Project Levees:	No
Non-project Levees:	Yes
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	341
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	355.7
Mean Elevation (ft)	-3.4
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	2.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	9.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	5.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

LONG ISLAND

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No Data
Non-project Levees: No Data
RD Number:

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	0
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	31
Public Safety: Private Property	Urban areas (acres)	10
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	341.0
Mean Elevation (ft)	0.1
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

LOWER ROBERTS ISLAND		
County:	SACRAMENTO	
Delta Zone:	Primary Delta	
Population (2010):	39	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	2.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.4
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	4.3
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	42
Infrastructure: Energy & Telcom	Transmission lines (miles)	15.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.9
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	22.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	10.8
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	439
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	10055
Public Safety: Private Property	Commercial parcels	110
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	11
Public Safety: Private Property	Urban areas (acres)	72
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	10.4
Mean Elevation (ft)	9.6
Agricultural lands (acres)	10055.2
Total Levees (miles)	16.6
PL 84-99 Levees (miles)	12.0
HMP Levees (miles)	2.1
Levees Below HMP or Unknown (miles)	0.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	5.1
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	4

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	14.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	13.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	20.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	45.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MAINTENANCE AREA 9 NORTH

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 183
Project Levees: Yes
Non-project Levees: No
RD Number: 684

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.8
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	3
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	9
Infrastructure: Energy & Telcom	Transmission lines (miles)	7.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.0
Infrastructure: Transportation, Public Surface	County highways (miles)	0.0
Infrastructure: Transportation, Public Surface	Local roads (miles)	170.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	6.3
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0.5
Public Resources: Ecosystem	Natural lands (acres)	534
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	639
Public Safety: Private Property	Commercial parcels	597
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	3
Public Safety: Private Property	Residential parcels	15295
Public Safety: Private Property	Urban areas (acres)	4796
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	14
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	10563.5
Mean Elevation (ft)	-7.8
Agricultural lands (acres)	638.9
Total Levees (miles)	9.5
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	140.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	13.8

Quantities shown are counts unless otherwise noted.

MAINTENANCE AREA 9 SOUTH

County: #REF!
Delta Zone: #REF!
Population (2010): #REF!
Project Levees: Yes
Non-project Levees: No
RD Number: #REF!

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	3.1
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	18
Infrastructure: Energy & Telcom	Transmission lines (miles)	5.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	30.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.9
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	7.4
Public Resources: Ecosystem	Natural lands (acres)	5312
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	1
Public Resources: Public Lands/Recreation	State parks (acres)	1.5
Public Safety: Private Property	Agricultural lands (acres)	5219
Public Safety: Private Property	Commercial parcels	137
Public Safety: Private Property	Confined animal facilities	1
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	365
Public Safety: Private Property	Urban areas (acres)	484
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	#REF!
Mean Elevation (ft)	#REF!
Agricultural lands (acres)	5218.9
Total Levees (miles)	26.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	12.1
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	1.6
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	383.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	109.7
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	500.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	186.9
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	1912.4
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	27.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	1747.5

Quantities shown are counts unless otherwise noted.

MANDEVILLE ISLAND

County: SACRAMENTO
Delta Zone: Secondary Delta
Population (2010): 45552
Project Levees: No
Non-project Levees: Yes
RD Number: 0

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	16.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	984
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4277
Public Safety: Private Property	Commercial parcels	7
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	8
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	5965.2
Mean Elevation (ft)	12.0
Agricultural lands (acres)	4277.5
Total Levees (miles)	14.3
PL 84-99 Levees (miles)	0.7
HMP Levees (miles)	13.2
Levees Below HMP or Unknown (miles)	0.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	2.7
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.3
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1144.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	207.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	98.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	71.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	4.6
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MCCORMACK-WILLIAMSON TRACT		
County:	SACRAMENTO	
Delta Zone:	Primary Delta	
Population (2010):	1495	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	0	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	1
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	95
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1499
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	1
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	11007.0
Mean Elevation (ft)	9.6
Agricultural lands (acres)	1499.5
Total Levees (miles)	8.7
PL 84-99 Levees (miles)	0.4
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	8.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	11.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	5.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	24.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	1552.1

Quantities shown are counts unless otherwise noted.

MCDONALD ISLAND		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	26	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2027	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	3.2
Infrastructure: Energy & Telcom	Gas storage	1
Infrastructure: Energy & Telcom	Gas wells	85
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	8.3
Infrastructure: Energy & Telcom	Natural gas stations	15
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	785
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5216
Public Safety: Private Property	Commercial parcels	19
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	46
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY		
Area (acres)	5268.7	
Mean Elevation (ft)	-14.5	
Agricultural lands (acres)	5215.9	
Total Levees (miles)	13.8	
PL 84-99 Levees (miles)	13.8	
HMP Levees (miles)	0	
Levees Below HMP or Unknown (miles)	0	

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	3.6
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	155.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	50.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	46.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	129.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MCMULLIN RANCH

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 19
Project Levees: Yes
Non-project Levees: Yes
RD Number: 2110

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	2.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	70
Infrastructure: Energy & Telcom	Transmission lines (miles)	7.2
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	15.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	167
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5084
Public Safety: Private Property	Commercial parcels	60
Public Safety: Private Property	Confined animal facilities	7
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	8
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1595.6
Mean Elevation (ft)	3.4
Agricultural lands (acres)	5084.2
Total Levees (miles)	20.4
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	13.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	3.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	16.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	64.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	41.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MEDFORD ISLAND

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	85
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2030

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	468
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	681
Public Safety: Private Property	Commercial parcels	13
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6044.5
Mean Elevation (ft)	-14.2
Agricultural lands (acres)	681.4
Total Levees (miles)	5.9
PL 84-99 Levees (miles)	0.9
HMP Levees (miles)	2.6
Levees Below HMP or Unknown (miles)	2.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	2.1
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	733.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	24.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	47.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	69.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	209.7

Quantities shown are counts unless otherwise noted.

MEIN'S LANDING

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 293
Project Levees: No Data
Non-project Levees: No Data
RD Number: 2075

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.1
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	669
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	5250.8
Mean Elevation (ft)	26.0
Agricultural lands (acres)	0
Total Levees (miles)	2.7
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	620.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	3.8
Ecosystem: Protected Areas	Additional conserved lands (acres)	35.2

Quantities shown are counts unless otherwise noted.

MERRITT ISLAND

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 1
Project Levees: Yes
Non-project Levees: No
RD Number: 2041

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.3
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	7.2
Infrastructure: Transportation, Public Surface	Local roads (miles)	24.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	286
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4665
Public Safety: Private Property	Commercial parcels	64
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	30
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1148.9
Mean Elevation (ft)	-10.1
Agricultural lands (acres)	4665.0
Total Levees (miles)	17.7
PL 84-99 Levees (miles)	14.7
HMP Levees (miles)	2.3
Levees Below HMP or Unknown (miles)	0.8

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	120.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	19.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MIDDLE & UPPER ROBERTS ISLAND

County:	SOLANO
Delta Zone:	Suisun
Population (2010):	7
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	4.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	23
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	3.4
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	87
Infrastructure: Energy & Telcom	Transmission lines (miles)	13.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.7
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	47.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.8
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	205
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	18382
Public Safety: Private Property	Commercial parcels	96
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	102
Public Safety: Private Property	Urban areas (acres)	837
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	669.1
Mean Elevation (ft)	2.1
Agricultural lands (acres)	18381.6
Total Levees (miles)	31.7
PL 84-99 Levees (miles)	21.4
HMP Levees (miles)	3.8
Levees Below HMP or Unknown (miles)	0.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	16.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	13.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	69.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	23.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MILDRED ISLAND

County: YOLO
Delta Zone: Primary Delta
Population (2010): 173
Project Levees: No
Non-project Levees: Yes
RD Number: 150

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1027
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	4908.2
Mean Elevation (ft)	6.4
Agricultural lands (acres)	0
Total Levees (miles)	0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	15.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	43.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

MOSSDALE ISLAND

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 510
Project Levees: Yes
Non-project Levees: No
RD Number: 524, 544

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	9
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.2
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	6.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	1.4
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	41
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	865
Public Safety: Private Property	Commercial parcels	12
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	1
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	5
Public Safety: Private Property	Urban areas (acres)	126
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	19415.4
Mean Elevation (ft)	4.7
Agricultural lands (acres)	865.2
Total Levees (miles)	4.2
PL 84-99 Levees (miles)	1.8
HMP Levees (miles)	1.3
Levees Below HMP or Unknown (miles)	1.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	25.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

NETHERLANDS		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	0	
Project Levees:	Yes	
Non-project Levees:	No	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.7
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.1
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0.0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	120.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	17.0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	650
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	24356
Public Safety: Private Property	Commercial parcels	363
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	168
Public Safety: Private Property	Urban areas (acres)	258
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	3
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1026.8
Mean Elevation (ft)	-10.4
Agricultural lands (acres)	24355.6
Total Levees (miles)	32.4
PL 84-99 Levees (miles)	31.0
HMP Levees (miles)	0.9
Levees Below HMP or Unknown (miles)	0.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	15.7
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	7.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	19.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	230.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	63.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

NEW HOPE TRACT		
County:	SAN JOAQUIN	
Delta Zone:	Secondary Delta	
Population (2010):	14	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2107	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	3
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	3.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	4.1
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	4.6
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	3.4
Infrastructure: Transportation, Public Surface	County highways (miles)	3.4
Infrastructure: Transportation, Public Surface	Local roads (miles)	28.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.9
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	336
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	8890
Public Safety: Private Property	Commercial parcels	230
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	238
Public Safety: Private Property	Urban areas (acres)	434
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1032.1
Mean Elevation (ft)	16.7
Agricultural lands (acres)	8889.6
Total Levees (miles)	17.4
PL 84-99 Levees (miles)	9.5
HMP Levees (miles)	6.0
Levees Below HMP or Unknown (miles)	1.9

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	2

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	48.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	5.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	203.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	39.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	94.4

Quantities shown are counts unless otherwise noted.

NORTH STOCKTON		
County:	SAN JOAQUIN	
Delta Zone:	Secondary Delta	
Population (2010):	358	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2064	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.8
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	4.5
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	10
Infrastructure: Energy & Telcom	Transmission lines (miles)	13.6
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	170.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.9
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	13.3
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	332
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	228
Public Safety: Private Property	Commercial parcels	1419
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	6
Public Safety: Private Property	Residential parcels	14860
Public Safety: Private Property	Urban areas (acres)	5963
Public Safety: Public Facilities	Fire stations	3
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	16
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	5126.4
Mean Elevation (ft)	29.6
Agricultural lands (acres)	228.3
Total Levees (miles)	13.6
PL 84-99 Levees (miles)	7.8
HMP Levees (miles)	0.4
Levees Below HMP or Unknown (miles)	0.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	1.1
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	3

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	3.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	1.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	77.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	6.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	8.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PALM-ORWOOD

County: YOLO
Delta Zone: Primary Delta
Population (2010): 917
Project Levees: No
Non-project Levees: Yes
RD Number: 999

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	6.6
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	2.8
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	15
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.8
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.5
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	22.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	7.7
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	458
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4393
Public Safety: Private Property	Commercial parcels	14
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	1
Public Safety: Private Property	Urban areas (acres)	27
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	25145.5
Mean Elevation (ft)	4.1
Agricultural lands (acres)	4393.3
Total Levees (miles)	14.5
PL 84-99 Levees (miles)	10.1
HMP Levees (miles)	3.6
Levees Below HMP or Unknown (miles)	0.8

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	42.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	23.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	5.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	23.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PARADISE JUNCTION

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	1490
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	348

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.2
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	57
Infrastructure: Energy & Telcom	Transmission lines (miles)	9.1
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	1.7
Infrastructure: Transportation, Public Surface	County highways (miles)	0.7
Infrastructure: Transportation, Public Surface	Local roads (miles)	7.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	2.2
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	170
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3458
Public Safety: Private Property	Commercial parcels	44
Public Safety: Private Property	Confined animal facilities	1
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	5
Public Safety: Private Property	Urban areas (acres)	300
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	1
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	2

GEOMETRY	
Area (acres)	9654.5
Mean Elevation (ft)	5.3
Agricultural lands (acres)	3457.5
Total Levees (miles)	5.0
PL 84-99 Levees (miles)	2.7
HMP Levees (miles)	0.7
Levees Below HMP or Unknown (miles)	1.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	17.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	54.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	21.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PEARSON DISTRICT

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 50570
Project Levees: Yes
Non-project Levees: Yes
RD Number: 2074, 1608

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	3
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	25
Infrastructure: Energy & Telcom	Transmission lines (miles)	7.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	1.9
Infrastructure: Transportation, Public Surface	Local roads (miles)	14.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	3.3
Public Resources: Ecosystem	Natural lands (acres)	101
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	8608
Public Safety: Private Property	Commercial parcels	152
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	116
Public Safety: Private Property	Urban areas (acres)	129
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	3
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6522.2
Mean Elevation (ft)	7.0
Agricultural lands (acres)	8607.5
Total Levees (miles)	14.0
PL 84-99 Levees (miles)	14.0
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	30.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	5.7
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	53.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	16.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PESCADERO DISTRICT		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	66	
Project Levees:	Yes	
Non-project Levees:	Yes	
RD Number:	2024	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.5
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0.9
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	4
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.4
Infrastructure: Transportation, Public Surface	County highways (miles)	0.9
Infrastructure: Transportation, Public Surface	Local roads (miles)	45.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	3.3
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	358
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	7757
Public Safety: Private Property	Commercial parcels	258
Public Safety: Private Property	Confined animal facilities	1
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	465
Public Safety: Private Property	Urban areas (acres)	769
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	4878.3
Mean Elevation (ft)	-7.1
Agricultural lands (acres)	7757.4
Total Levees (miles)	8.6
PL 84-99 Levees (miles)	7.8
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	0.6

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	15.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	56.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	6.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PETERS POCKET		
County:	SAN JOAQUIN	
Delta Zone:	Secondary Delta	
Population (2010):	3808	
Project Levees:	Yes	
Non-project Levees:	No	
RD Number:	2095	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.9
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.3
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	12.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	124
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1328
Public Safety: Private Property	Commercial parcels	8
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3927.1
Mean Elevation (ft)	19.6
Agricultural lands (acres)	1327.6
Total Levees (miles)	5.8
PL 84-99 Levees (miles)	0
HMP Levees (miles)	2.0
Levees Below HMP or Unknown (miles)	3.8

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	5.1
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	5.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.5
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PICO-NAGLEE

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 696
Project Levees: No
Non-project Levees: Yes
RD Number: 551

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	3.6
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	48
Infrastructure: Energy & Telcom	Transmission lines (miles)	12.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	3.2
Infrastructure: Transportation, Public Surface	Local roads (miles)	32.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	333
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	6246
Public Safety: Private Property	Commercial parcels	415
Public Safety: Private Property	Confined animal facilities	4
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	215
Public Safety: Private Property	Urban areas (acres)	943
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	2
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	8787.0
Mean Elevation (ft)	0.5
Agricultural lands (acres)	6245.8
Total Levees (miles)	10.6
PL 84-99 Levees (miles)	8.7
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	34.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

PROSPECT ISLAND		
County:	SAN JOAQUIN	
Delta Zone:	Secondary Delta	
Population (2010):	751	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2058	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.5
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	6.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	405
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1890
Public Safety: Private Property	Commercial parcels	6
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY		
Area (acres)	8883.7	
Mean Elevation (ft)	15.5	
Agricultural lands (acres)	1889.7	
Total Levees (miles)	9.8	
PL 84-99 Levees (miles)	0.6	
HMP Levees (miles)	0.3	
Levees Below HMP or Unknown (miles)	8.9	

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	4.6
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	595.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	198.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	204.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	206.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	471.5

Quantities shown are counts unless otherwise noted.

QUIMBY ISLAND

County: SOLANO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No
Non-project Levees: Yes
RD Number: 2104

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	6.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	100
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	667
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1451.9
Mean Elevation (ft)	8.6
Agricultural lands (acres)	666.9
Total Levees (miles)	7.0
PL 84-99 Levees (miles)	6.1
HMP Levees (miles)	0.7
Levees Below HMP or Unknown (miles)	0.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	34.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	1.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	39.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	8.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

RANDALL ISLAND

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 859
Project Levees: Yes
Non-project Levees: No
RD Number: 1007

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	399
Public Safety: Private Property	Commercial parcels	11
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	5
Public Safety: Private Property	Urban areas (acres)	12
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	7521.2
Mean Elevation (ft)	9.8
Agricultural lands (acres)	399.2
Total Levees (miles)	1.9
PL 84-99 Levees (miles)	1.9
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

RECLAMATION DISTRICT 17

County: SOLANO
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: Yes
Non-project Levees: Yes
RD Number: 1667

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.6
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	13
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.2
Infrastructure: Energy & Telcom	Natural gas stations	2
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	2
Infrastructure: Energy & Telcom	Substations	3
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	81
Infrastructure: Energy & Telcom	Transmission lines (miles)	22.0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	3.7
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	130.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	6.1
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	694
Public Resources: Public Lands/Recreation	County parks	2
Public Resources: Public Lands/Recreation	Regional parks	2
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	8098
Public Safety: Private Property	Commercial parcels	1183
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	1
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	7924
Public Safety: Private Property	Urban areas (acres)	1927
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	6
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	2

GEOMETRY	
Area (acres)	2294.6
Mean Elevation (ft)	5.2
Agricultural lands (acres)	8098.0
Total Levees (miles)	18.6
PL 84-99 Levees (miles)	15.9
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	50.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	13.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

RINDGE TRACT		
County:	CONTRA COSTA	
Delta Zone:	Primary Delta	
Population (2010):	0	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2090	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	102
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	6610
Public Safety: Private Property	Commercial parcels	21
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	7
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	767.0
Mean Elevation (ft)	-9.2
Agricultural lands (acres)	6610.2
Total Levees (miles)	15.8
PL 84-99 Levees (miles)	3.2
HMP Levees (miles)	8.4
Levees Below HMP or Unknown (miles)	4.2

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	6.6
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	4.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	2.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

RIO BLANCO TRACT		
County:	SACRAMENTO	
Delta Zone:	Primary Delta	
Population (2010):	66	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	755	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	5
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	651
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	412.3
Mean Elevation (ft)	8.8
Agricultural lands (acres)	651.5
Total Levees (miles)	4.3
PL 84-99 Levees (miles)	2.0
HMP Levees (miles)	1.4
Levees Below HMP or Unknown (miles)	0.9

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

RIVER JUNCTION

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 27617
Project Levees: Yes
Non-project Levees: Yes
RD Number: 17

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	4.4
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	18.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	253
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4729
Public Safety: Private Property	Commercial parcels	100
Public Safety: Private Property	Confined animal facilities	3
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	42
Public Safety: Private Property	Urban areas (acres)	145
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	10717.2
Mean Elevation (ft)	12.5
Agricultural lands (acres)	4728.9
Total Levees (miles)	10.6
PL 84-99 Levees (miles)	3.9
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	6.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	167.9
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	4.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	4.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

ROUGH AND READY ISLAND

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	55
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2037

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	2.5
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	1
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	19.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	1
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	445
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	380
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	627
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	1
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	6718.1
Mean Elevation (ft)	-10.5
Agricultural lands (acres)	379.7
Total Levees (miles)	6.8
PL 84-99 Levees (miles)	5.3
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	1.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	2.5
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	3.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	101.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	1.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

RYER ISLAND

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: Yes
Non-project Levees: No
RD Number: 2114

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.6
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	53.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	9.3
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	158
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	11634
Public Safety: Private Property	Commercial parcels	60
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	4
Public Safety: Private Property	Urban areas (acres)	14
Public Safety: Public Facilities	Fire stations	2
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	656.5
Mean Elevation (ft)	1.1
Agricultural lands (acres)	11634.5
Total Levees (miles)	20.3
PL 84-99 Levees (miles)	20.3
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	4.4
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	2

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	12.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	11.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	8.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

SHERMAN ISLAND

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 0
Project Levees: Yes
Non-project Levees: Yes
RD Number: 403

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.8
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	37.5
Infrastructure: Energy & Telcom	Natural gas stations	4
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	96
Infrastructure: Energy & Telcom	Transmission lines (miles)	18.6
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	28.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	6.9
Public Resources: Ecosystem	Natural lands (acres)	924
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	9466
Public Safety: Private Property	Commercial parcels	72
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	42
Public Safety: Private Property	Urban areas (acres)	49
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1451.6
Mean Elevation (ft)	3.9
Agricultural lands (acres)	9465.5
Total Levees (miles)	19.5
PL 84-99 Levees (miles)	17.4
HMP Levees (miles)	1.3
Levees Below HMP or Unknown (miles)	0.8

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	10.2
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	1

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.6
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	381.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	18.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	27.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	93.1
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	16.4
Ecosystem: Protected Areas	Additional conserved lands (acres)	8646.0

Quantities shown are counts unless otherwise noted.

SHIMA TRACT

County:	SOLANO
Delta Zone:	Primary Delta
Population (2010):	320
Project Levees:	No
Non-project Levees:	Yes
RD Number:	501

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	18
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.6
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	79
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1727
Public Safety: Private Property	Commercial parcels	5
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	63
Public Safety: Private Property	Urban areas (acres)	18
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	11792.3
Mean Elevation (ft)	-3.9
Agricultural lands (acres)	1726.8
Total Levees (miles)	6.9
PL 84-99 Levees (miles)	2.0
HMP Levees (miles)	1.5
Levees Below HMP or Unknown (miles)	3.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	38.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

SHIN KEE TRACT

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 186
Project Levees: No
Non-project Levees: Yes
RD Number: 341

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.3
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	18
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1010
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	10429.4
Mean Elevation (ft)	-9.8
Agricultural lands (acres)	1009.5
Total Levees (miles)	5.0
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0.2
Levees Below HMP or Unknown (miles)	3.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	6.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

STARK TRACT

County:	SAN JOAQUIN
Delta Zone:	Secondary Delta
Population (2010):	18
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	2115

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	11
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	17
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	693
Public Safety: Private Property	Commercial parcels	11
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1823.7
Mean Elevation (ft)	-0.5
Agricultural lands (acres)	693.2
Total Levees (miles)	3.7
PL 84-99 Levees (miles)	3.7
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	5.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	6.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

STATEN ISLAND		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	0	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:		

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	2.5
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	4
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	3.5
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0.9
Infrastructure: Transportation, Public Surface	Local roads (miles)	8.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	238
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	8810
Public Safety: Private Property	Commercial parcels	0
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	10
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1027.7
Mean Elevation (ft)	0.3
Agricultural lands (acres)	8810.2
Total Levees (miles)	25.4
PL 84-99 Levees (miles)	0.2
HMP Levees (miles)	25.2
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	55.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	8943.3

Quantities shown are counts unless otherwise noted.

STEWART TRACT

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 11
Project Levees: Yes
Non-project Levees: No
RD Number: 2089

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	12.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	79
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3886
Public Safety: Private Property	Commercial parcels	3
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	31
Public Safety: Private Property	Urban areas (acres)	7
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	709.7
Mean Elevation (ft)	9.6
Agricultural lands (acres)	3886.0
Total Levees (miles)	12.1
PL 84-99 Levees (miles)	9.7
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	2.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	7.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	7.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

SUNRISE CLUB

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	26
Project Levees:	No Data
Non-project Levees:	No Data
RD Number:	38

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	305
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	9055.8
Mean Elevation (ft)	-10.4
Agricultural lands (acres)	0
Total Levees (miles)	3.0
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	TBD

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	276.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	7.6
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

SUTTER ISLAND

County:	SAN JOAQUIN
Delta Zone:	Secondary Delta
Population (2010):	17
Project Levees:	Yes
Non-project Levees:	No
RD Number:	2062

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0.5
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	1.0
Public Resources: Ecosystem	Natural lands (acres)	47
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2468
Public Safety: Private Property	Commercial parcels	41
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	10
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3972.4
Mean Elevation (ft)	12.1
Agricultural lands (acres)	2468.3
Total Levees (miles)	12.4
PL 84-99 Levees (miles)	12.4
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.4
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	37.8
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	6.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

TERMINOUS TRACT

County:	SOLANO
Delta Zone:	Suisun
Population (2010):	0
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2135

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	6.7
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	1
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	19
Infrastructure: Energy & Telcom	Transmission lines (miles)	10.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	26.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	6.4
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	786
Public Resources: Public Lands/Recreation	County parks	1
Public Resources: Public Lands/Recreation	Regional parks	1
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	11256
Public Safety: Private Property	Commercial parcels	100
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	200
Public Safety: Private Property	Urban areas (acres)	208
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	304.7
Mean Elevation (ft)	1.3
Agricultural lands (acres)	11255.7
Total Levees (miles)	17.3
PL 84-99 Levees (miles)	1.5
HMP Levees (miles)	3.2
Levees Below HMP or Unknown (miles)	11.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	69.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	59.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	38.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	56.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	7.1
Ecosystem: Protected Areas	Additional conserved lands (acres)	134.8

Quantities shown are counts unless otherwise noted.

TWITCHELL ISLAND

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 111
Project Levees: Yes
Non-project Levees: Yes
RD Number: 349

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	3.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	42
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.9
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	178
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	3367
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	4
Public Safety: Private Property	Urban areas (acres)	13
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	1
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2505.2
Mean Elevation (ft)	3.7
Agricultural lands (acres)	3366.7
Total Levees (miles)	11.9
PL 84-99 Levees (miles)	4.9
HMP Levees (miles)	1.7
Levees Below HMP or Unknown (miles)	5.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	5.3
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	29.9
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	12.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	4.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	35.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	2854.7

Quantities shown are counts unless otherwise noted.

TYLER ISLAND		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	461	
Project Levees:	Yes	
Non-project Levees:	Yes	
RD Number:	548	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	6.5
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	17
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	8.3
Infrastructure: Energy & Telcom	Natural gas stations	4
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	1.0
Infrastructure: Transportation, Public Surface	Local roads (miles)	19.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	190
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	8667
Public Safety: Private Property	Commercial parcels	76
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	5
Public Safety: Private Property	Urban areas (acres)	33
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	12247.1
Mean Elevation (ft)	-4.9
Agricultural lands (acres)	8667.3
Total Levees (miles)	22.4
PL 84-99 Levees (miles)	13.5
HMP Levees (miles)	8.4
Levees Below HMP or Unknown (miles)	0.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	99.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	7.8
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	6.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	19.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	707.3

Quantities shown are counts unless otherwise noted.

UNION ISLAND EAST

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 30
Project Levees: Yes
Non-project Levees: Yes
RD Number: 1601

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	4.7
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	10
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	2.5
Infrastructure: Energy & Telcom	Natural gas stations	1
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	73
Infrastructure: Energy & Telcom	Transmission lines (miles)	7.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	1.5
Infrastructure: Transportation, Public Surface	Local roads (miles)	32.2
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	367
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	11270
Public Safety: Private Property	Commercial parcels	61
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	16
Public Safety: Private Property	Urban areas (acres)	14
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3555.2
Mean Elevation (ft)	-12.3
Agricultural lands (acres)	11270.2
Total Levees (miles)	15.1
PL 84-99 Levees (miles)	13.8
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	1.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	5.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	3.5
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	61.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	58.4
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

UNION ISLAND WEST

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 103
Project Levees: No
Non-project Levees: Yes
RD Number: 563

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	1
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	5.9
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	173
Infrastructure: Energy & Telcom	Transmission lines (miles)	32.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	23.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	335
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	12810
Public Safety: Private Property	Commercial parcels	24
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	8
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	8814.1
Mean Elevation (ft)	-7.6
Agricultural lands (acres)	12810.1
Total Levees (miles)	16.3
PL 84-99 Levees (miles)	16.3
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	1.1
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	3.6
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	5.3
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	32.6
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	2.3
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

UPPER ANDRUS ISLAND

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	181
Project Levees:	Yes
Non-project Levees:	No
RD Number:	1

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	1.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	7
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	1
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	144
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2170
Public Safety: Private Property	Commercial parcels	36
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	13
Public Safety: Private Property	Urban areas (acres)	14
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	11648.7
Mean Elevation (ft)	4.4
Agricultural lands (acres)	2169.8
Total Levees (miles)	11.3
PL 84-99 Levees (miles)	6.6
HMP Levees (miles)	4.7
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	5.8
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	11.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	15.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

VEALE TRACT

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 185
Project Levees: No
Non-project Levees: Yes
RD Number: 556

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	1.5
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	38
Infrastructure: Energy & Telcom	Transmission lines (miles)	6.5
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	15.5
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1334
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	555
Public Safety: Private Property	Commercial parcels	13
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	13
Public Safety: Private Property	Urban areas (acres)	98
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2322.4
Mean Elevation (ft)	-0.2
Agricultural lands (acres)	554.9
Total Levees (miles)	5.0
PL 84-99 Levees (miles)	3.2
HMP Levees (miles)	1.1
Levees Below HMP or Unknown (miles)	0.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	10.8
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	7.8
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	4.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	10.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	3.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

VENICE ISLAND

County: CONTRA COSTA
Delta Zone: Primary Delta
Population (2010): 55
Project Levees: No
Non-project Levees: Yes
RD Number: 2065

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	294
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	2794
Public Safety: Private Property	Commercial parcels	2
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	4
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1986.7
Mean Elevation (ft)	0.6
Agricultural lands (acres)	2794.0
Total Levees (miles)	12.4
PL 84-99 Levees (miles)	2.5
HMP Levees (miles)	2.3
Levees Below HMP or Unknown (miles)	7.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	4.4
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	26.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	7.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	73.6
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	28.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

VICTORIA ISLAND		
County:	SAN JOAQUIN	
Delta Zone:	Primary Delta	
Population (2010):	1	
Project Levees:	No	
Non-project Levees:	Yes	
RD Number:	2023	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	13
Infrastructure: Energy & Telcom	Transmission lines (miles)	3.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	4.3
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	299
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	6824
Public Safety: Private Property	Commercial parcels	8
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	24
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	3090.6
Mean Elevation (ft)	-14.8
Agricultural lands (acres)	6823.6
Total Levees (miles)	15.1
PL 84-99 Levees (miles)	11.7
HMP Levees (miles)	3.4
Levees Below HMP or Unknown (miles)	0.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	1
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.2
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.2
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WALNUT GROVE

County:	SAN JOAQUIN
Delta Zone:	Primary Delta
Population (2010):	0
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	2040

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	3
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.4
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	1
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0.0
Infrastructure: Transportation, Public Surface	Local roads (miles)	4.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	5
Public Resources: Cultural Resources	Legacy towns	1
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	29
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	322
Public Safety: Private Property	Commercial parcels	107
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	119
Public Safety: Private Property	Urban areas (acres)	119
Public Safety: Public Facilities	Fire stations	1
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	1
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	1
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	7146.8
Mean Elevation (ft)	-8.4
Agricultural lands (acres)	322.1
Total Levees (miles)	2.8
PL 84-99 Levees (miles)	1.1
HMP Levees (miles)	1.8
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.5
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	15.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	3.5
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	5.5

Quantities shown are counts unless otherwise noted.

WALTHALL

County: SACRAMENTO
Delta Zone: Primary Delta
Population (2010): 502
Project Levees: Yes
Non-project Levees: Yes
RD Number: 554

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.7
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	11
Infrastructure: Energy & Telcom	Transmission lines (miles)	5.4
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	5.3
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	155
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1743
Public Safety: Private Property	Commercial parcels	17
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	2
Public Safety: Private Property	Urban areas (acres)	13
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	469.8
Mean Elevation (ft)	3.4
Agricultural lands (acres)	1742.6
Total Levees (miles)	2.8
PL 84-99 Levees (miles)	0.4
HMP Levees (miles)	1.7
Levees Below HMP or Unknown (miles)	0.8

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	68.7
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	8.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	6.7
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WEBB TRACT

County:	SAN JOAQUIN
Delta Zone:	Secondary Delta
Population (2010):	38
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2094

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.1
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	10.8
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	636
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	4788
Public Safety: Private Property	Commercial parcels	21
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1910.1
Mean Elevation (ft)	19.1
Agricultural lands (acres)	4788.1
Total Levees (miles)	12.9
PL 84-99 Levees (miles)	3.1
HMP Levees (miles)	4.1
Levees Below HMP or Unknown (miles)	5.7

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	6.1
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	123.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	20.9
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	74.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	78.7
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WEST SACRAMENTO

County:	CONTRA COSTA
Delta Zone:	Primary Delta
Population (2010):	0
Project Levees:	Yes
Non-project Levees:	Yes
RD Number:	2026

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	2
Infrastructure: Energy & Telcom	Communications facilities	2
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0.2
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	14.5
Infrastructure: Energy & Telcom	Natural gas stations	3
Infrastructure: Energy & Telcom	Oil pipelines (miles)	17.6
Infrastructure: Energy & Telcom	Operational power plants	1
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	2
Infrastructure: Energy & Telcom	Transmission line towers	25
Infrastructure: Energy & Telcom	Transmission lines (miles)	2.9
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	2.8
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	209.7
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	11.4
Infrastructure: Transportation, Water	Ports	2
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	1
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	1463
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	5065
Public Safety: Private Property	Commercial parcels	1454
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	3
Public Safety: Private Property	Residential parcels	10409
Public Safety: Private Property	Urban areas (acres)	4621
Public Safety: Public Facilities	Fire stations	4
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	1
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	9
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	5424.5
Mean Elevation (ft)	-14.1
Agricultural lands (acres)	5065.1
Total Levees (miles)	39.6
PL 84-99 Levees (miles)	TBD
HMP Levees (miles)	TBD
Levees Below HMP or Unknown (miles)	24.3

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	8.2
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	68.6
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	16.2
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	185.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	34.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	46.2
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WETHERBEE LAKE		
County:	YOLO	
Delta Zone:	Secondary Delta	
Population (2010):	35855	
Project Levees:	Yes	
Non-project Levees:	Yes	
RD Number:	900	

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0.1
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	2.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	14
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	21
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	67
Public Safety: Private Property	Urban areas (acres)	53
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	1

GEOMETRY	
Area (acres)	11148.4
Mean Elevation (ft)	14.7
Agricultural lands (acres)	0.1
Total Levees (miles)	0.1
PL 84-99 Levees (miles)	0
HMP Levees (miles)	0.1
Levees Below HMP or Unknown (miles)	0.1

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	52.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WINTER ISLAND

County:	SAN JOAQUIN
Delta Zone:	Secondary Delta
Population (2010):	201
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2096

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	0
Infrastructure: Energy & Telcom	Transmission lines (miles)	0
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	438
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	0
Public Safety: Private Property	Commercial parcels	1
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	67.7
Mean Elevation (ft)	16.4
Agricultural lands (acres)	0
Total Levees (miles)	4.7
PL 84-99 Levees (miles)	0.2
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	4.5

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	1.3
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.0
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	0.0
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	1.3
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	352.9
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WOODWARD ISLAND

County:	SAN JOAQUIN
Delta Zone:	Secondary Delta
Population (2010):	201
Project Levees:	No
Non-project Levees:	Yes
RD Number:	2096

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	1.5
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	2
Infrastructure: Energy & Telcom	Transmission lines (miles)	1.8
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	0
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	4.4
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	91
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1712
Public Safety: Private Property	Commercial parcels	5
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	0
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	67.7
Mean Elevation (ft)	16.4
Agricultural lands (acres)	1711.7
Total Levees (miles)	8.9
PL 84-99 Levees (miles)	5.7
HMP Levees (miles)	2.8
Levees Below HMP or Unknown (miles)	0.4

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	0.7
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	0.1
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	7.5
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	5.8
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	0.0

Quantities shown are counts unless otherwise noted.

WRIGHT-ELMWOOD TRACT

County: SAN JOAQUIN
Delta Zone: Primary Delta
Population (2010): 0
Project Levees: No
Non-project Levees: Yes
RD Number: 2072

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	0
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	0
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	0
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	35
Infrastructure: Energy & Telcom	Transmission lines (miles)	12.3
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	3.1
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	195
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	1897
Public Safety: Private Property	Commercial parcels	14
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	0
Public Safety: Private Property	Urban areas (acres)	6
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	1802.4
Mean Elevation (ft)	-9.4
Agricultural lands (acres)	1897.1
Total Levees (miles)	8.2
PL 84-99 Levees (miles)	5.7
HMP Levees (miles)	2.5
Levees Below HMP or Unknown (miles)	0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	3.6
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	0.0
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	11.2
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	26.3
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	10.1
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	37.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	0.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	23.2

Quantities shown are counts unless otherwise noted.

YOLANO

County: SAN JOAQUIN
Delta Zone: Secondary Delta
Population (2010): 18
Project Levees: Yes
Non-project Levees: Yes
RD Number: 2119

ASSET CATEGORY	LANDSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Energy & Telcom	Cell towers	0
Infrastructure: Energy & Telcom	Communications facilities	0
Infrastructure: Energy & Telcom	Gas fields (sq miles)	7.0
Infrastructure: Energy & Telcom	Gas storage	0
Infrastructure: Energy & Telcom	Gas wells	2
Infrastructure: Energy & Telcom	Natural gas pipelines (miles)	0
Infrastructure: Energy & Telcom	Natural gas stations	0
Infrastructure: Energy & Telcom	Oil pipelines (miles)	11.8
Infrastructure: Energy & Telcom	Operational power plants	0
Infrastructure: Energy & Telcom	Substations	2
Infrastructure: Energy & Telcom	Terminals 2012	0
Infrastructure: Energy & Telcom	Transmission line towers	55
Infrastructure: Energy & Telcom	Transmission lines (miles)	11.7
Infrastructure: Transportation, Private Surface	Airstrips	0
Infrastructure: Transportation, Private Surface	Railroads (miles)	0
Infrastructure: Transportation, Public Surface	County highways (miles)	0
Infrastructure: Transportation, Public Surface	Local roads (miles)	88.4
Infrastructure: Transportation, Public Surface	State & Federal highways (miles)	0
Infrastructure: Transportation, Water	Ports	0
Infrastructure: Water Supply	Mokelumne Aqueduct (miles)	0
Public Resources: Cultural Resources	Historic places	0
Public Resources: Cultural Resources	Legacy towns	0
Public Resources: Cultural Resources	National Historic Landmarks	0
Public Resources: Cultural Resources	Scenic highways (miles)	0
Public Resources: Ecosystem	Natural lands (acres)	988
Public Resources: Public Lands/Recreation	County parks	0
Public Resources: Public Lands/Recreation	Regional parks	0
Public Resources: Public Lands/Recreation	State parks (acres)	0
Public Safety: Private Property	Agricultural lands (acres)	13159
Public Safety: Private Property	Commercial parcels	128
Public Safety: Private Property	Confined animal facilities	0
Public Safety: Private Property	Mines	0
Public Safety: Private Property	Private schools	0
Public Safety: Private Property	Residential parcels	6
Public Safety: Private Property	Urban areas (acres)	62
Public Safety: Public Facilities	Fire stations	0
Public Safety: Public Facilities	Flood depots	0
Public Safety: Public Facilities	Hospitals	0
Public Safety: Public Facilities	Police	0
Public Safety: Public Facilities	Prison	0
Public Safety: Public Facilities	Public schools	0
Public Safety: Public Facilities	Rock stockpiles	0
Public Safety: Public Facilities	Wastewater treatment plants	0

GEOMETRY	
Area (acres)	2097.0
Mean Elevation (ft)	-4.4
Agricultural lands (acres)	13159.1
Total Levees (miles)	4.5
PL 84-99 Levees (miles)	3.5
HMP Levees (miles)	0
Levees Below HMP or Unknown (miles)	1.0

ASSET CATEGORY	WATERSIDE ASSETS	Quantity
Flood Risk Assets		
Infrastructure: Water Transportation	Deep water shipping channels (miles)	0.0
Infrastructure: Water Supply	Water Intakes	0
Public Safety: Private Property	Marinas	0

ASSET CATEGORY	HIGH-VALUE HABITAT	Quantity
Habitat Assets		
Ecosystem: Terrestrial Habitat	Alkaline seasonal wetlands (acres)	69.8
Ecosystem: Terrestrial Habitat	Disturbed vernal pool complex (acres)	0.0
Ecosystem: Terrestrial Habitat	Managed wetland (acres)	2.3
Ecosystem: Terrestrial Habitat	Marsh (nontidal) (acres)	2.4
Ecosystem: Terrestrial Habitat	Riparian forest and woodland (acres)	1.4
Ecosystem: Terrestrial Habitat	Riparian scrub (acres)	0.0
Ecosystem: Terrestrial Habitat	Vernal pool complex (acres)	606.0
Ecosystem: Aquatic Habitat	Marsh (tidal) (acres)	0.0
Ecosystem: Protected Areas	Additional conserved lands (acres)	2.9

Quantities shown are counts unless otherwise noted.

APPENDIX B

Asset Replacement Values



Asset	Unit	Cost per Unit [usd]	Source
Confined animal facilities	ea	\$244,952.96	ParcelQuest as used in Asset Exposure Analysis (DWR 2013)
Transmission line towers	ea	(inc. in line cost)	n/a
Mines	ea	\$1,995,444.00	California Department of Conservation 2012, cited in Asset Exposure report (DWR 2013)
Ports	ea	\$7,699,097.00	Hazus typical per-facility replacement costs as cited in Asset Exposure (DWR 2013)
Mokelumne Aqueduct	mi	\$32,671,962.00	Delta Risk Management Strategy (DRMS) typical per-unit-length replacement costs, as cited in Asset Exposure (DWR 2013)
Fire stations	ea	\$2,040,720.00	Central Valley Flood Protection Plan (CVFPP) replacement costs, cited in Asset Exposure (DWR 2013)
Flood depots	ea	\$313,938.00	Total content replacement value as provided by DWR, cited in Asset Exposure (DWR 2013)
Hospitals	ea	\$15,015,550.00	CVFPP replacement costs, cited in Asset Exposure (DWR 2013)
Police	ea	\$1,760,110.00	CVFPP replacement costs, cited in Asset Exposure (DWR 2013)
Prison	ea	\$20,774,965.00	Aerial Imagery; Hazus; CVFPP replacement costs, cited in Asset Exposure (DWR 2013)
Private schools	ea	\$332,587.00	Building construction cost per school estimated using information developed by DWR for the 2009 proposed mandatory building code update, cited in Asset Exposure (DWR 2013)
Public schools	ea	\$332,587.00	Building construction cost per school estimated using information developed by DWR for the 2009 proposed mandatory building code update, cited in Asset Exposure (DWR 2013)
Rock stockpiles	ea	44 per ton	California Department of Conservation report Map Sheet 52: Aggregate Sustainability in California 2012, cited in Asset Exposure (DWR 2013)
Wastewater treatment plants	ea	Varied Cost	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Historic places	ea	Did Not Value	n/a
Legacy towns	ea	Did Not Value	n/a
National Historic Landmarks	ea	Did Not Value	n/a
Scenic highways (miles)	mi	\$1,237,574.00	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
Agricultural lands	acre	Varied Cost	California Pesticide Regulation Database, provided by University of the Pacific, utilized in the Delta Protection Commission (DPC) Economic Sustainability Plan (2012).
Natural lands	acre	Did Not Value	
Urban areas	acre	Did Not Value	
County parks	ea	\$139,375.00	ParcelQuest, cited in Asset Exposure (DWR 2013)
Regional parks	ea	\$139,375.00	ParcelQuest, cited in Asset Exposure (DWR 2013)

Asset	Unit	Cost per Unit [usd]	Source
State parks	acre	Varied Cost	California Department of State Parks (undated) and estimate value of \$7.91 person-day (USACE 2012) as cited in Asset Exposure (DWR 2013)
Residential parcels	ea	Varied Cost	Digital Mapping Products
Commercial parcels	ea	Varied Cost	Digital Mapping Products
Cell towers	ea	\$150,000.00	Statistic Brain 2012, cited in Asset Exposure (DWR 2013)
Communications facilities	ea	\$3,244,128.00	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Local roads	mi	\$618,787.00	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
County highways	mi	\$1,237,574.00	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
State and federal highways	mi	\$2,103,876.00	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
Railroads	mi	\$1,856,361.00	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
Airstrips	ea	\$190,740.00	ParcelQuest, cited in Asset Exposure (DWR 2013)
Gas wells	ea	\$4,533,223.00	U.S. Energy Information Administration 2013 (product) and HAZUS typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Gas fields	mi ²	Did Not Value	n/a (values for extracted gas, but no land value)
Gas storage	ea	\$1,622,063.00	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Natural gas pipelines	mi	Varied Cost	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
Natural gas stations	ea	\$1,622,064.00	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Oil pipelines	mi	\$1,361,332.00	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
Operational power plants	ea	Varied Cost	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Substations	ea	Varied Cost	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Terminals 2012	ea	\$16,220,638.00	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)
Transmission lines	mi	Varied Cost	DRMS typical per-unit-length replacement costs, cited in Asset Exposure (DWR 2013)
Deep water shipping channels	mi	Did Not Value	n/a
Recreation boating corridors	mi	Did Not Value	n/a
Marinas	ea	\$707,493.00	ParcelQuest, cited in Asset Exposure (DWR 2013)
Water Intakes	ea	\$243,310.00	Hazus typical per-facility replacement costs, cited in Asset Exposure (DWR 2013)

References:

California Department of Water Resources (DWR). 2013. *Asset Exposure Information to Support Delta Levee Improvement Prioritization*. Prepared by David Ford Consulting Engineers, Inc.

U.S. Army Corps of Engineers (USACE). 2012. *Economic Guidance Memorandum 12-03: Unit day values for recreation for fiscal year 2012*, Washington DC.

APPENDIX C

Delta Risk Management Strategy Water Level Methodology Excerpts



Topical Area: Flood Hazard

Excerpt A¹

5.5.2 Regression Analyses of Water-Surface Elevations

Using the data on maximum daily tide, mean daily inflow, and measured adjusted stages at the gauging stations, multiple regression analyses were made for each of the stage-measuring stations. The regression analyses were made to determine best fit coefficients for Equations 5-1 and 5-2. Either Equation 5-1 or 5-2 was used in the regression analyses, depending on the stage measuring station being analyzed. Equation 5-1 was used to estimate stages at the Freeport and Lisbon stations because stages at these stations depend on flow in Sacramento River and Yolo Bypass, respectively, and not the combined flows in Sacramento River and Yolo Bypass. Equation 5-2 was used for the other stage-measuring stations because the measured stage better correlates with the combined Sacramento River and Yolo Bypass flows.

$$WSE_i = aT + b(Q_{Sac})^{b'} + c(Q_{Yolo})^{c'} + d(Q_{SJ})^{d'} + e(Q_{Cos})^{e'} + f(Q_{Mok})^{f'} + g(Q_{misc})^{g'} \quad (5-1)$$

$$WSE_i = aT + b(Q_{Sac} + Q_{Yolo})^{b'} + d(Q_{SJ})^{d'} + e(Q_{Cos})^{e'} + f(Q_{Mok})^{f'} + g(Q_{misc})^{g'} \quad (5-2)$$

where:

WSE_i = water-surface elevation at station “i”

T = Golden Gate maximum daily tide elevation

Q_{Sac} = Sacramento River inflow

Q_{Yolo} = Yolo Bypass inflow

Q_{SJ} = San Joaquin River inflow

Q_{Cos} = Cosumnes River inflow

Q_{Mok} = Mokelumne River inflow

Q_{misc} = miscellaneous inflow

The theoretically derived weir equation and Manning’s Equation for a simple river (e.g., cross-sectional area equal width times depth) indicate that discharge per unit width of flow (q) is proportional to the hydraulic head to the 1.5 power, or, conversely, the hydraulic head is proportional to discharge to the 0.67 power (Streeter and Wylie 1979). Thus, the b’ through g’ exponents in Equations 5-1 and 5-2 were set equal to 0.67. Coefficients “a” through “g” are determined from the regression analyses.

Each component of Equations 5-1 and 5-2 represents the contribution to the expected stage of tide and flow from each inflow source.

In the regression analyses, a condition was imposed on the “a” through “g” coefficients to restrict these coefficients to positive values. Negative values for these coefficients would indicate a decrease in stage for an increase in flow, which is not realistic.

Regression analyses were performed for the 15 stage-measuring stations listed in Table 5-3. The multiple linear regression analyses were solved in two steps. In the first regression, the average absolute error was minimized. In the second regression, the average error was minimized. The absolute average error ranged from 0.17 feet to 0.92 feet.

¹ Excerpts A and B from Technical Memorandum: Delta Risk Management Strategy (DRMS) Phase I, Topical Area: Flood Hazard Final, Prepared by URS Corporation/Jack R. Benjamin & Associates, Inc., for California Department of Water Resources (DWR), March 4, 2008.

The coefficients “a” through “g” derived from the regression analyses are presented in Table 5-4. The resulting average absolute error and maximum error were determined and are also presented in Table 5-4.

5.6 Evaluation of Flood Stage Equations

At each station the measured water-surface elevation was compared to the water-surface elevation calculated using the coefficients listed in Table 5-4. Figure 5-5 compares the calculated stage with the measured stage at Venice Island for the period January 1998 to July 1998. Similar comparisons for the stations listed in Tables 5-2, 5-3, and 5-4 are provided in Appendix A. Also, the observed annual peak at each station is compared to the predicted annual peak for stations with four or more years of data. For most stations, the root mean square error is equal to 0.34 feet or less. Only two stations, Benson’s Ferry and Liberty Island, have root mean square errors that are greater than 1 foot.

5.7 Interpolation of Stages at Intermediate Locations

Given the coefficients “a” through “g”, a stage elevation can be predicted at each of the selected stage-measuring stations (primary stations) for any inflow pattern and tide condition. Stage estimates are also needed at locations where measured data are not available. Critical locations were selected (e.g., stream junctions) (secondary stations), and the stage at these locations was estimated by linear interpolation of the distances along the primary Delta channel flow path between the primary locations that passed through the secondary station.

5.8 Assumptions and Limitations

These analyses assume a channel system within the Delta that is regular and that behaves consistently over the period since 1984, when stage data first became available. At least two artificial (human-made) conditions exist in the Delta waterways that may account for some of the error found in the equations.

The weir near the Lisbon station can be operated to release flows at different stage elevations on the Sacramento River. The relatively larger error for this station may partly result from water releases made at different stage elevations over the past 22 years. For example, operators may choose to begin to release water at a lower-than-usual stage to minimize the danger to urban areas from higher flows expected in the near future. These operational issues have not been explored in these analyses.

Topical Area: Flood Hazard

Excerpt B

6.5 Future Delta Water-Surface Elevations

Water-surface elevations in the Delta will change in the future due to rising sea levels. The increases in sea level cannot simply be added to the water-surface elevations estimated as described in Section 5; the sea-level rise will change the hydraulic characteristics of flows through the Delta and its impact should decrease the farther inland a location is and the larger the storm event. A simple method to approximate changes in water-surface elevations in the Delta due to sea-level rise was developed and is described in the following paragraphs.

A rise in sea level increases the tailwater that inflows must overcome to pass through the Delta and enter San Francisco Bay. For any given inflow magnitude and pattern flow, depths in the Delta channels will be larger, thereby reducing flow velocities and hydraulic head losses. The reduction in hydraulic head loss must be accounted for in estimating water-surface elevations under future increased sea-level conditions. The following assumptions were made in analyzing impacts of sea-level rise on water-surface elevations in the Delta:

1. Manning's Equation can be used to describe the flow in the Delta channels during storm events.
2. The channels are much wider than they are deep; therefore, the hydraulic radius can be approximated as the channel depth.
3. The slope of the channel can be approximated as the water-surface slope between the station of interest and the next downstream station.
4. The water-surface elevation at any station can be approximated using the relationships developed in Section 5.

Using the above assumptions, the sea-level rise at any location in the Delta can be estimated using Equation 6-1.

$$\left(\frac{h_B}{h_B + d_B} \right)^{5/3} = 1 + \frac{d_B - d_A}{f_B(Q_i) - f_A(Q_i)} \quad (6-1)$$

where:

h_B = water depth at location of interest

d_B = sea-level rise at point of interest

d_A = known sea-level rise at downstream point

$f_B(Q_i)$ = water-surface elevation at point of interest calculated from relationships in Section 5

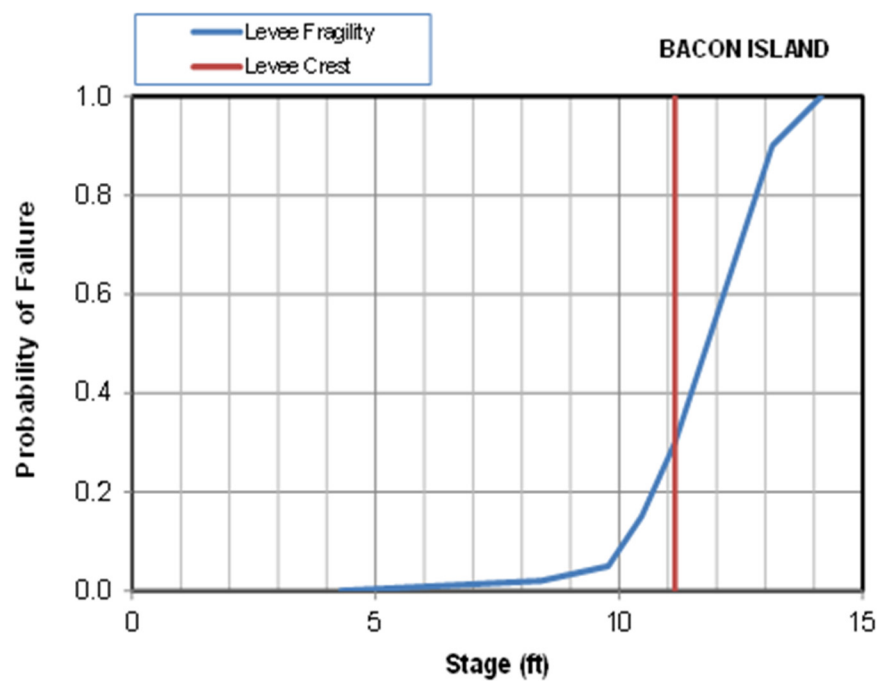
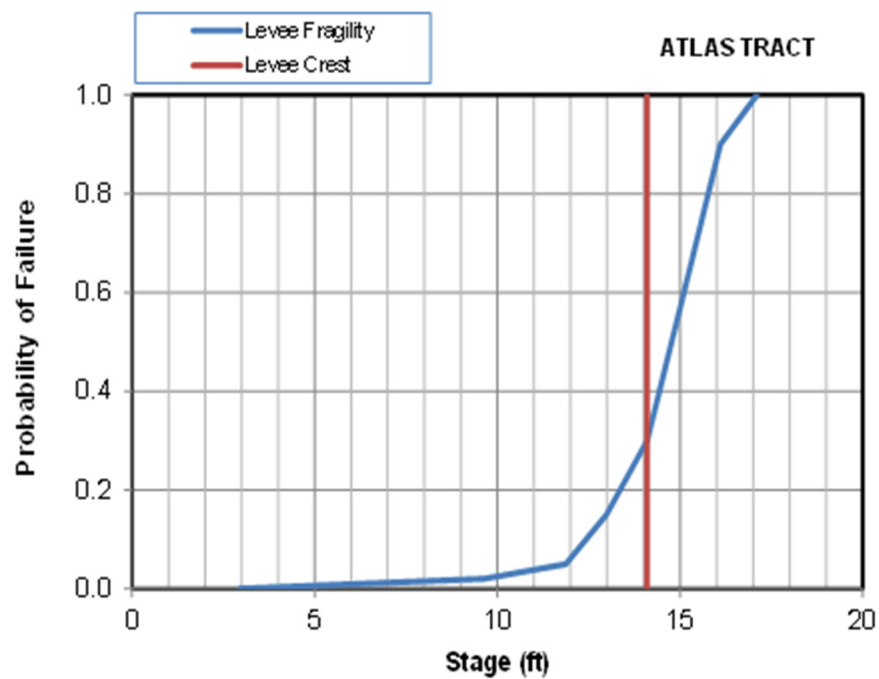
$f_A(Q_i)$ = water-surface elevation at point downstream calculated from relationships in Section 5

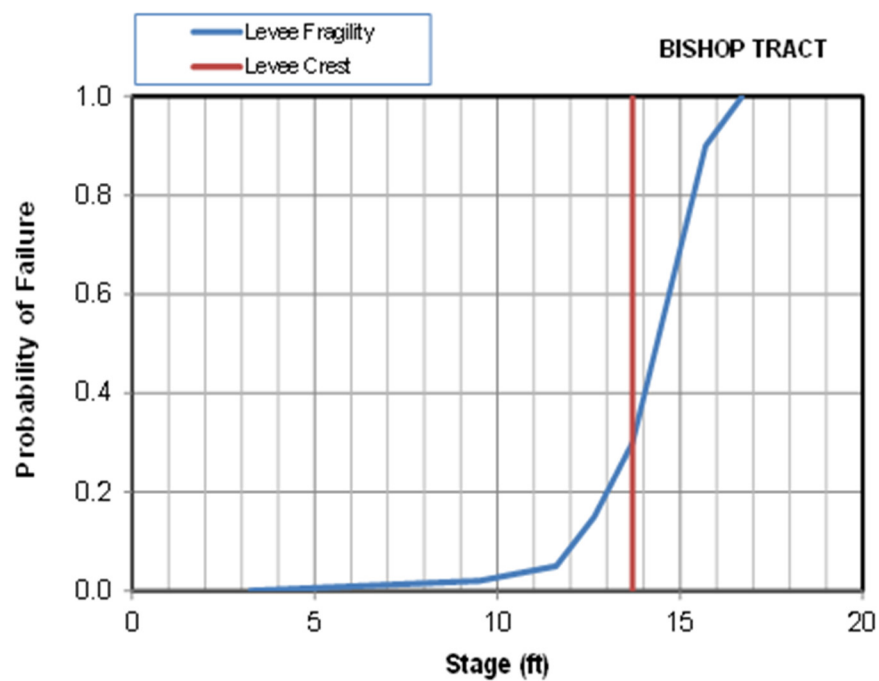
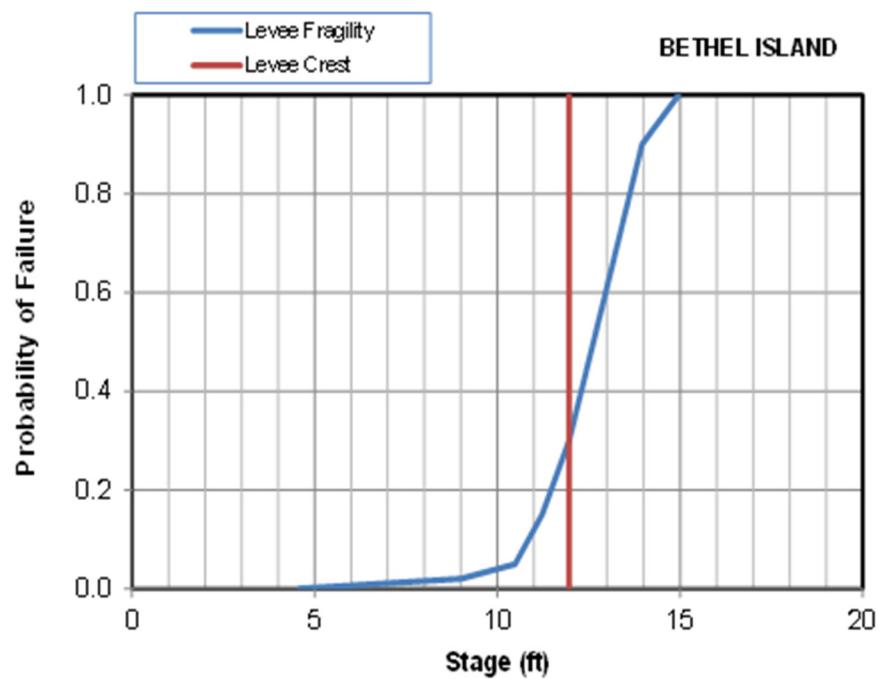
Equation 6-1 is applied starting from the farthest downstream point (e.g., the Mallard Island station) and moving upstream.

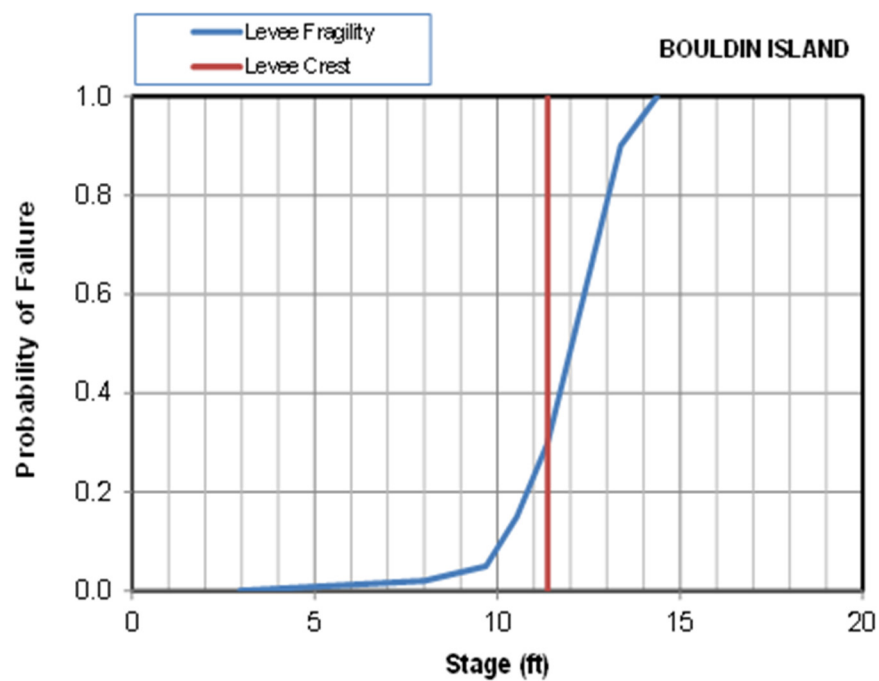
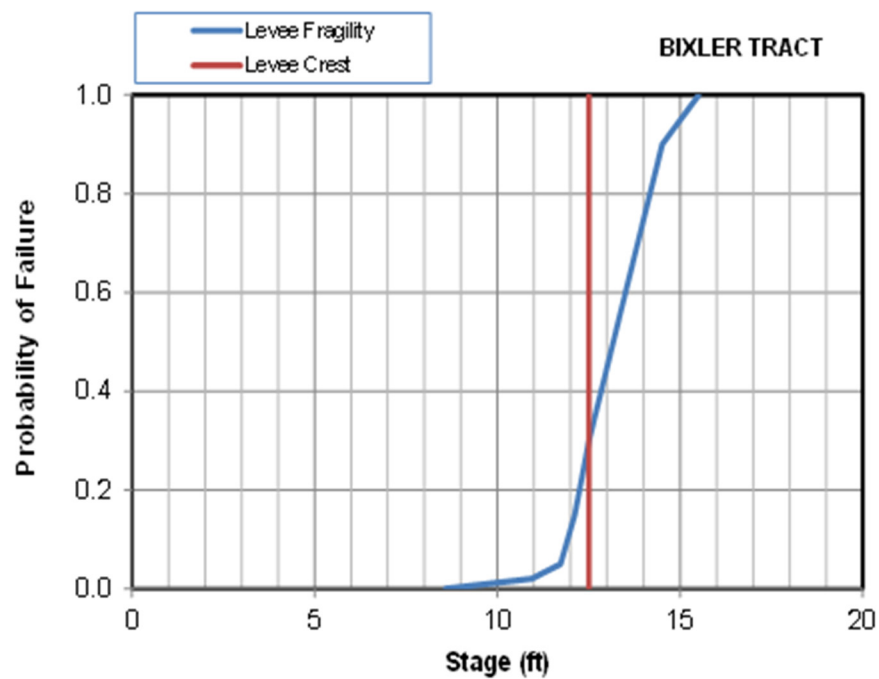
APPENDIX D

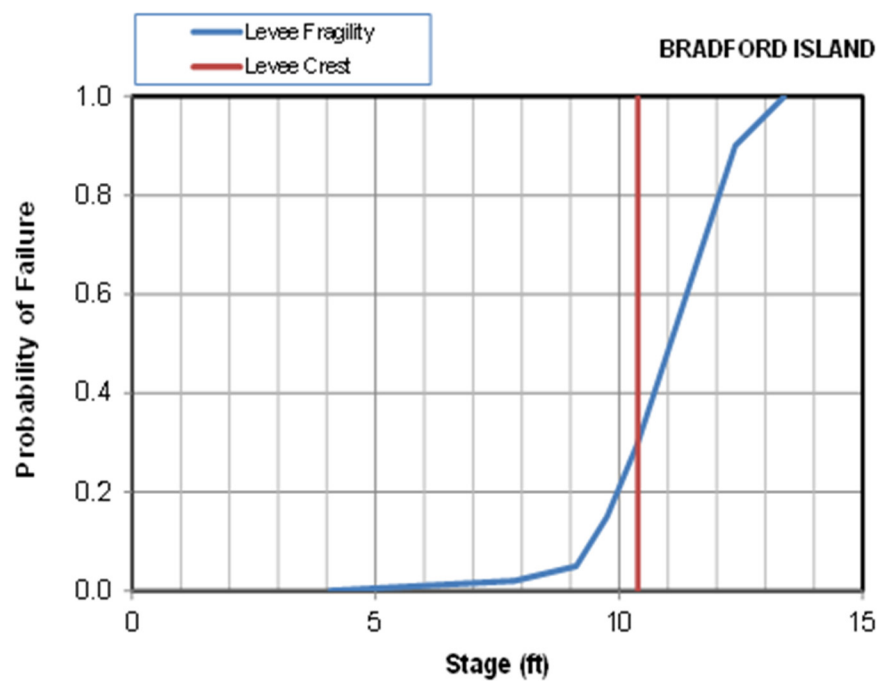
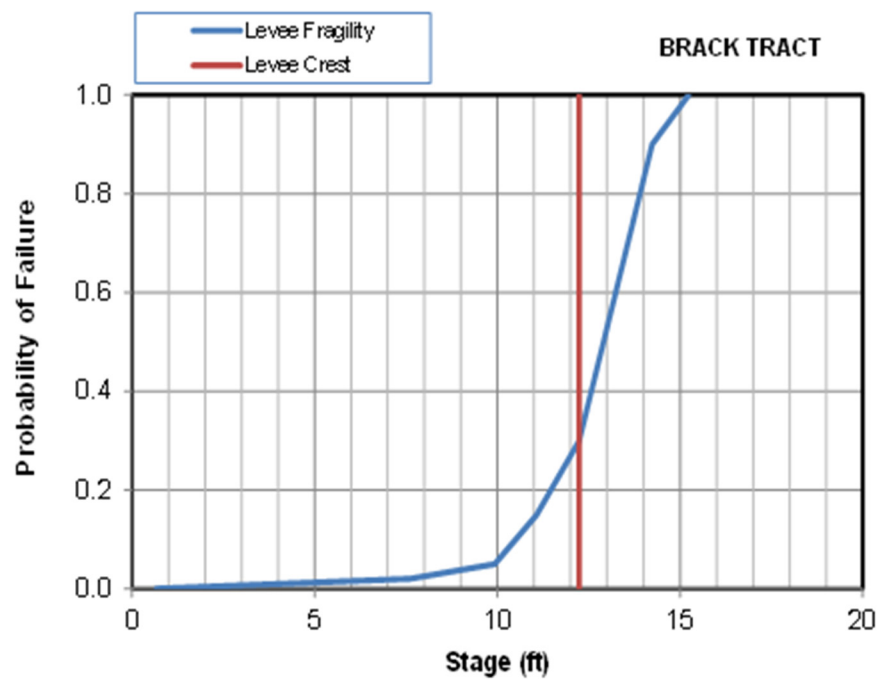
Levee Fragility Curves

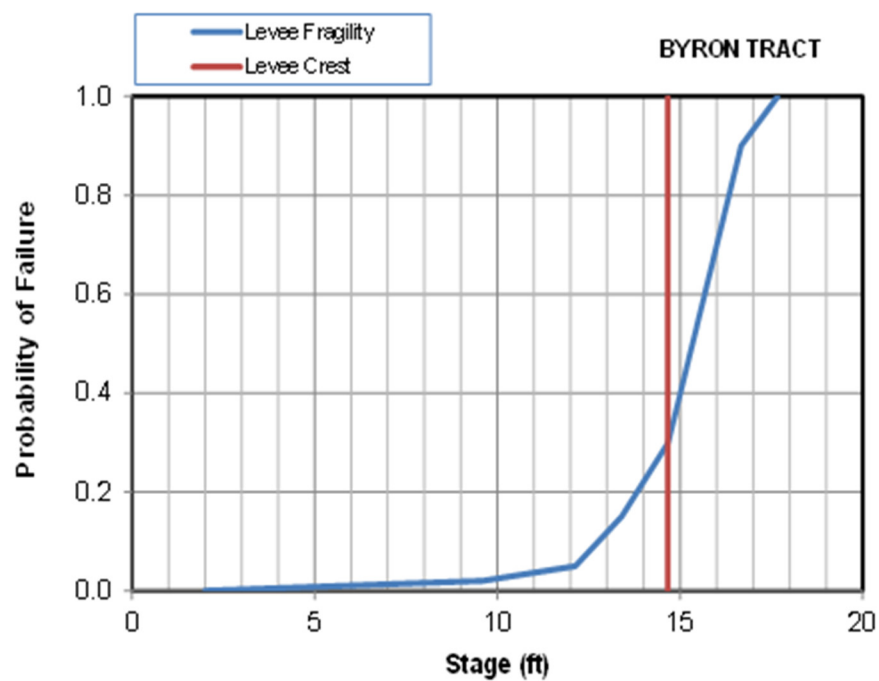
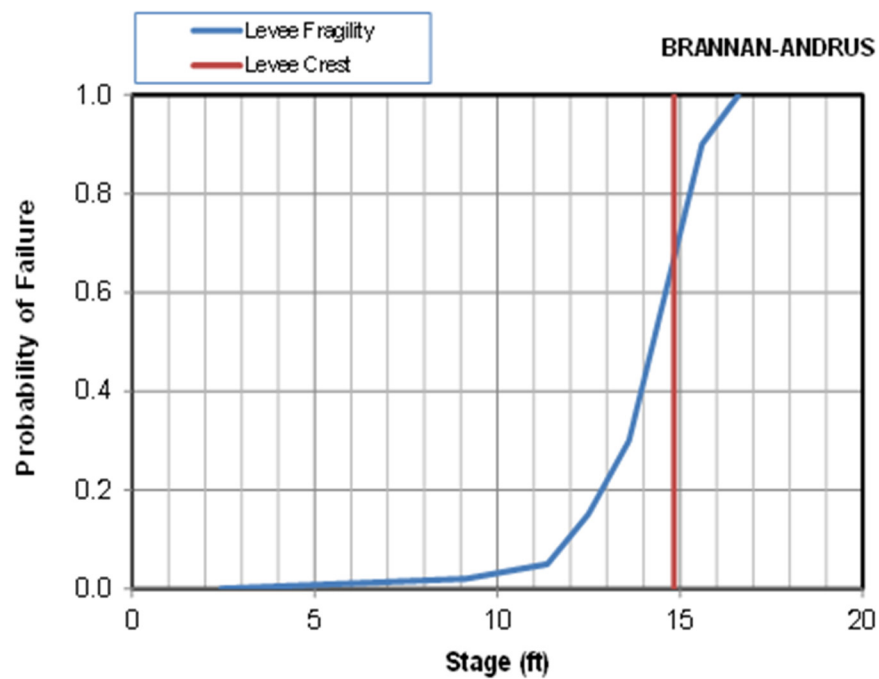


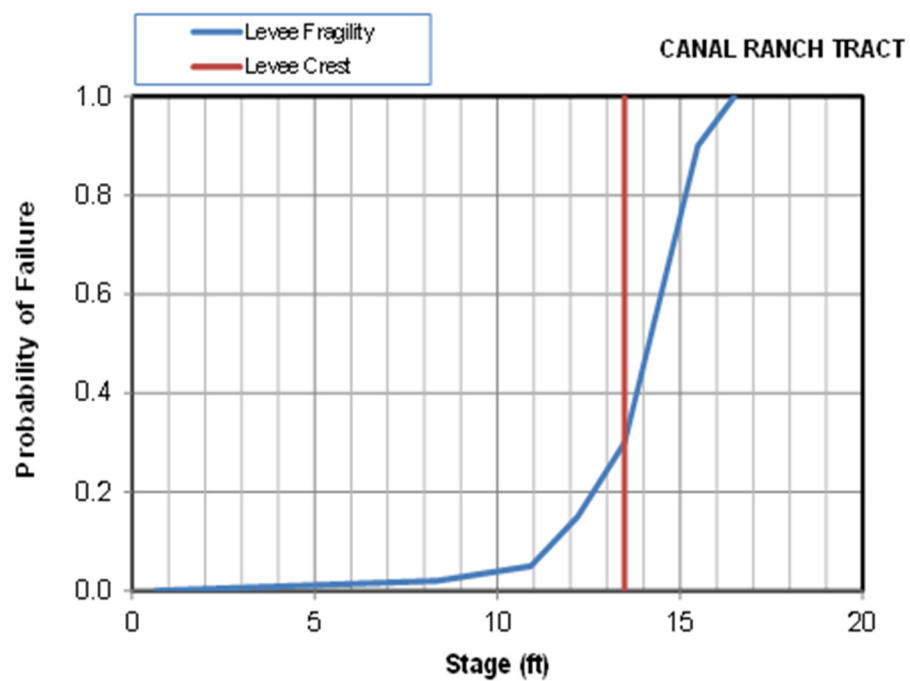
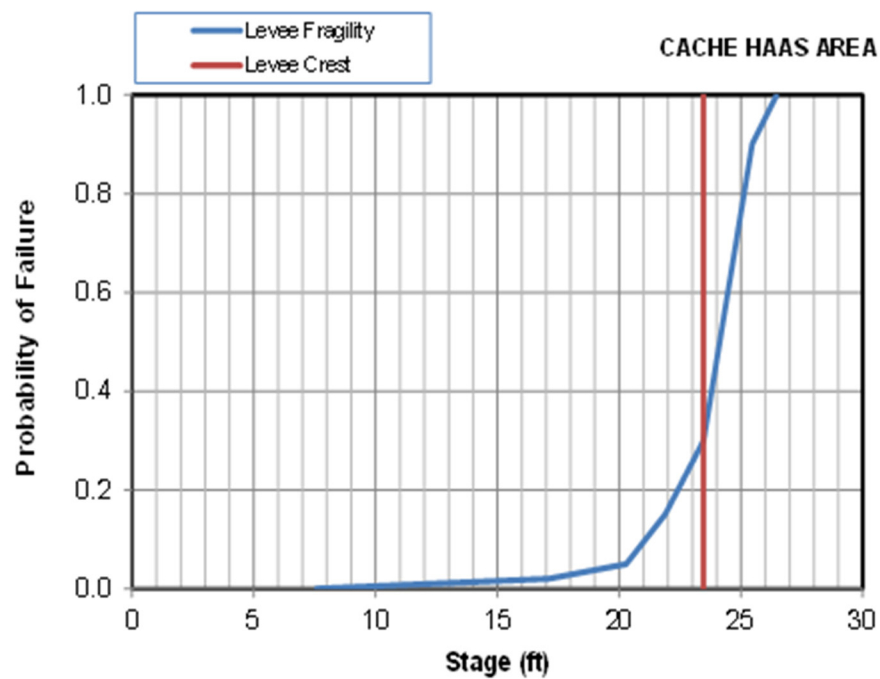


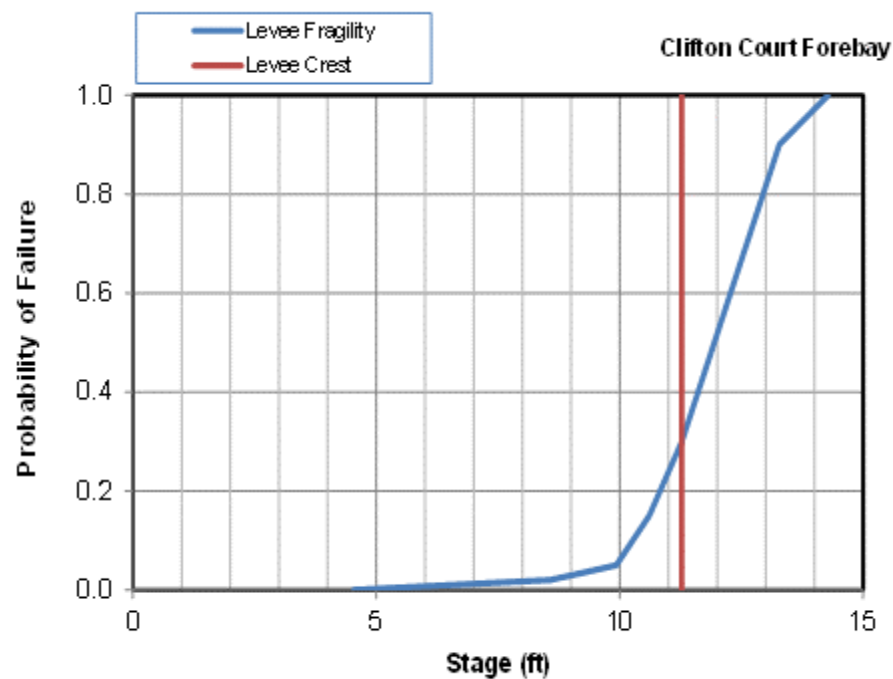
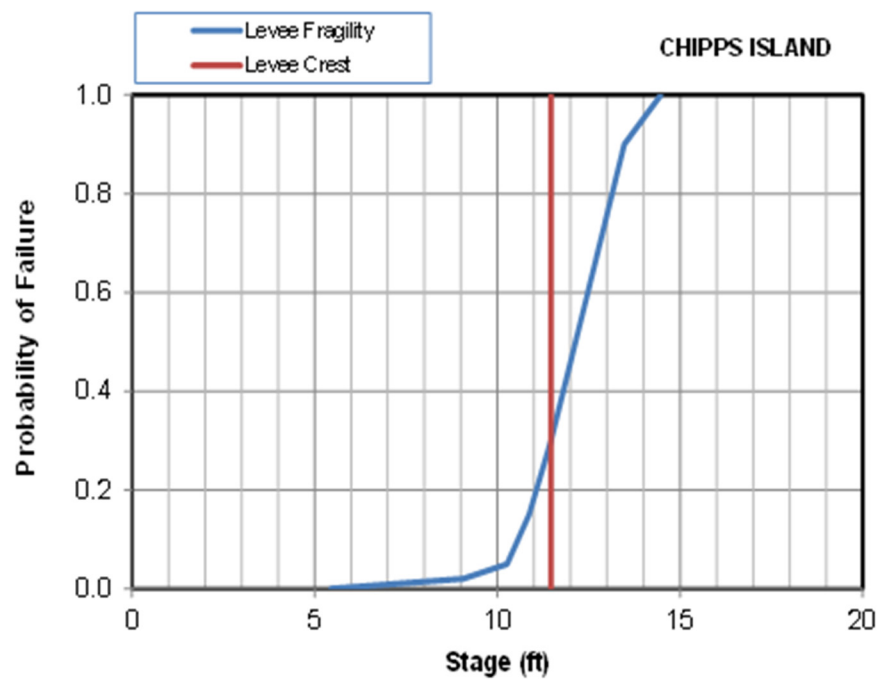


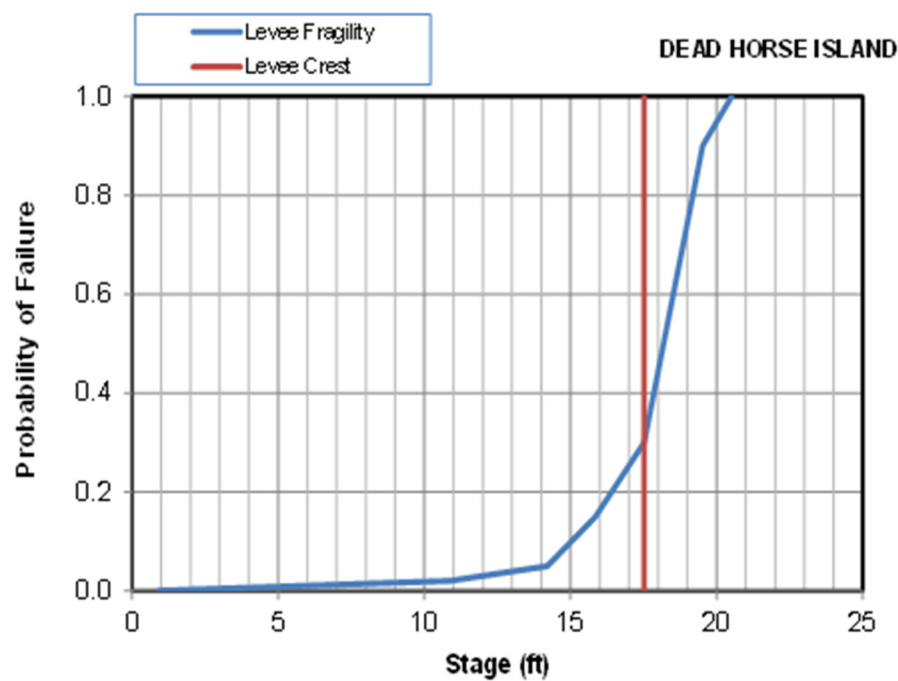
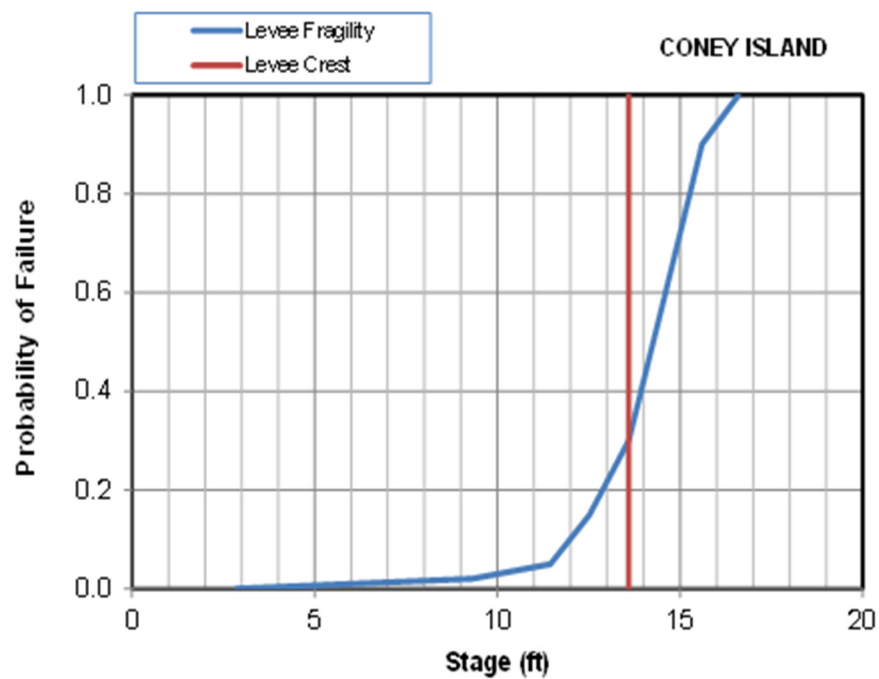


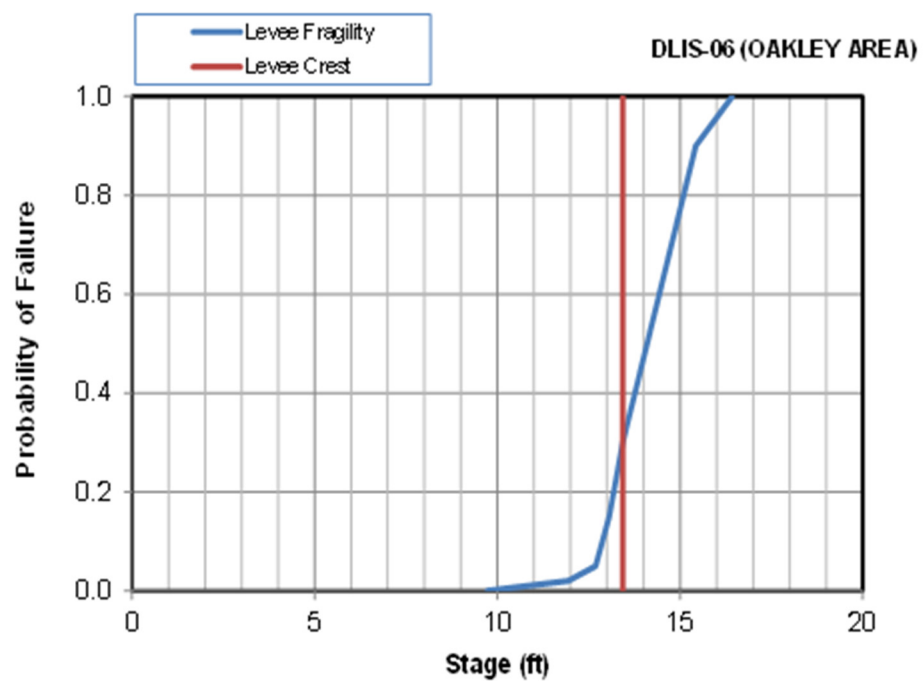
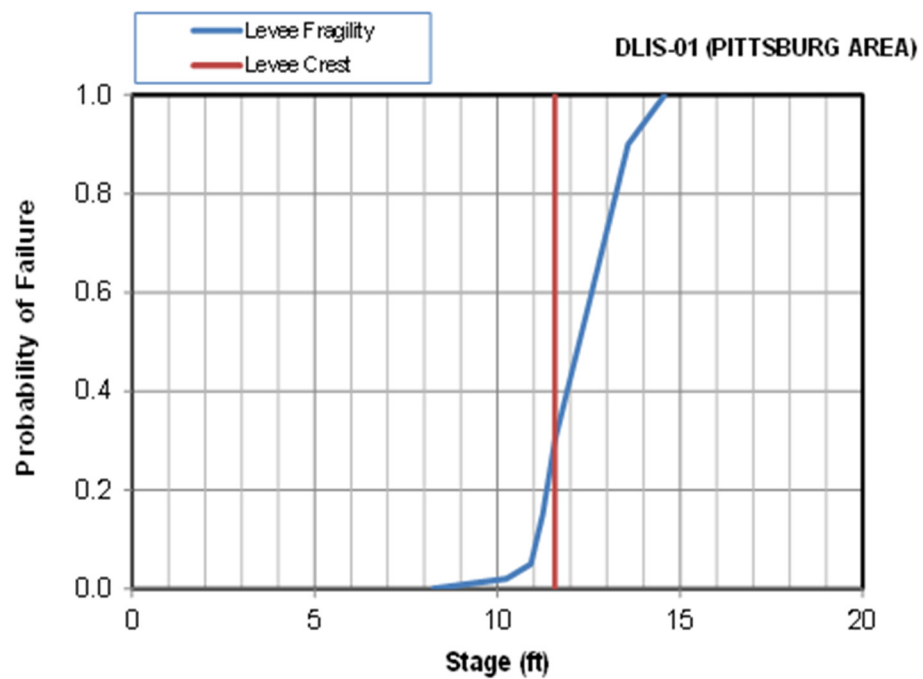


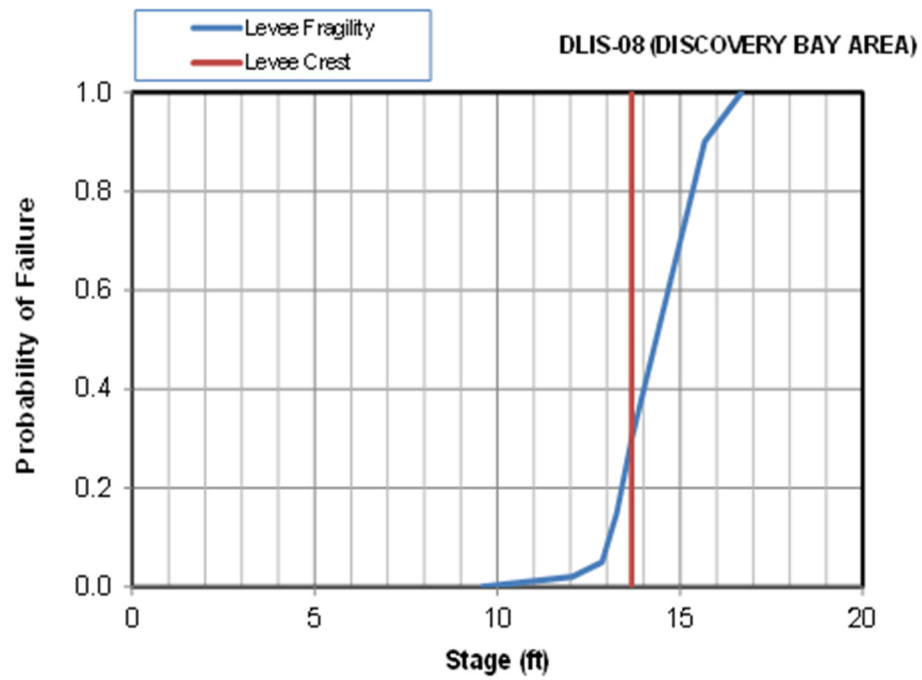
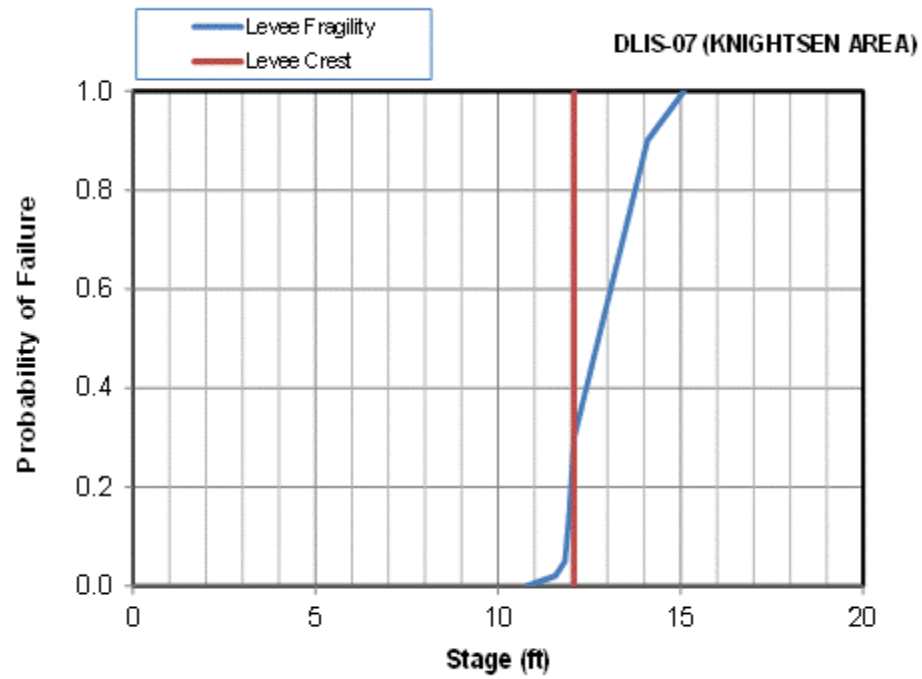


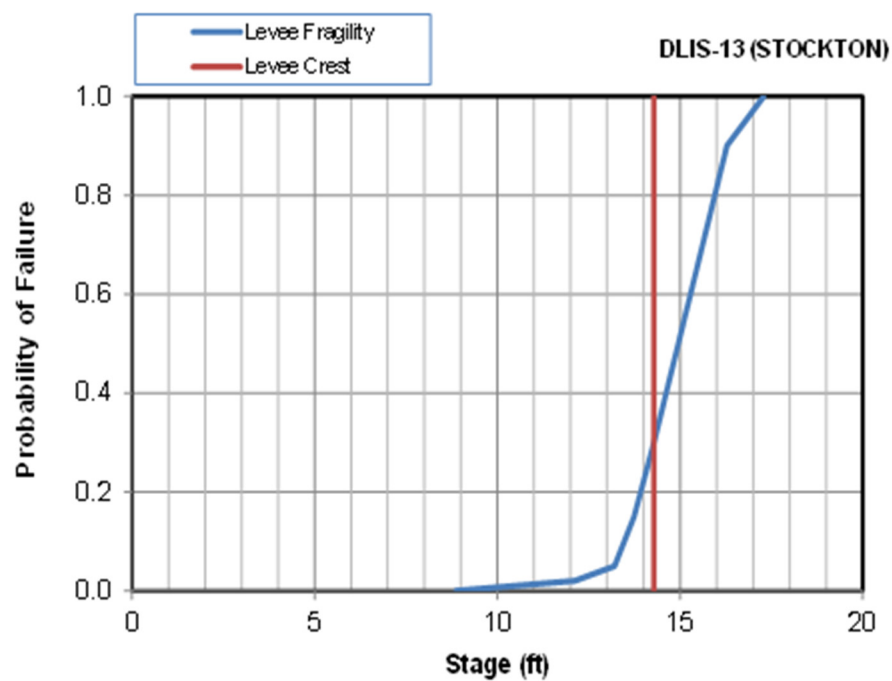
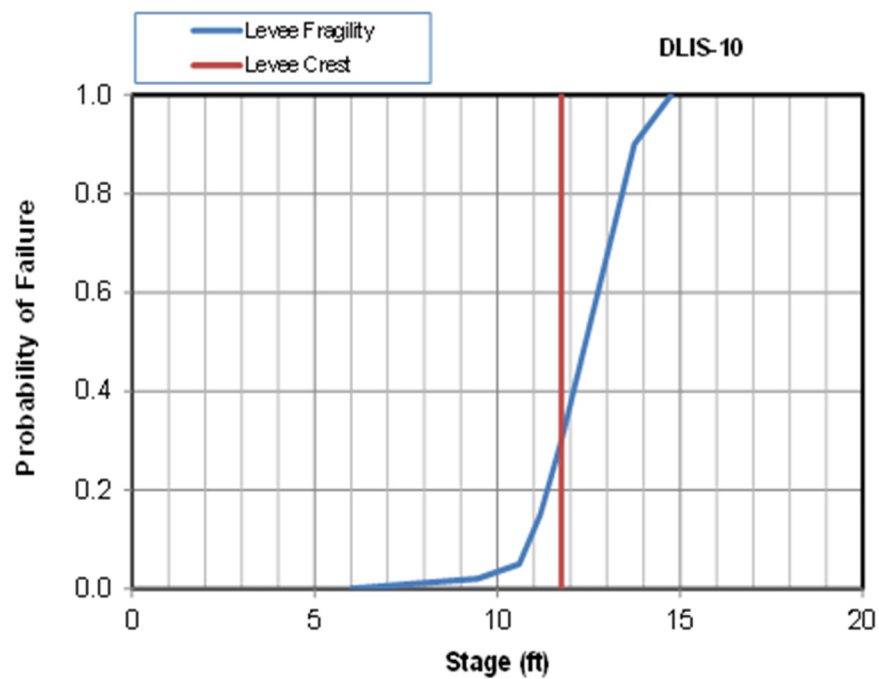


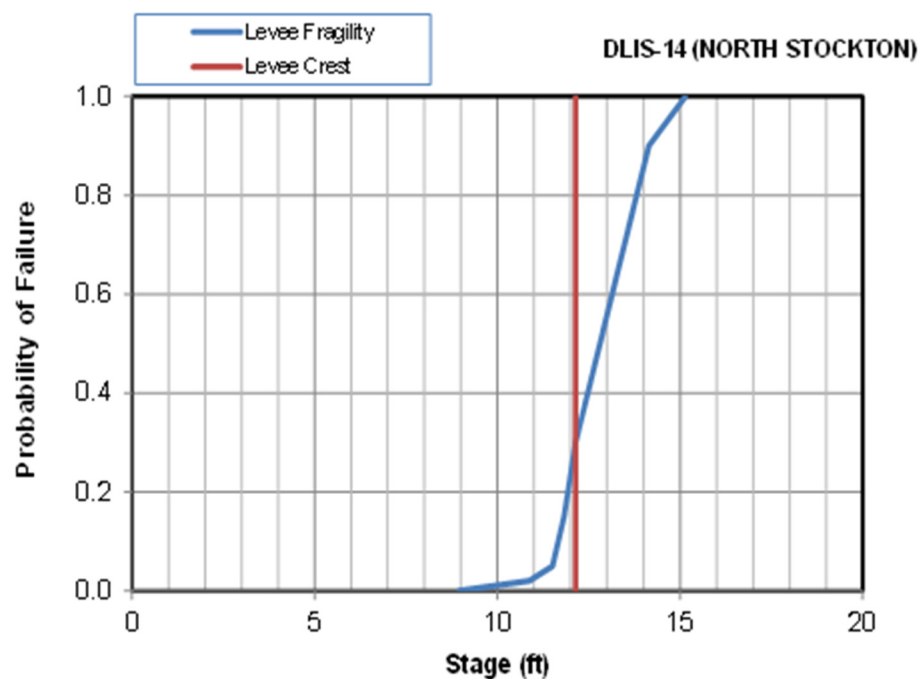
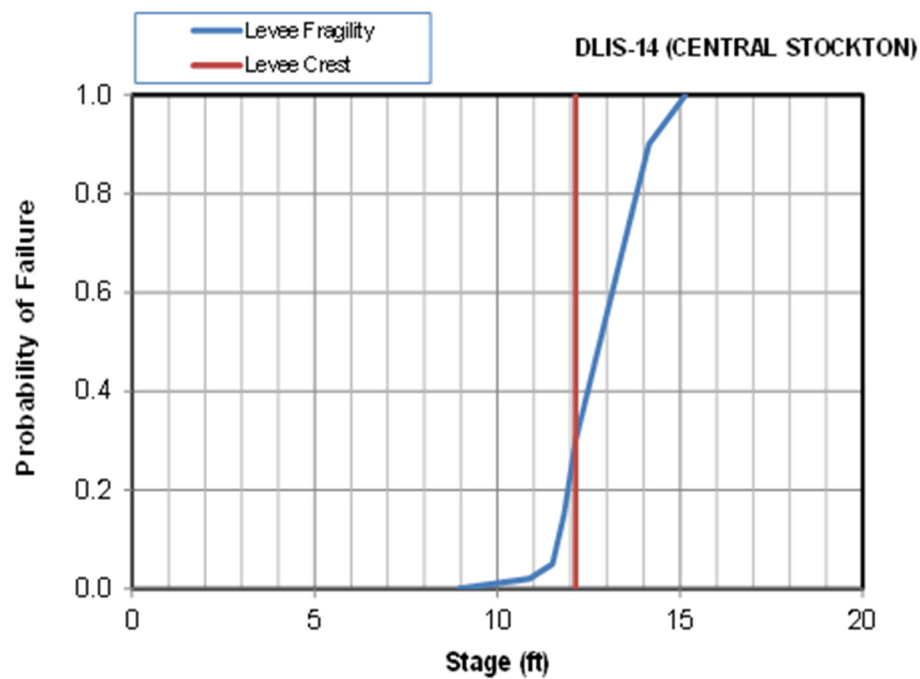


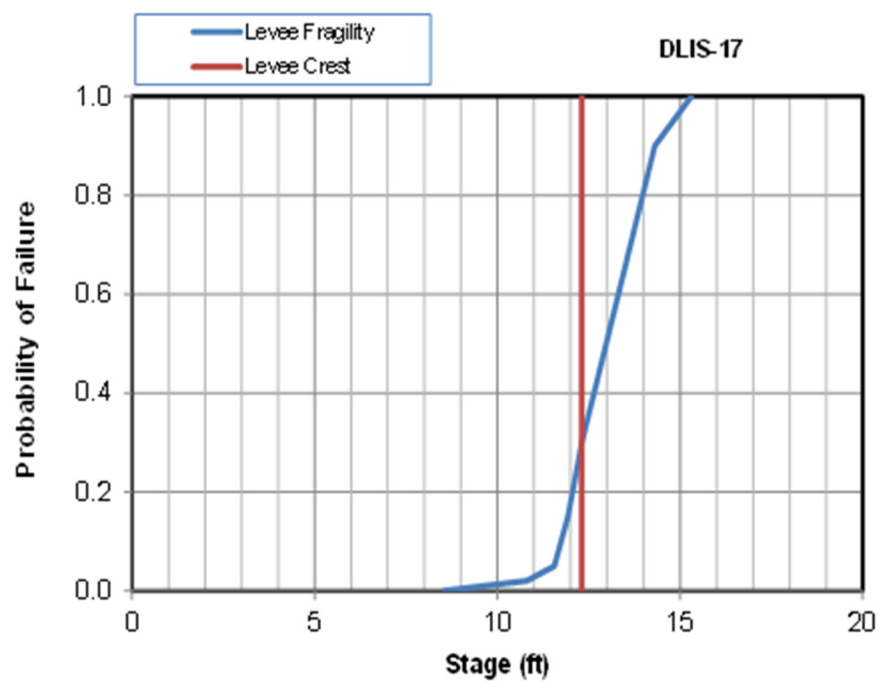
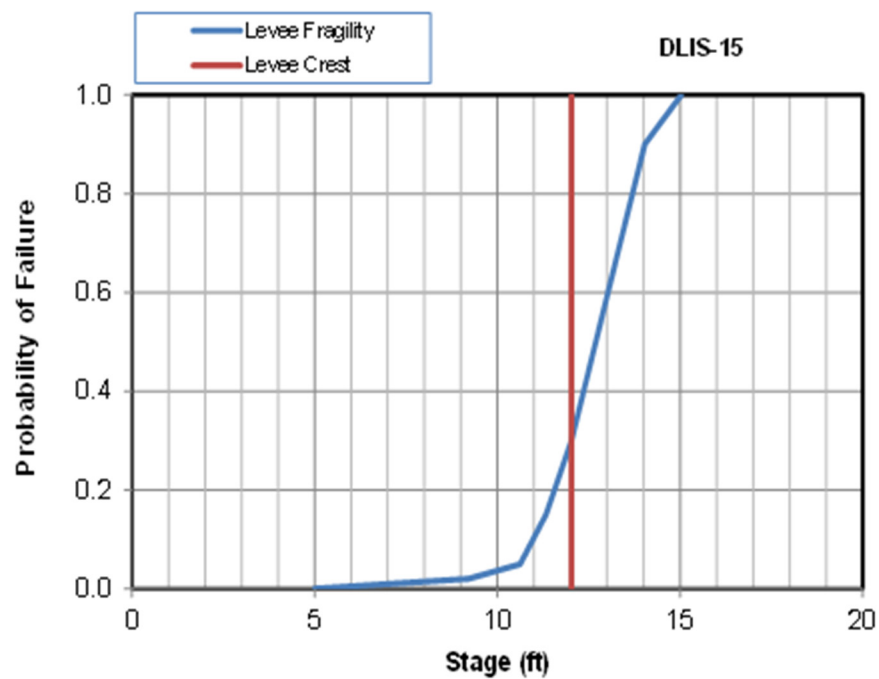


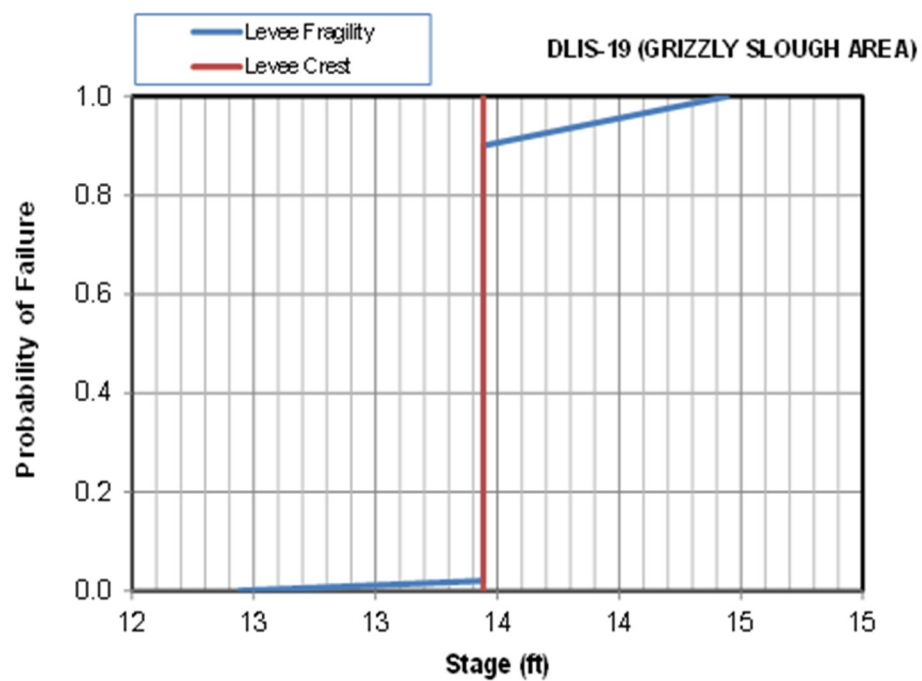
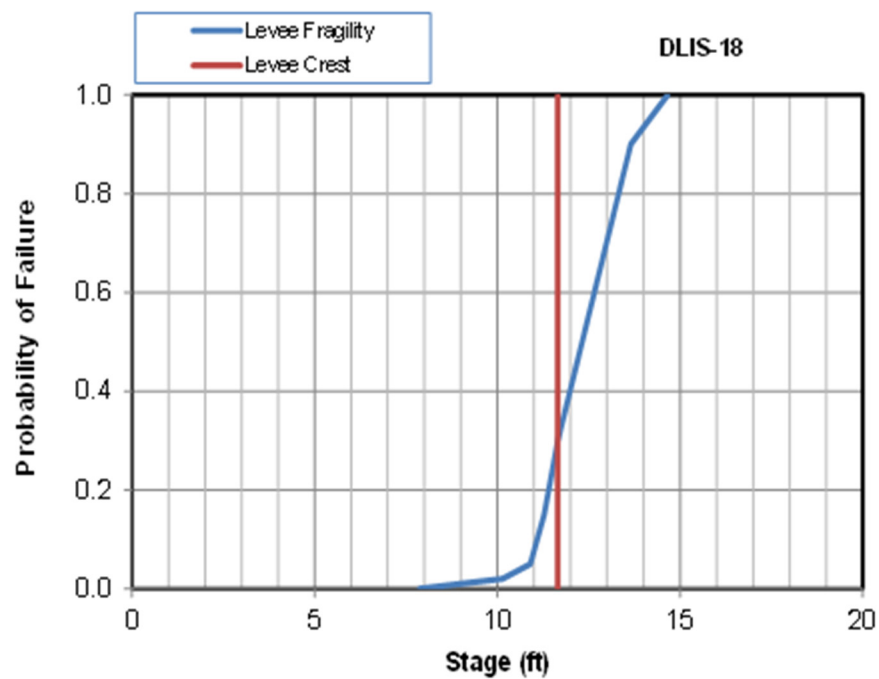


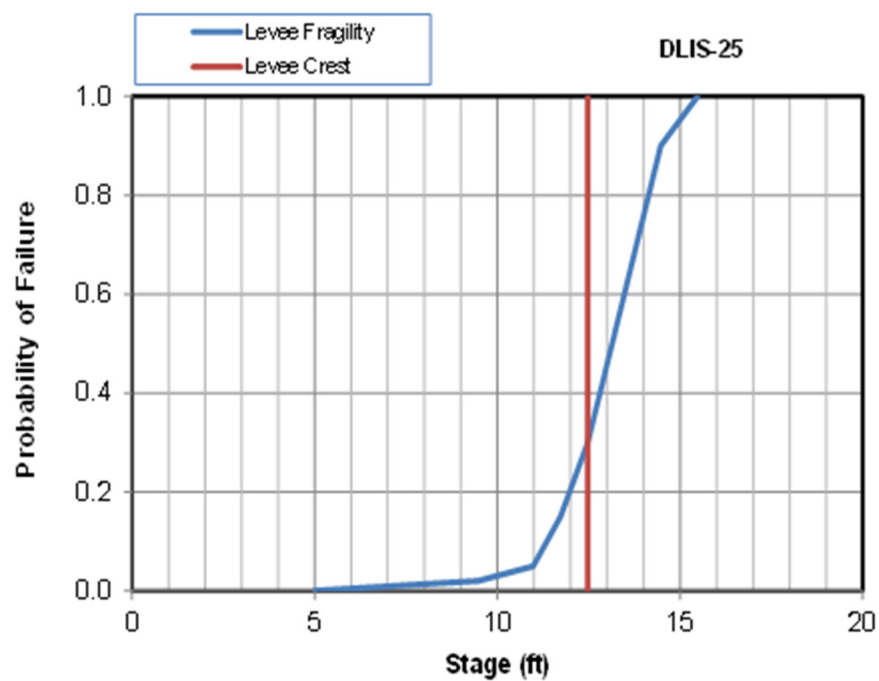
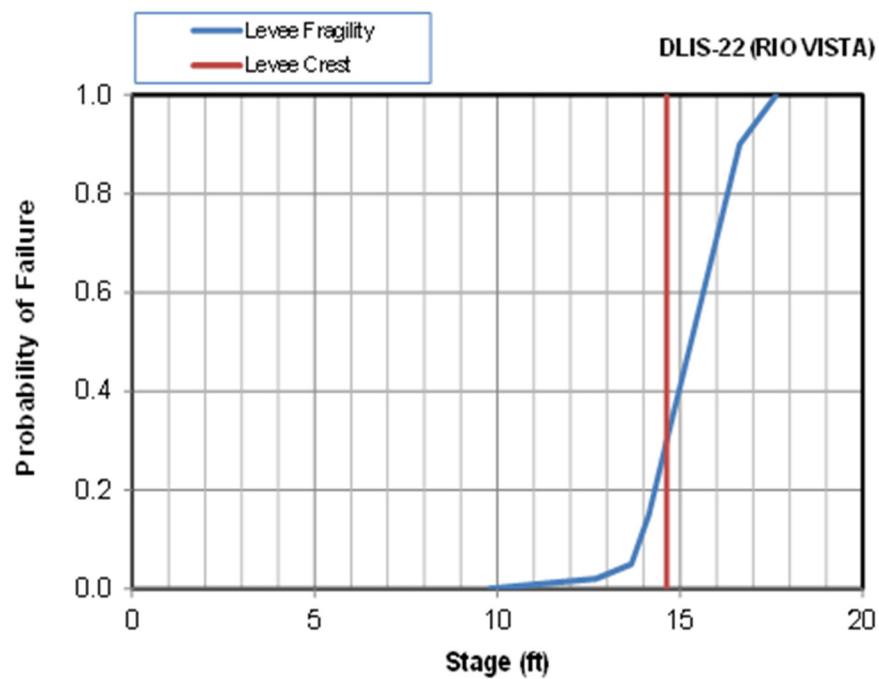


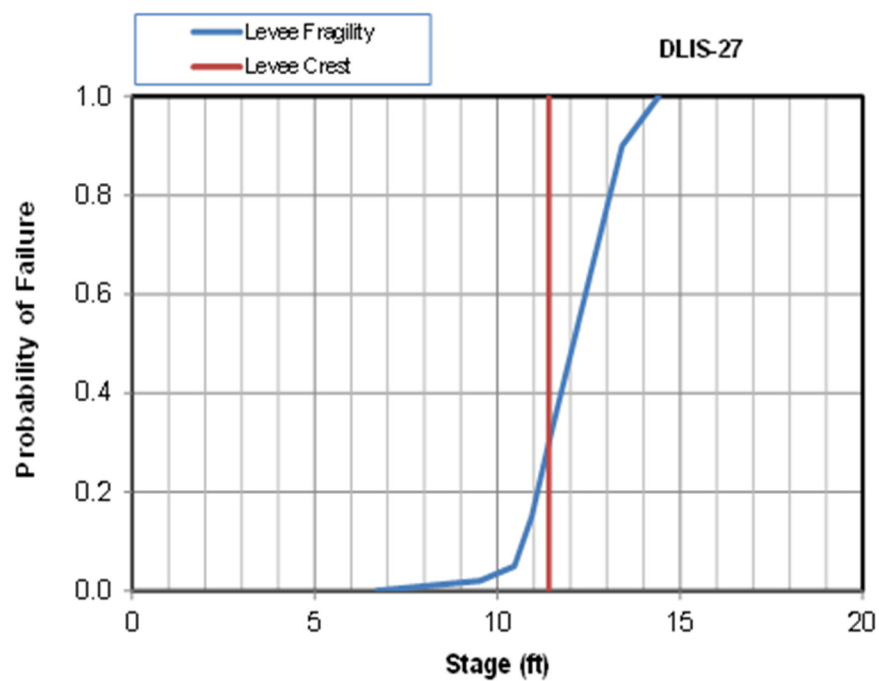
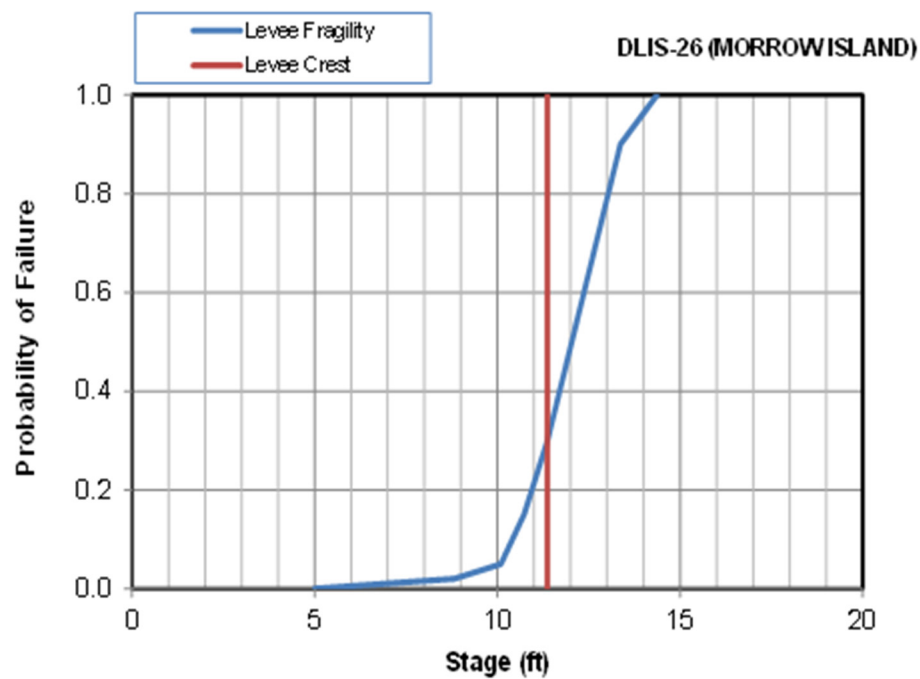


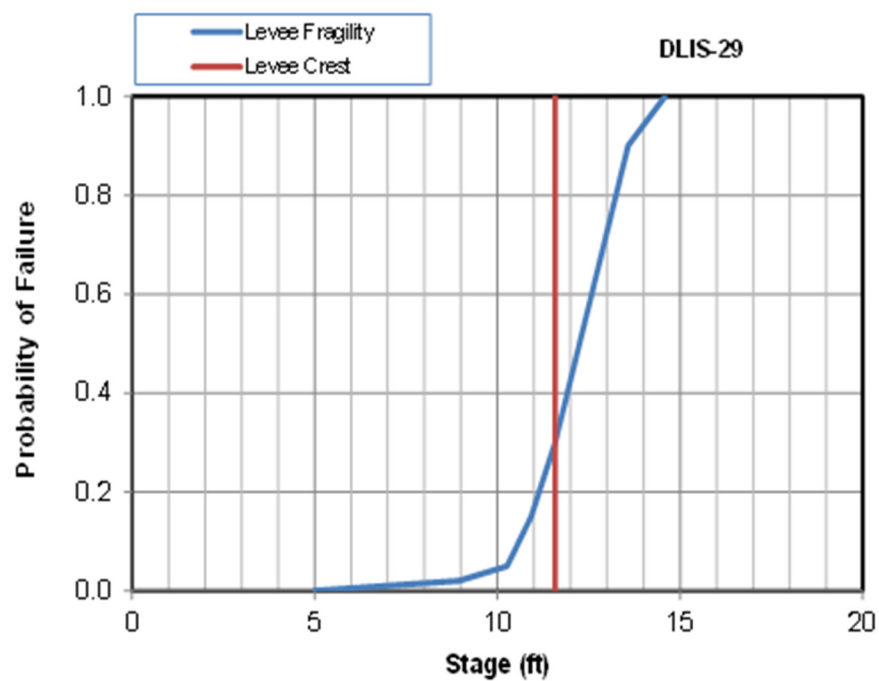
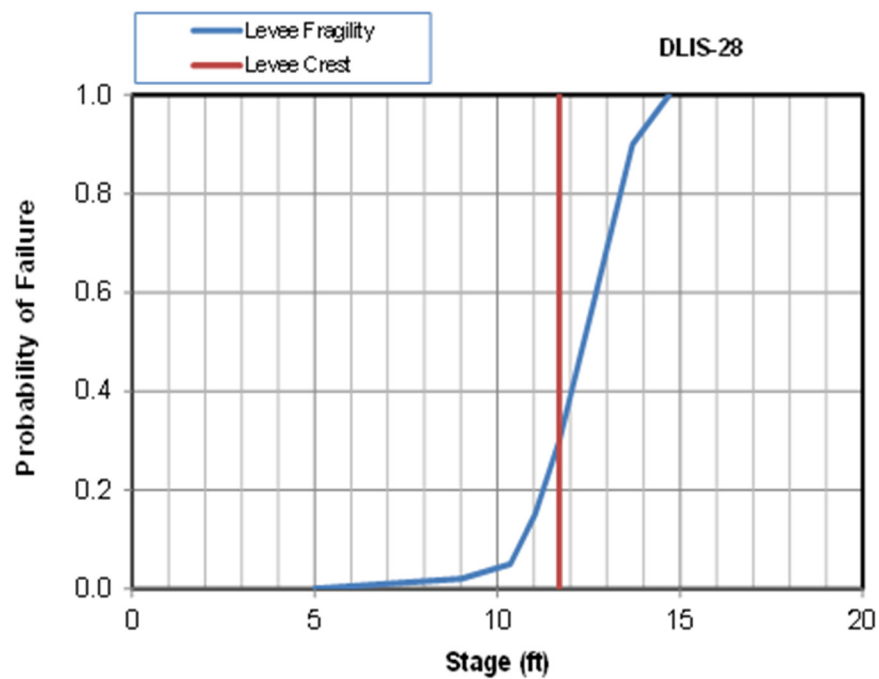


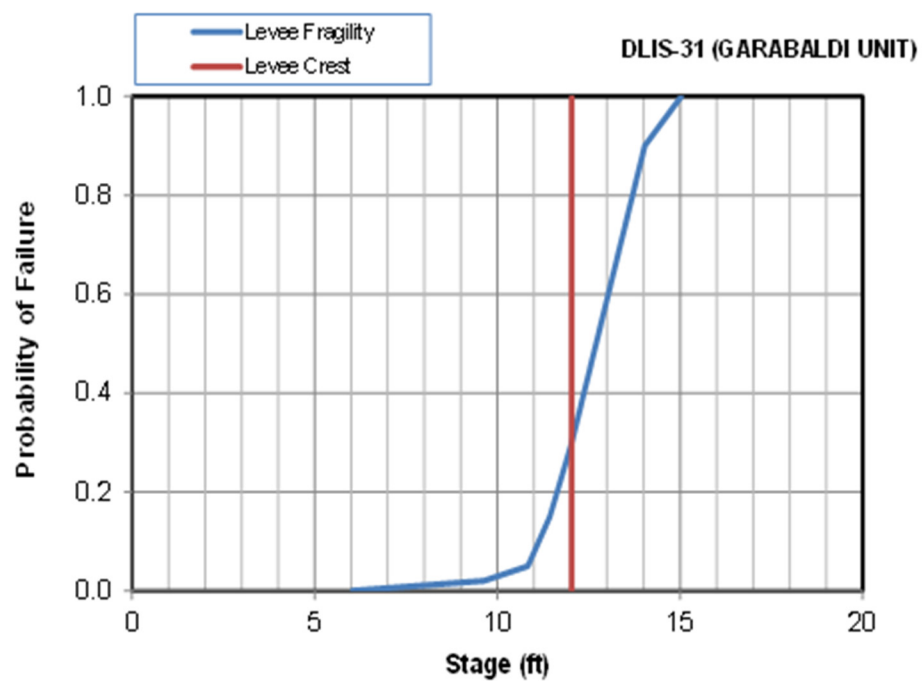
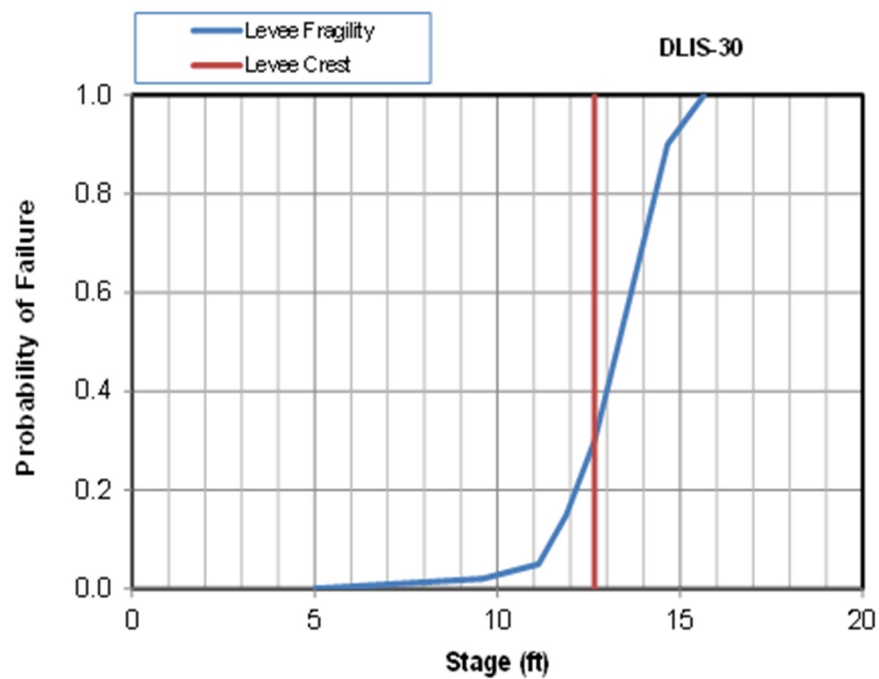


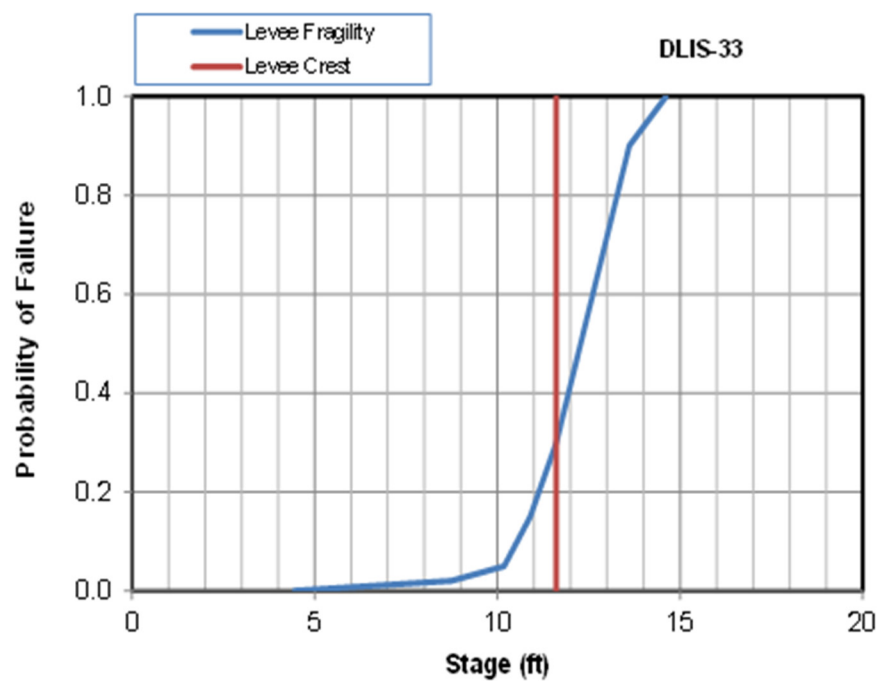
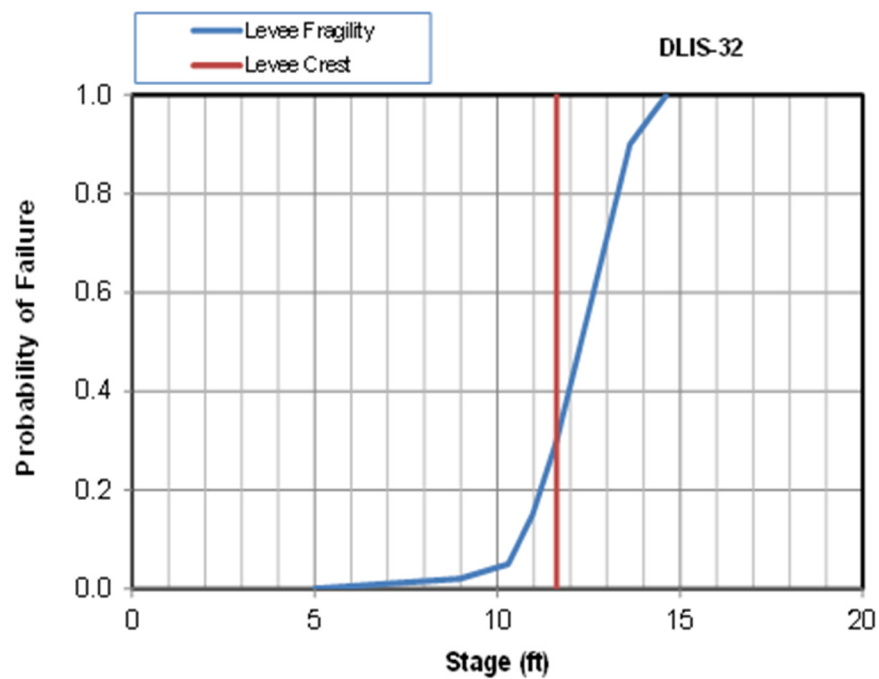


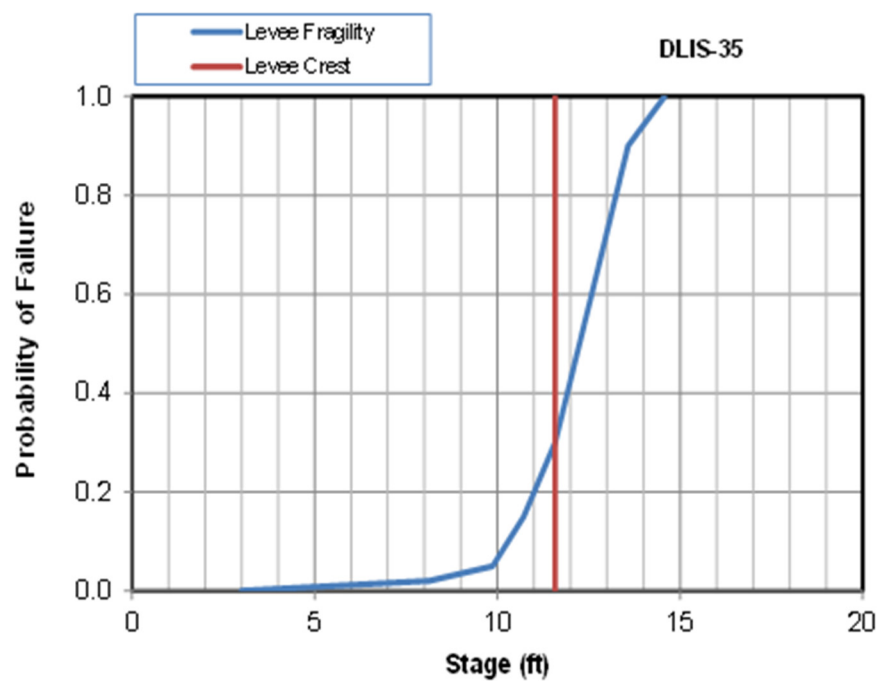
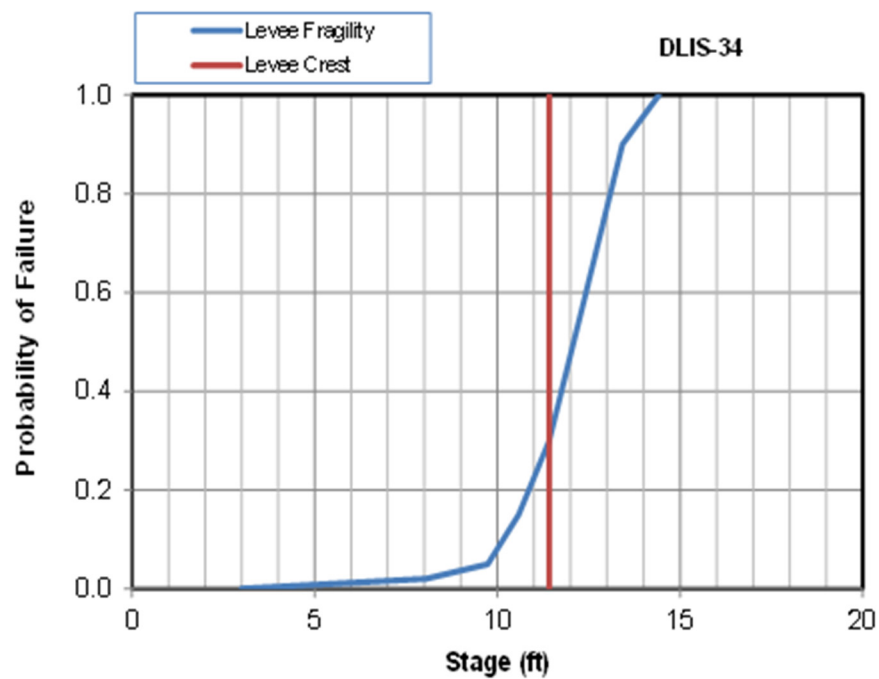


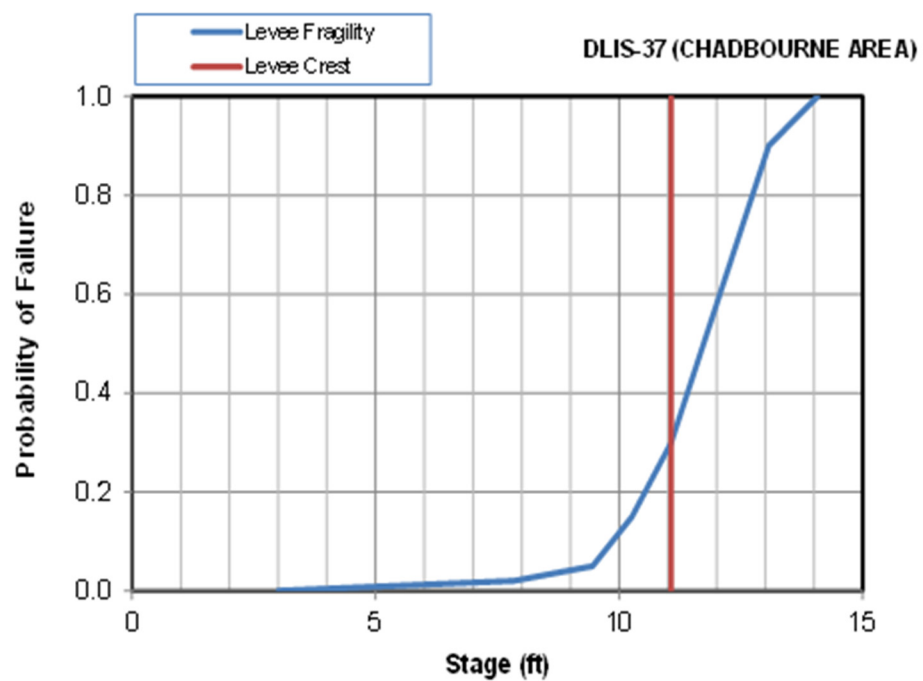
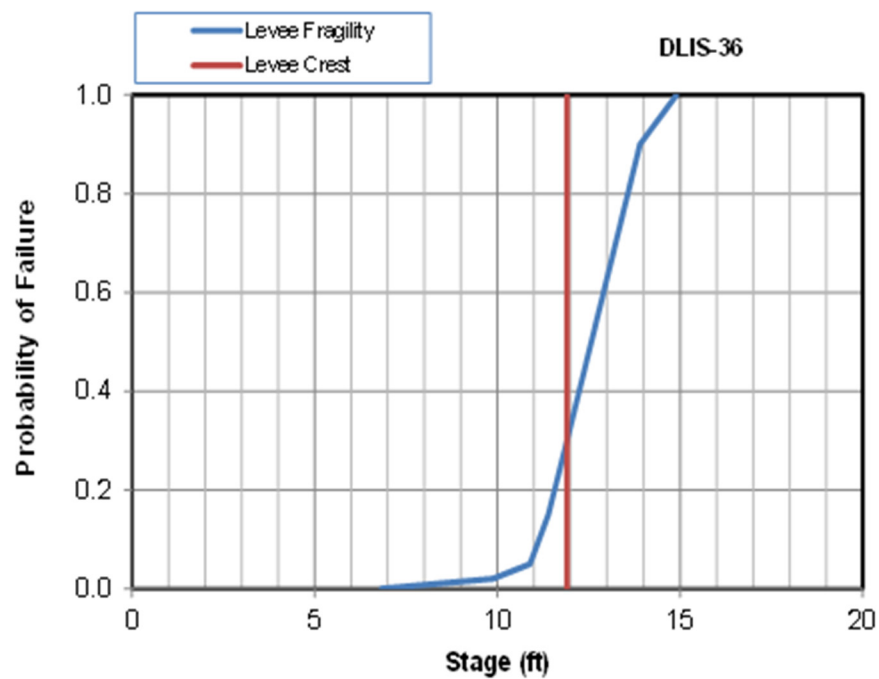


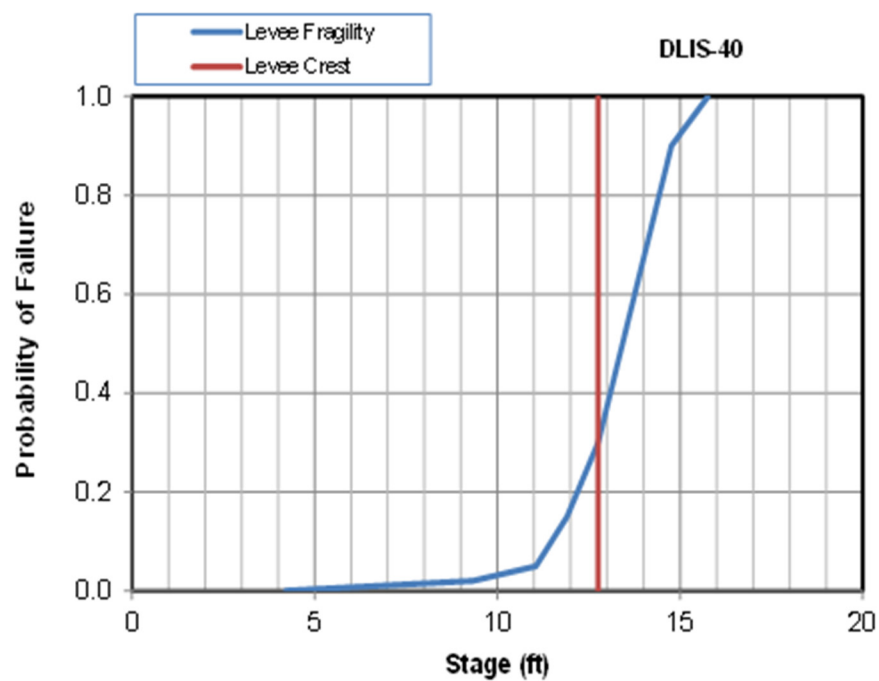
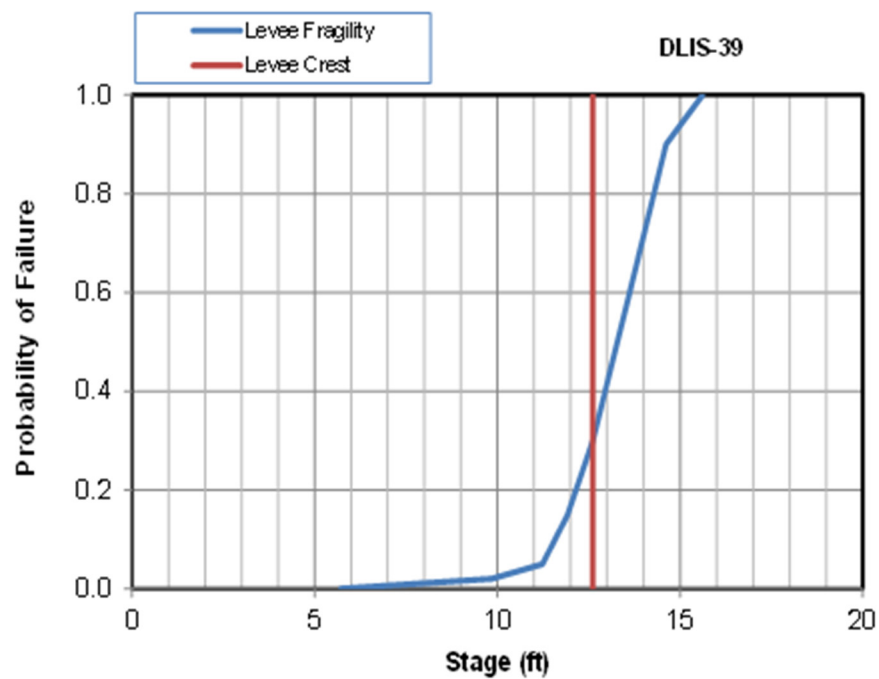


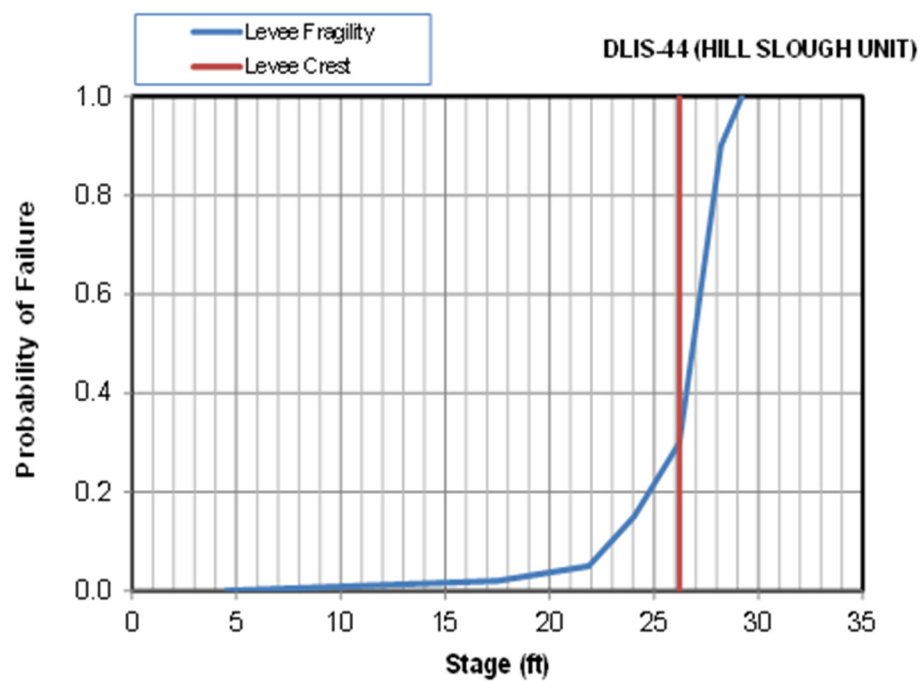
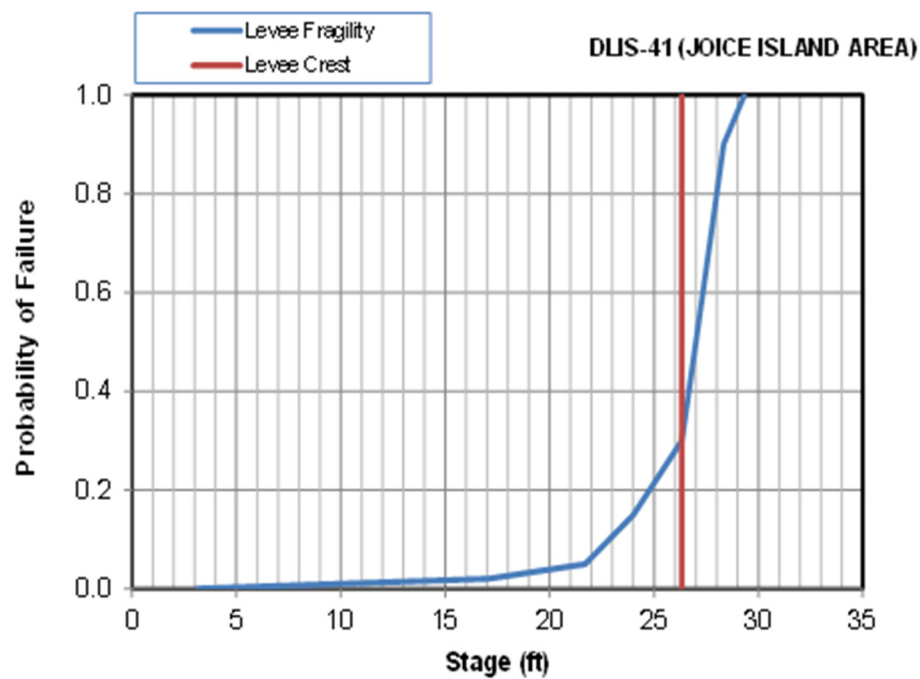


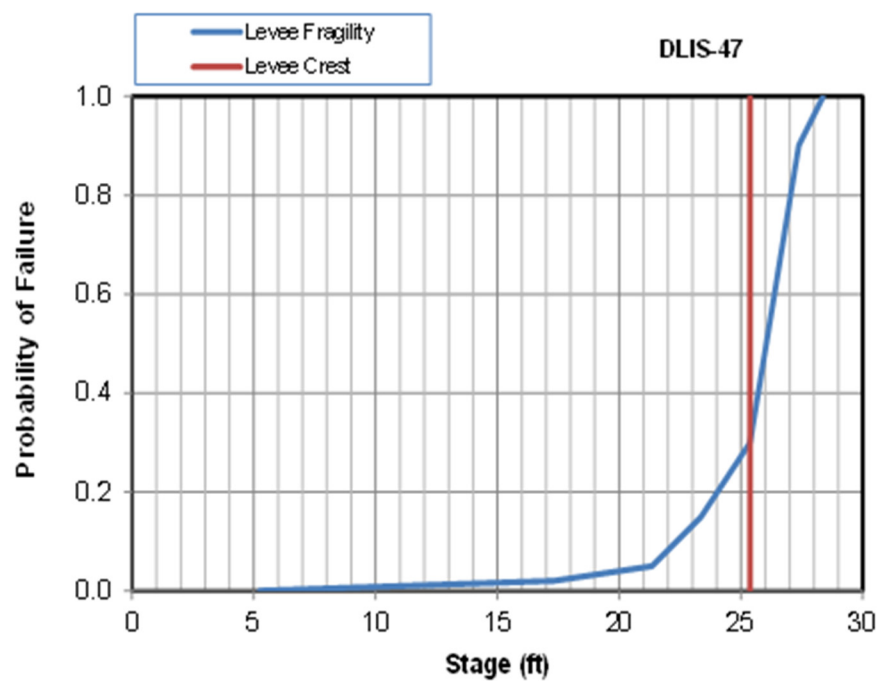
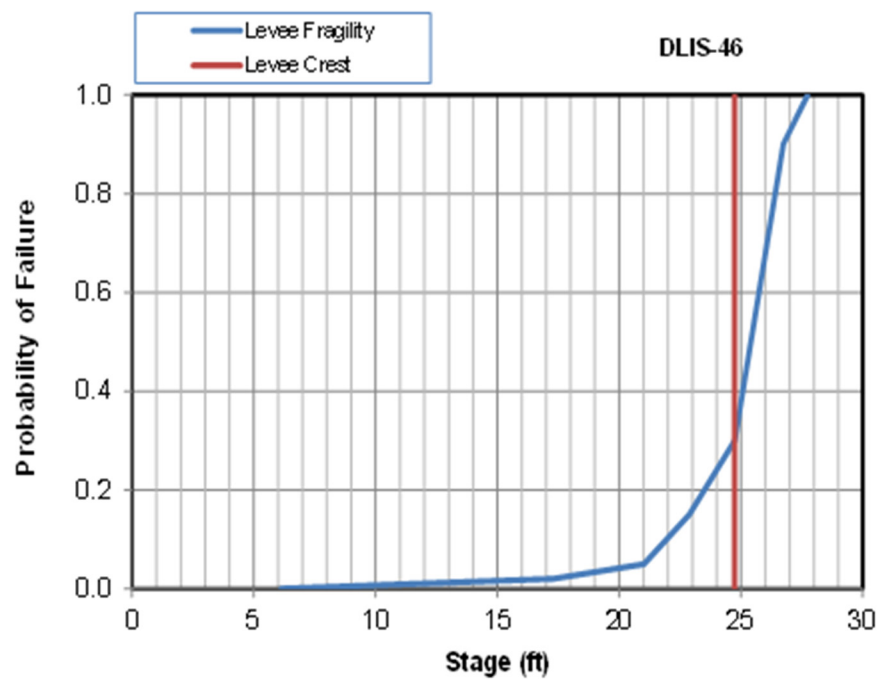


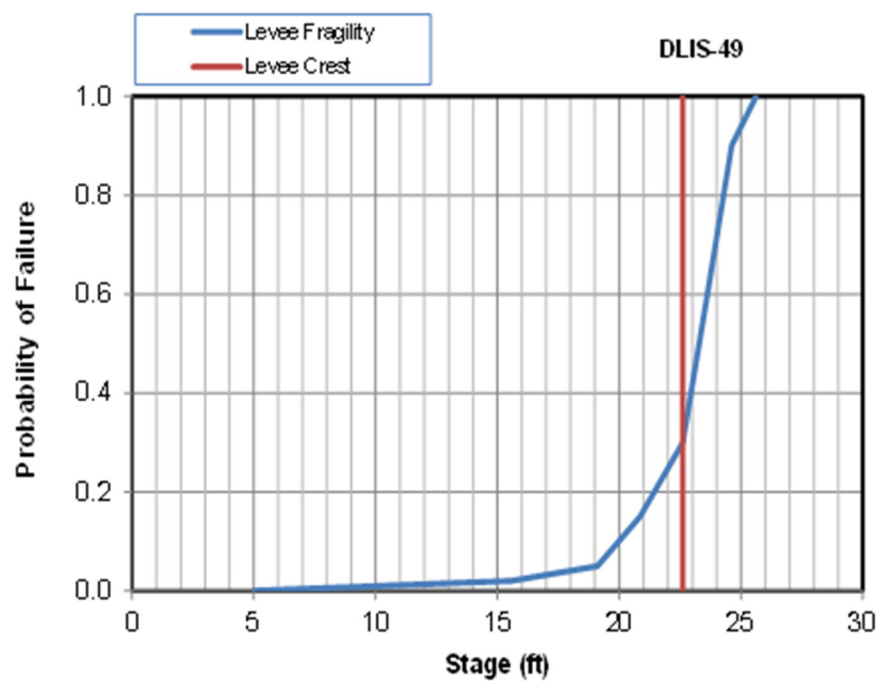
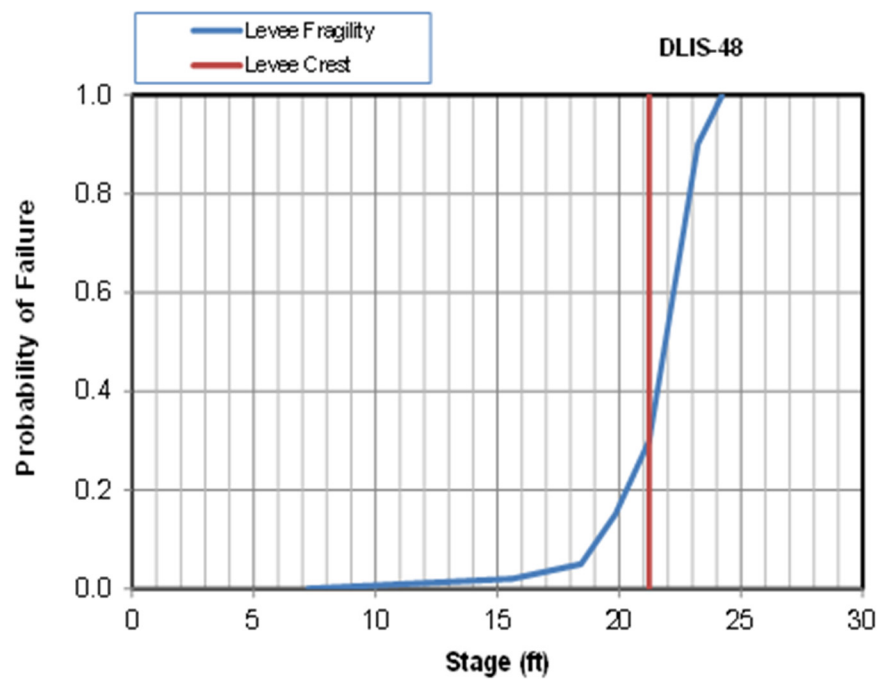


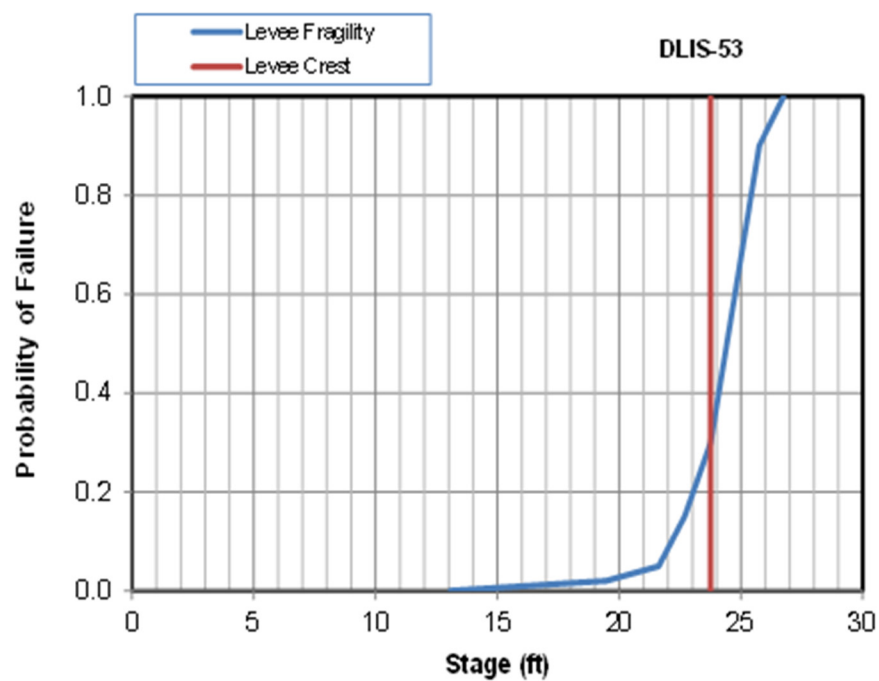
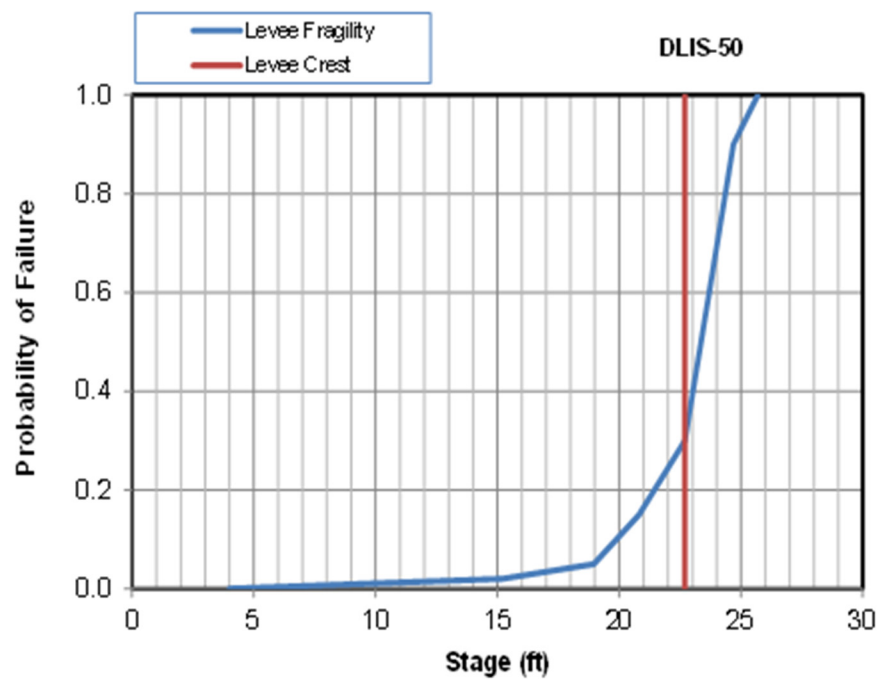


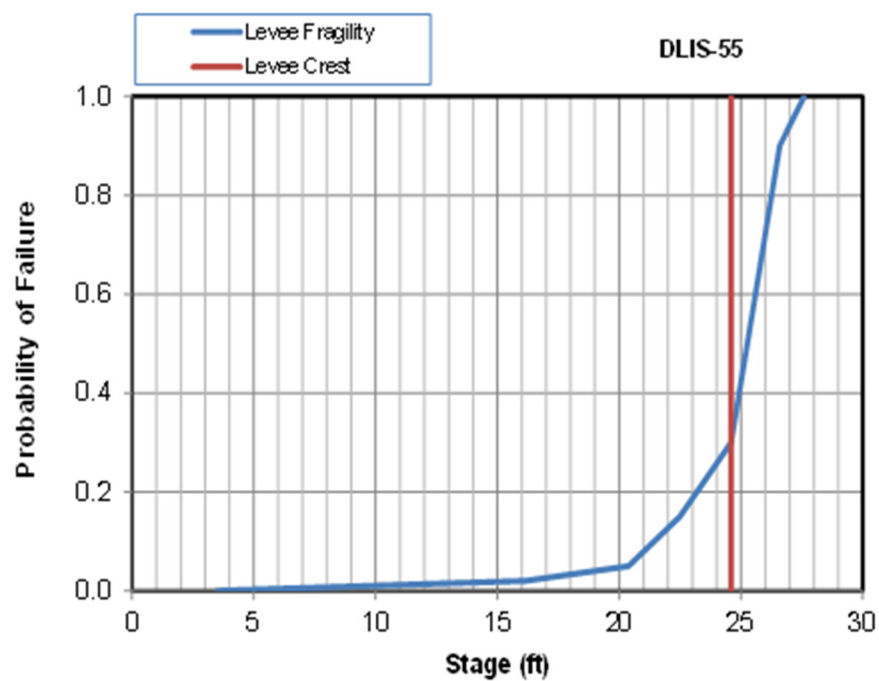
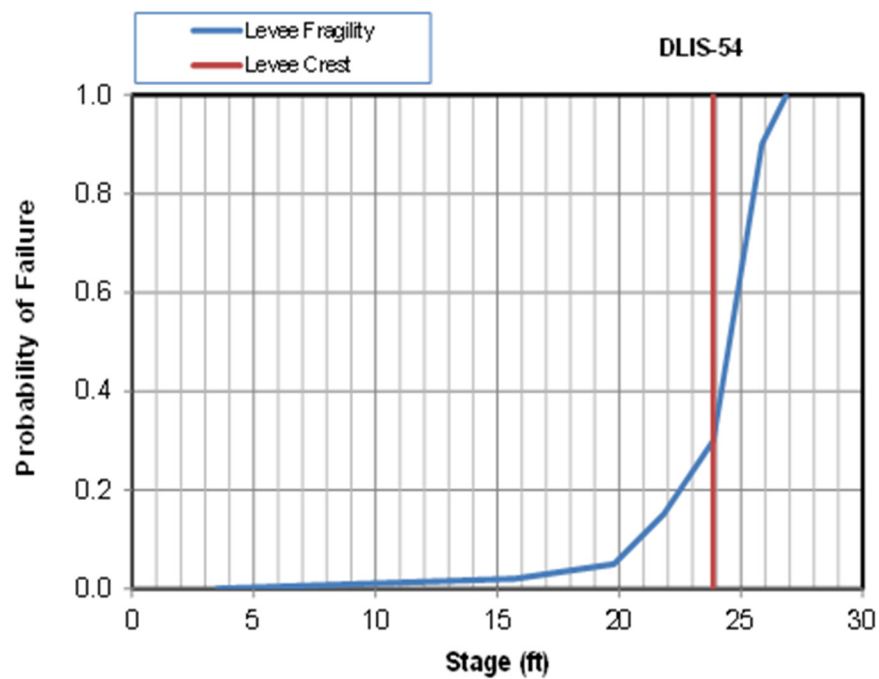


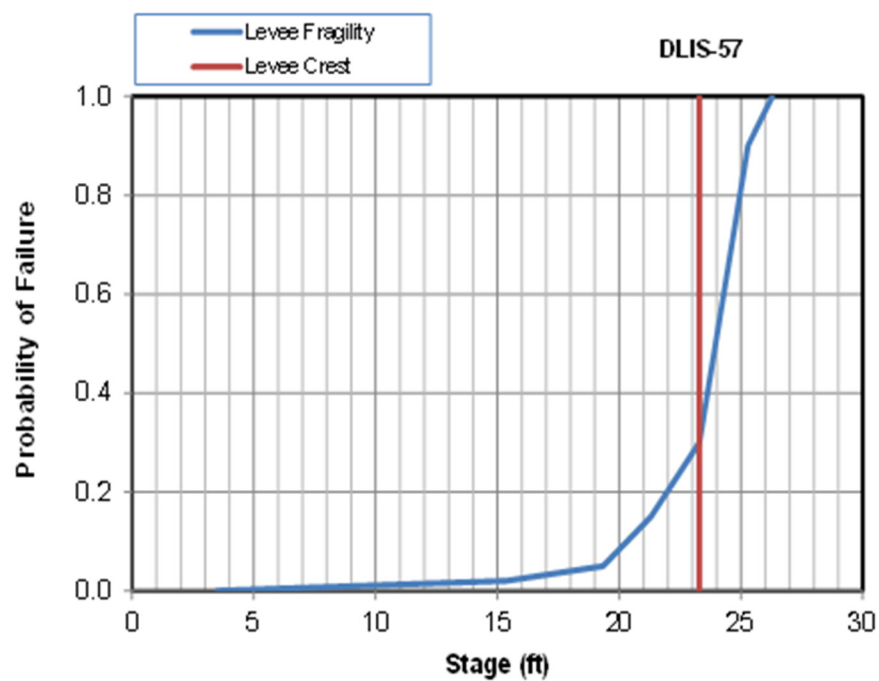
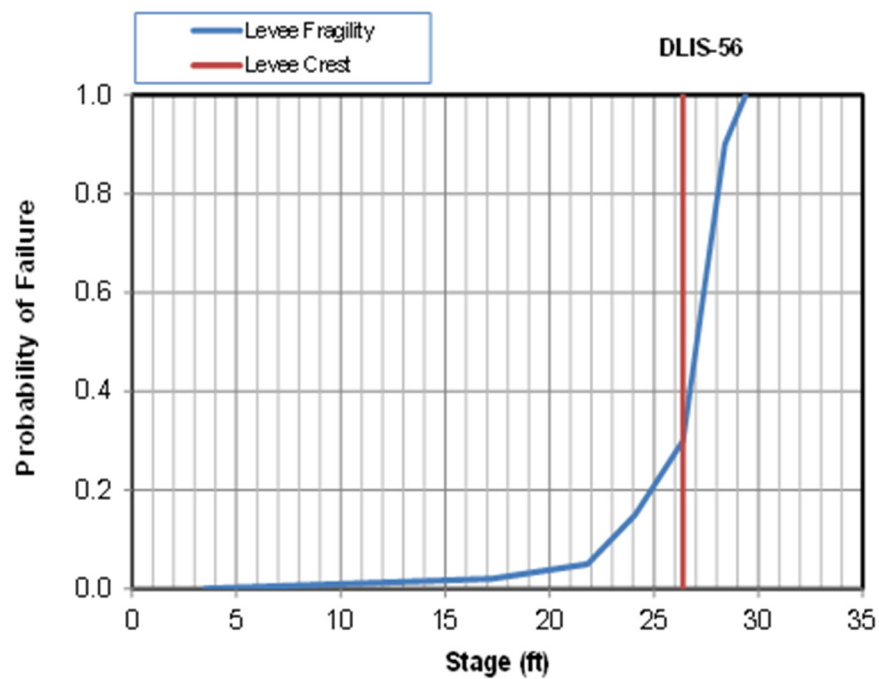


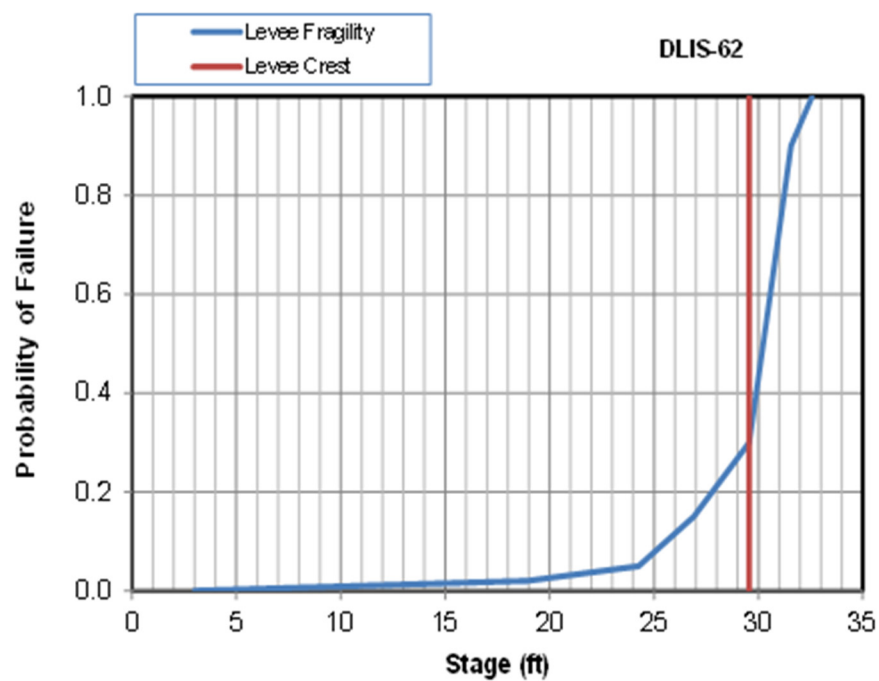
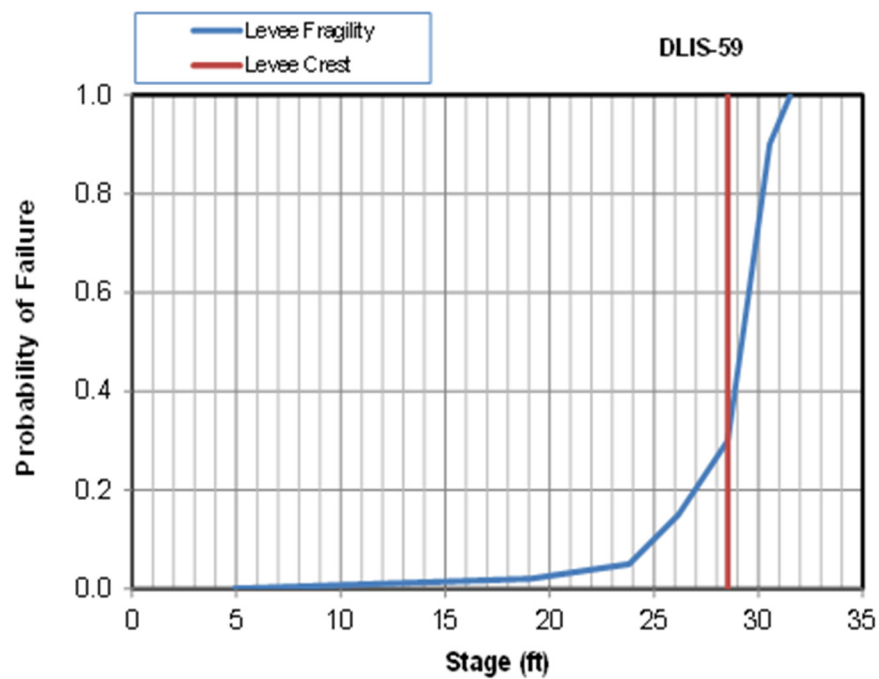


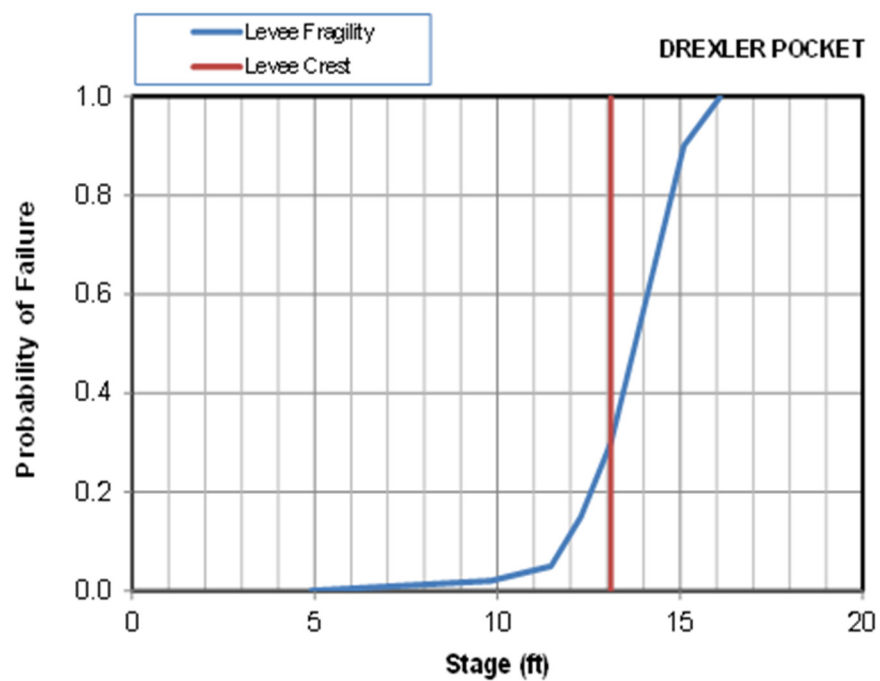
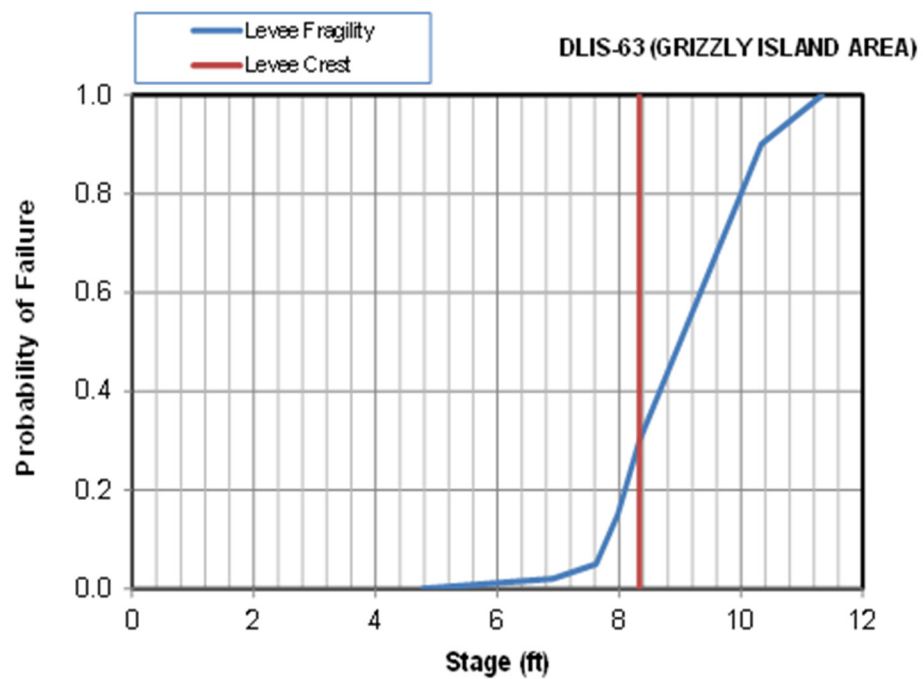


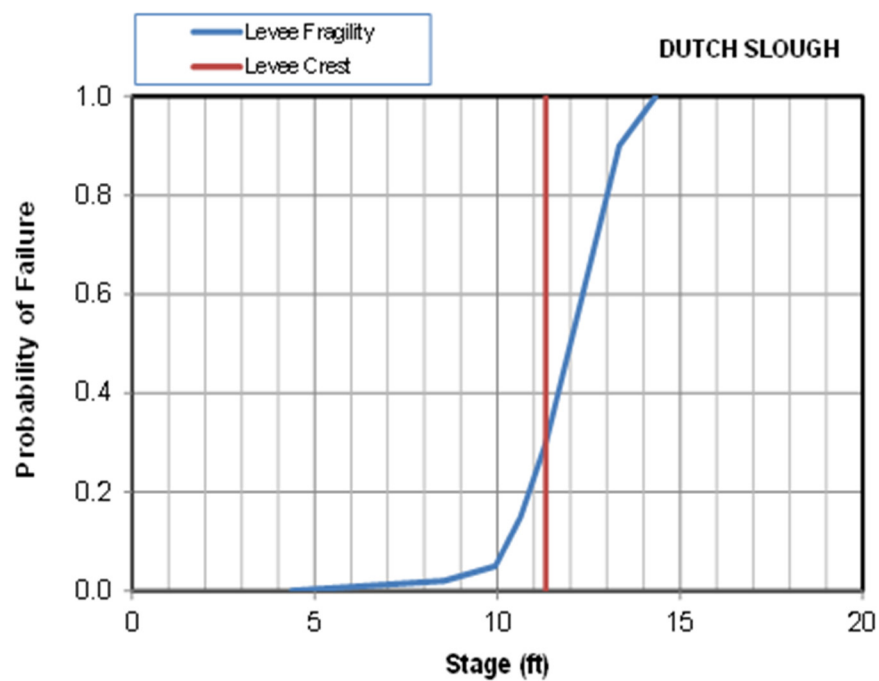
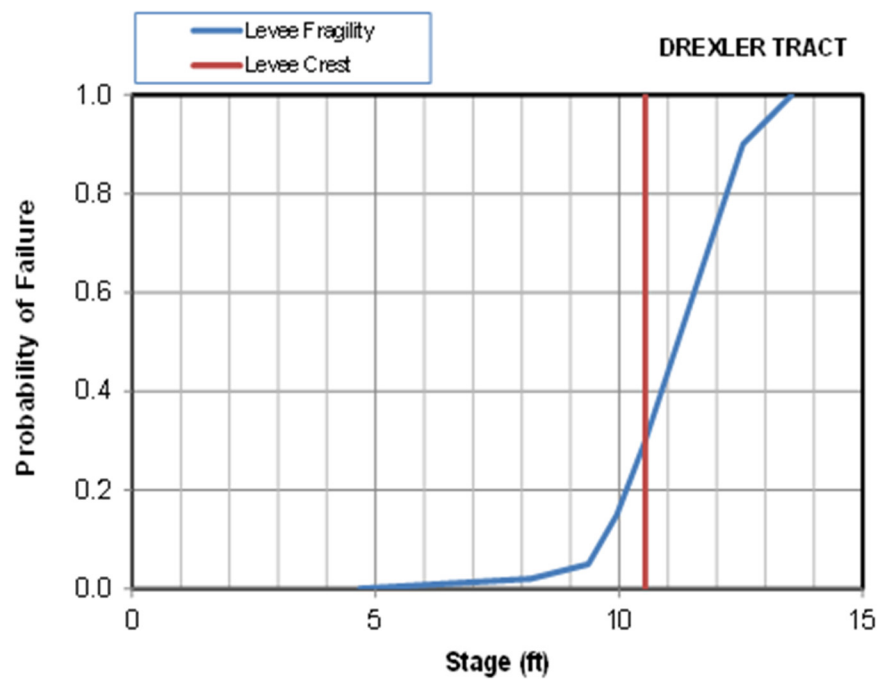


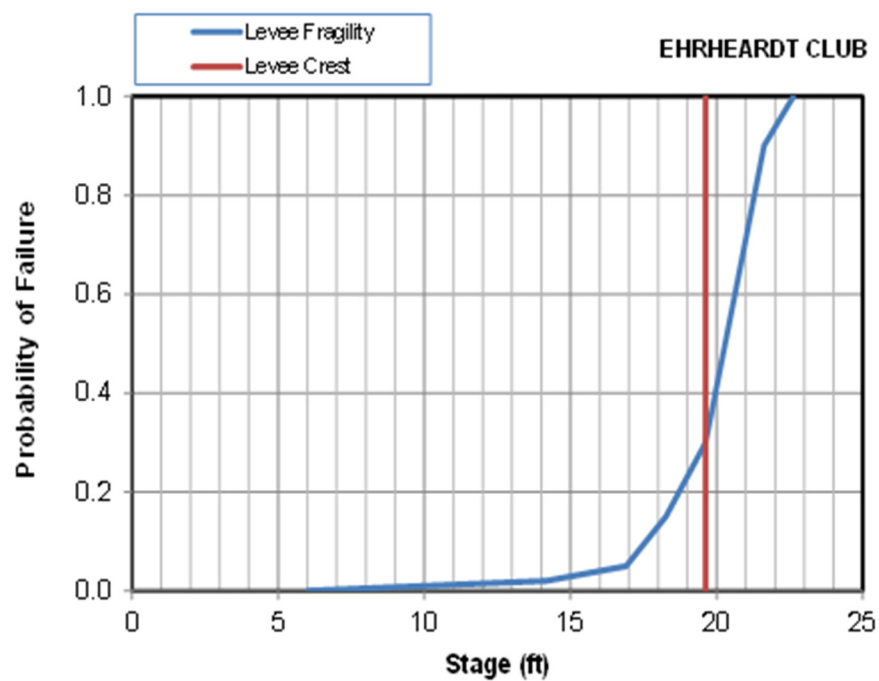
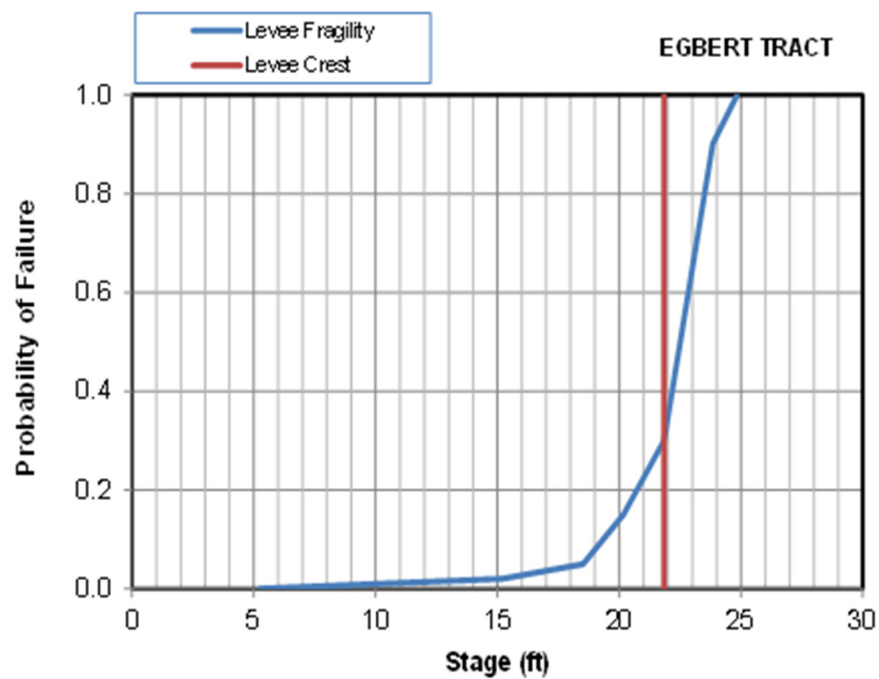


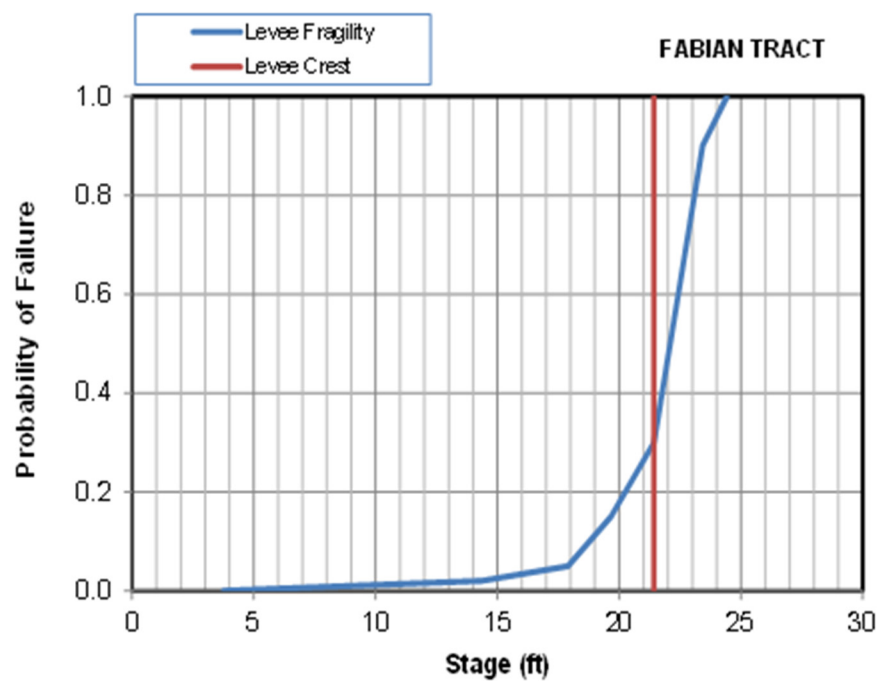
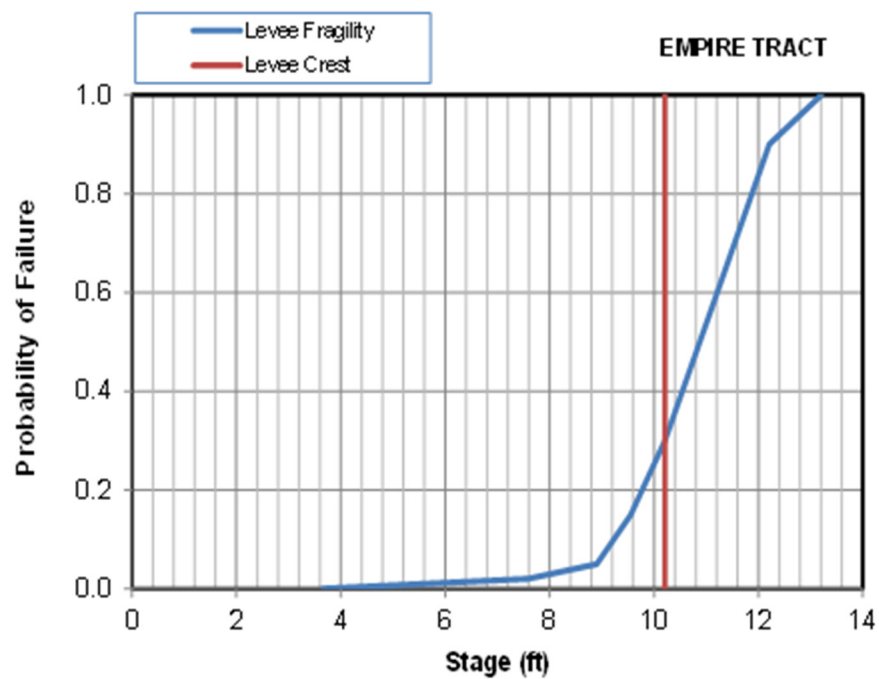


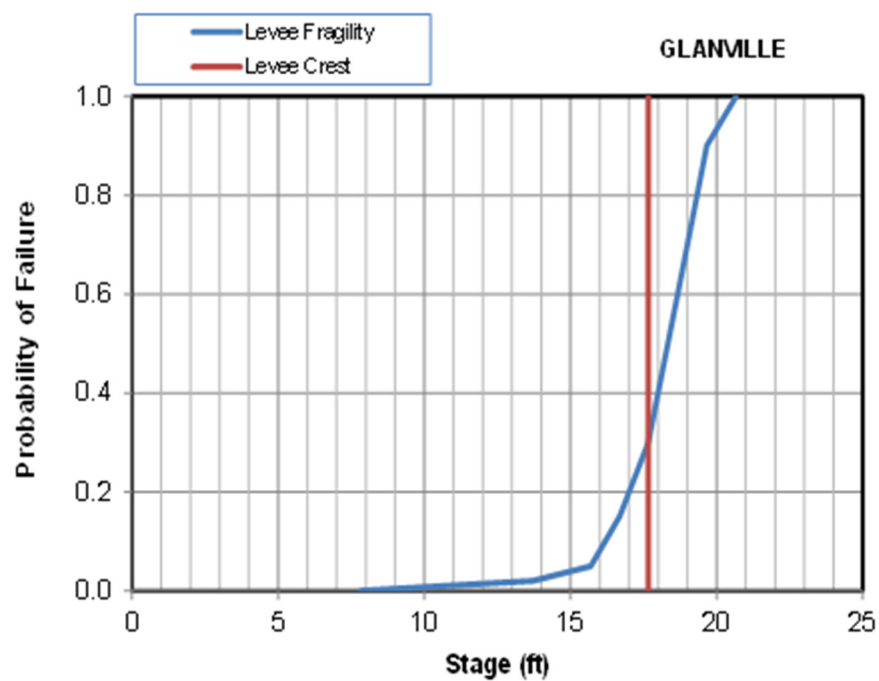
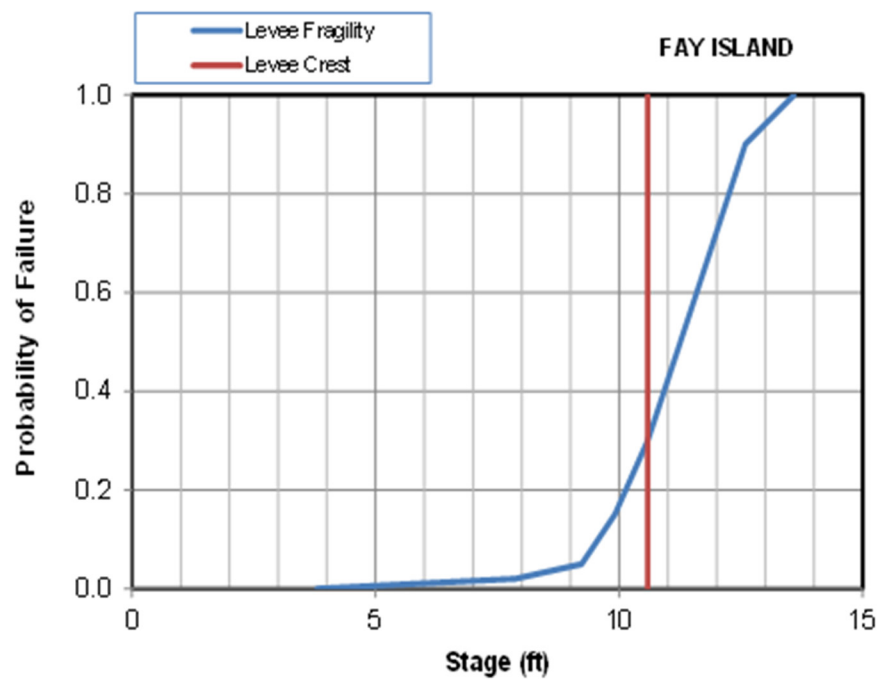


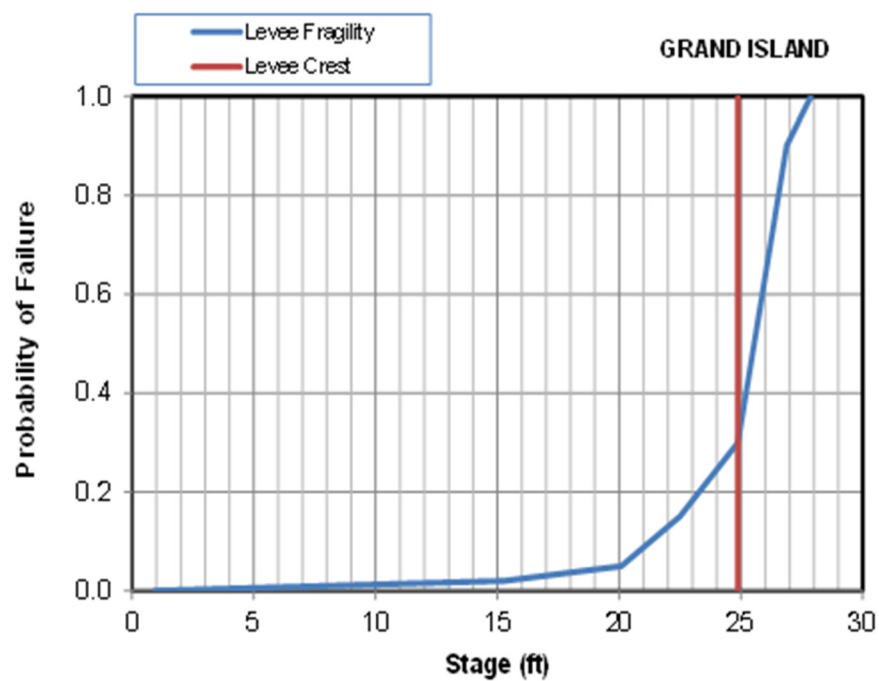
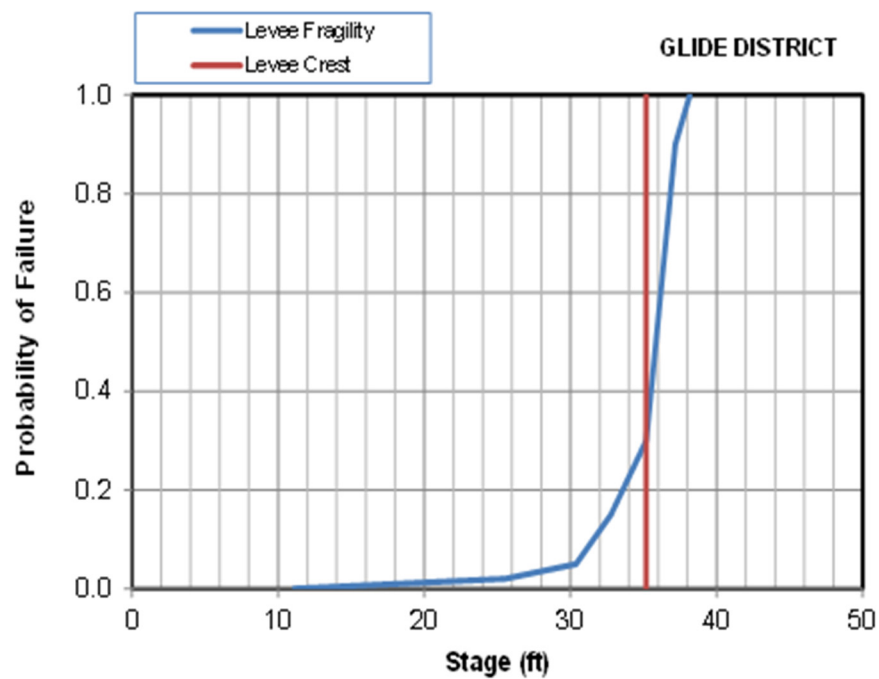


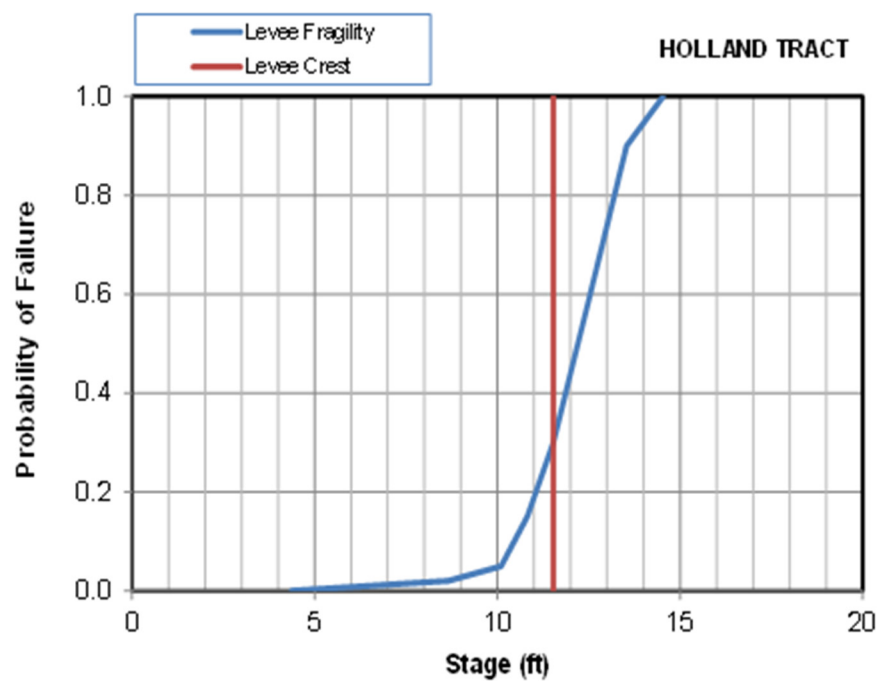
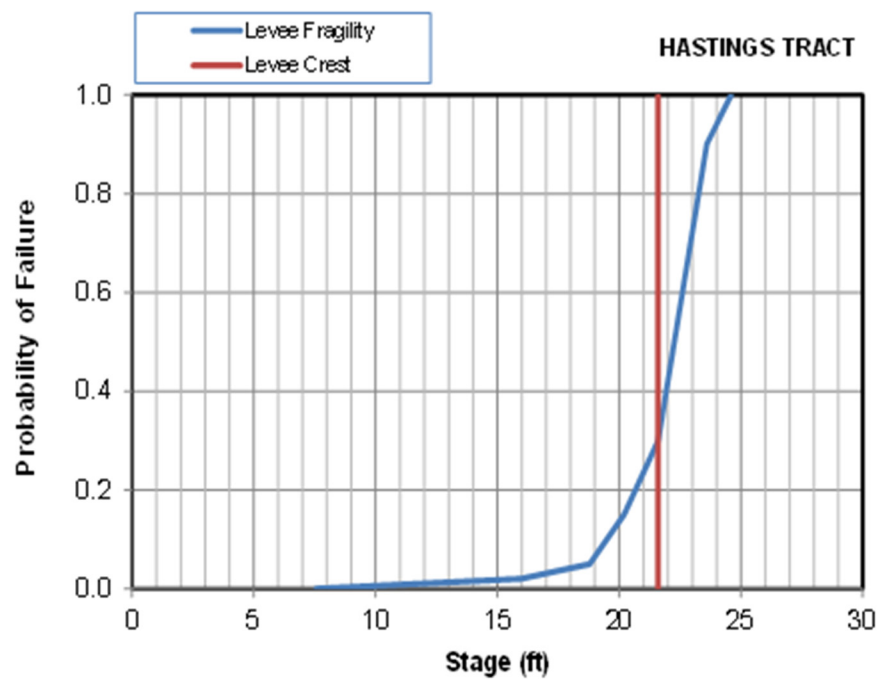


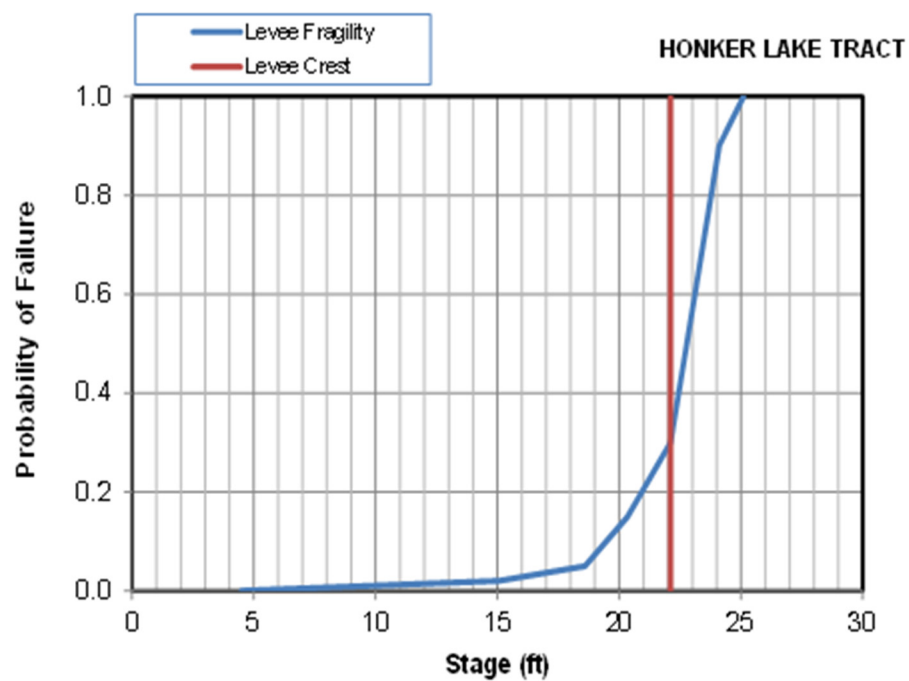
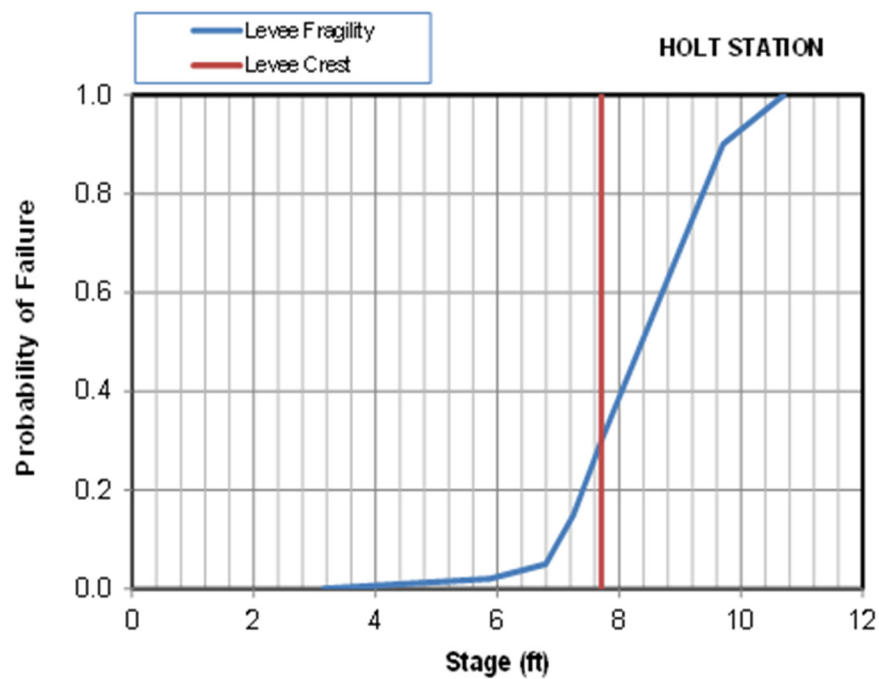


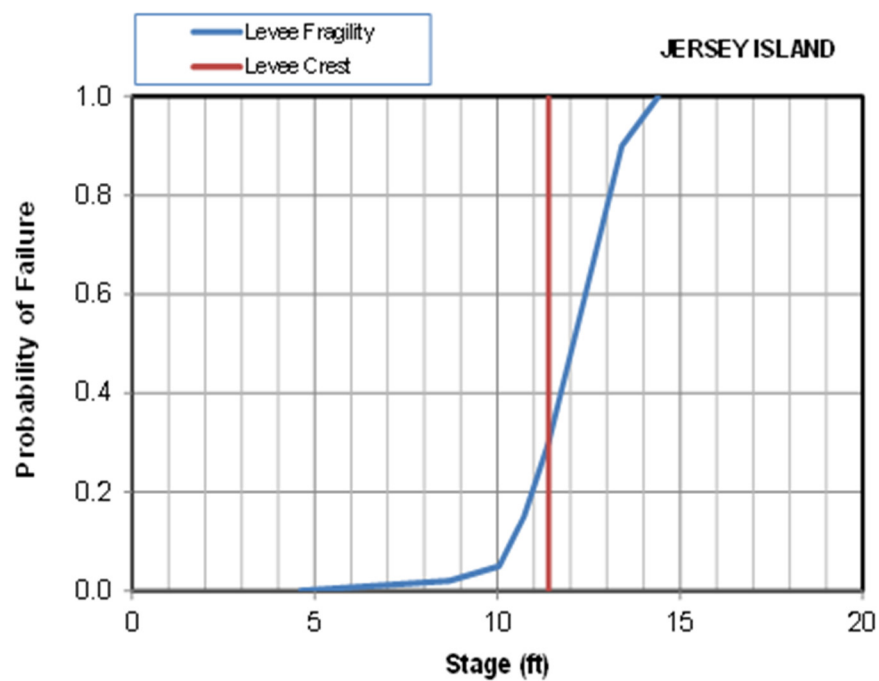
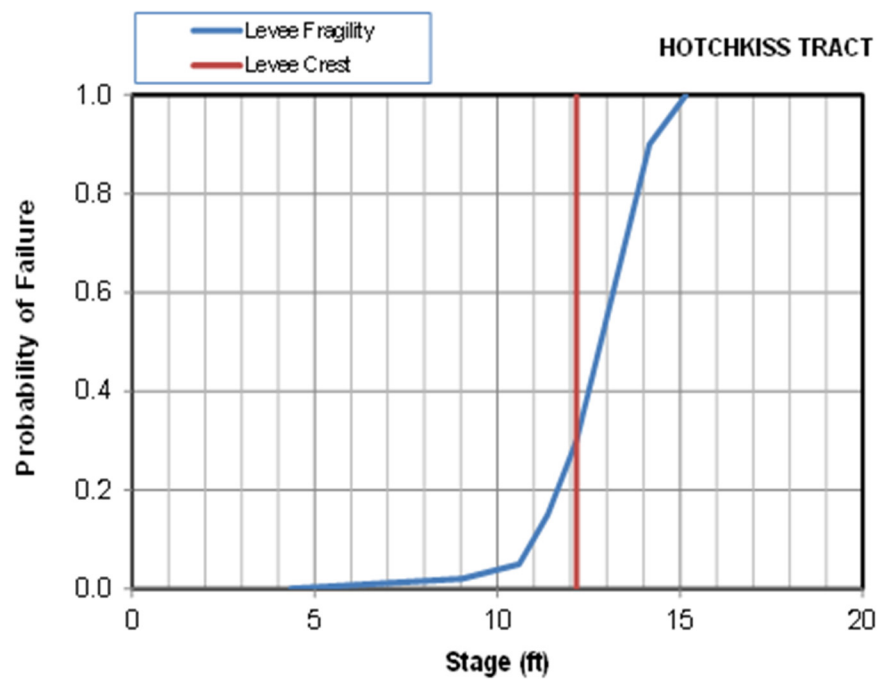


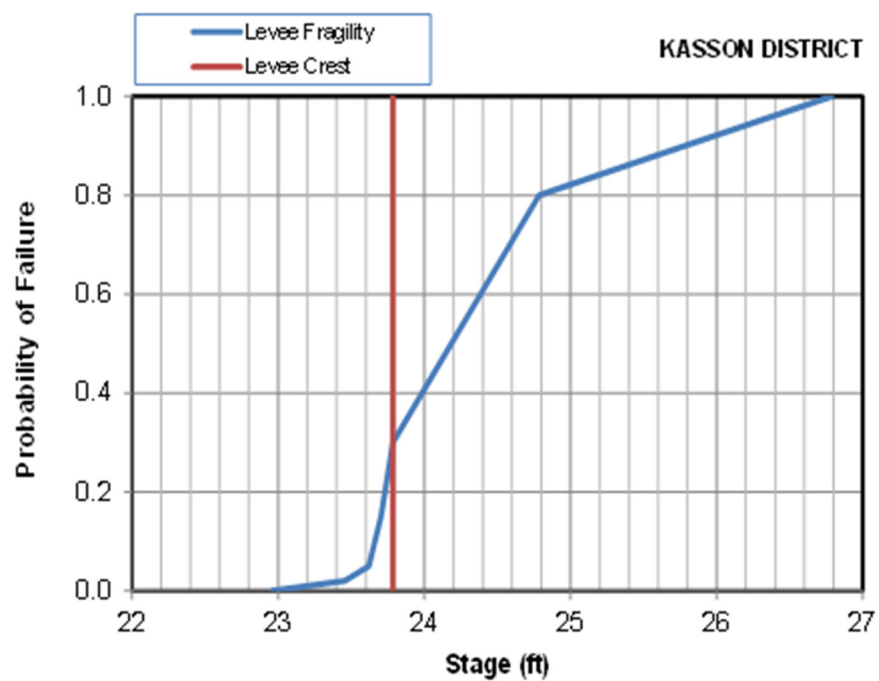
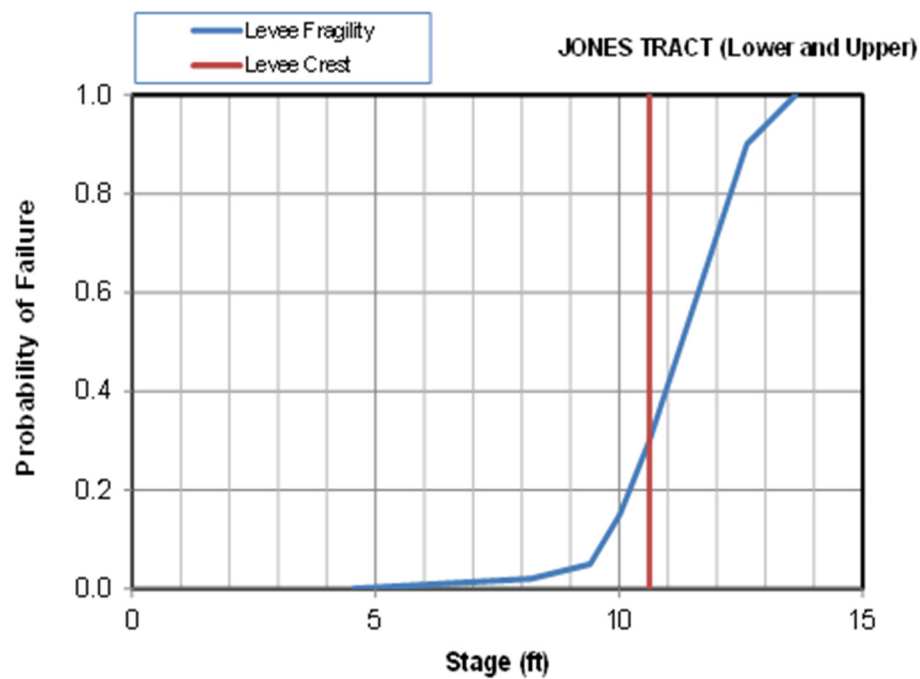


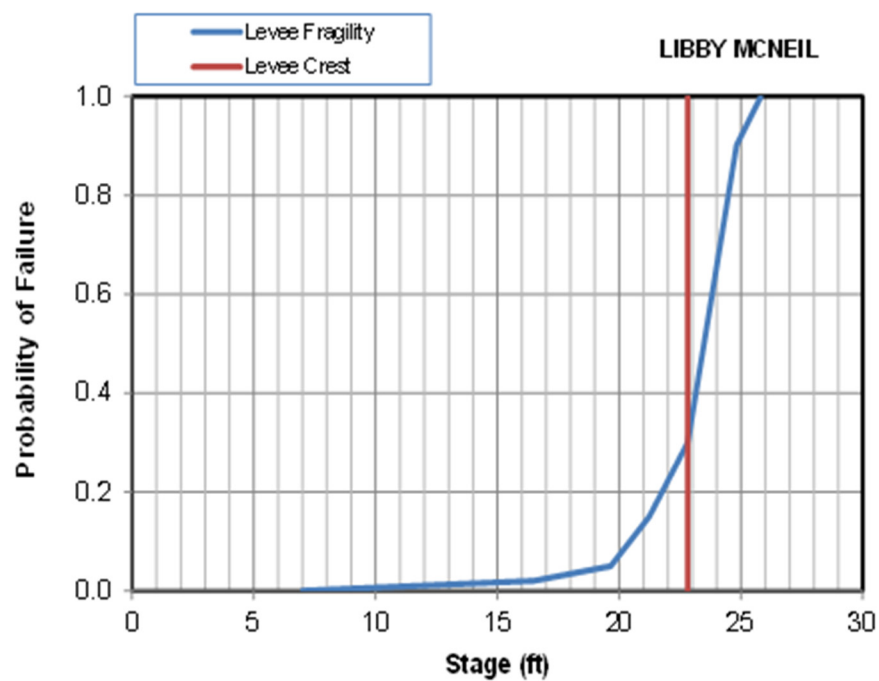
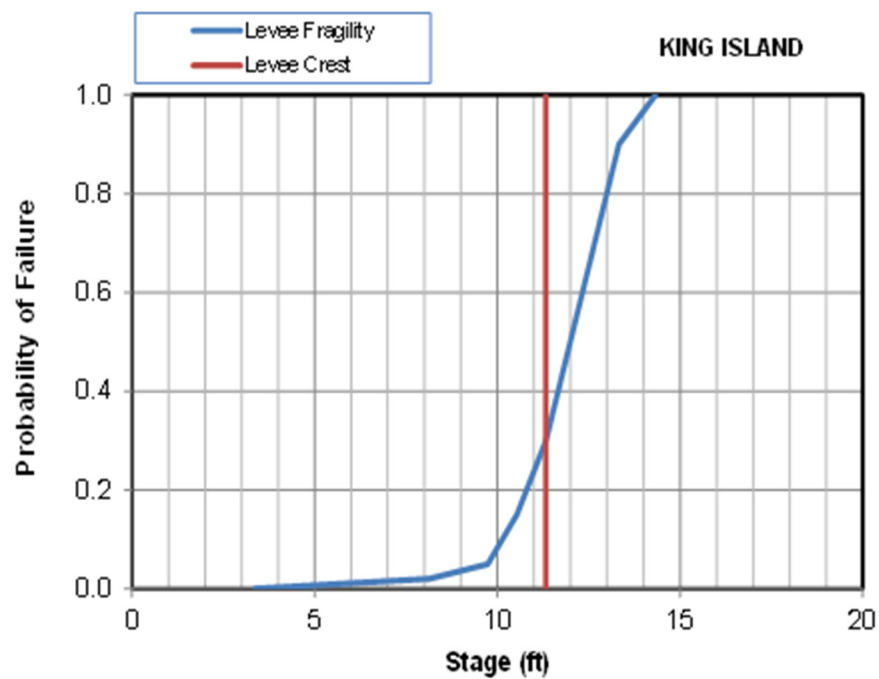


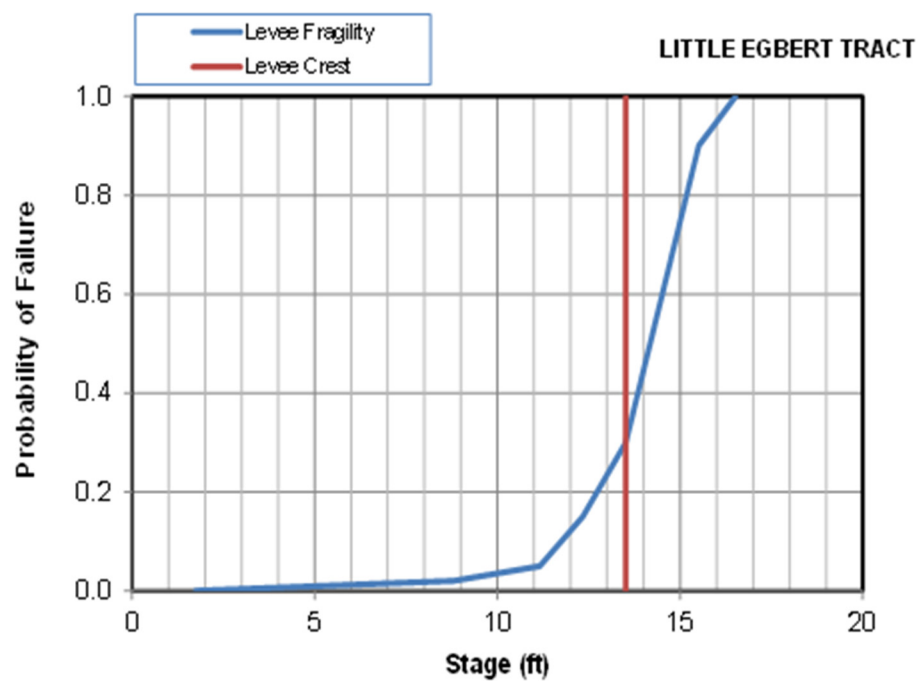
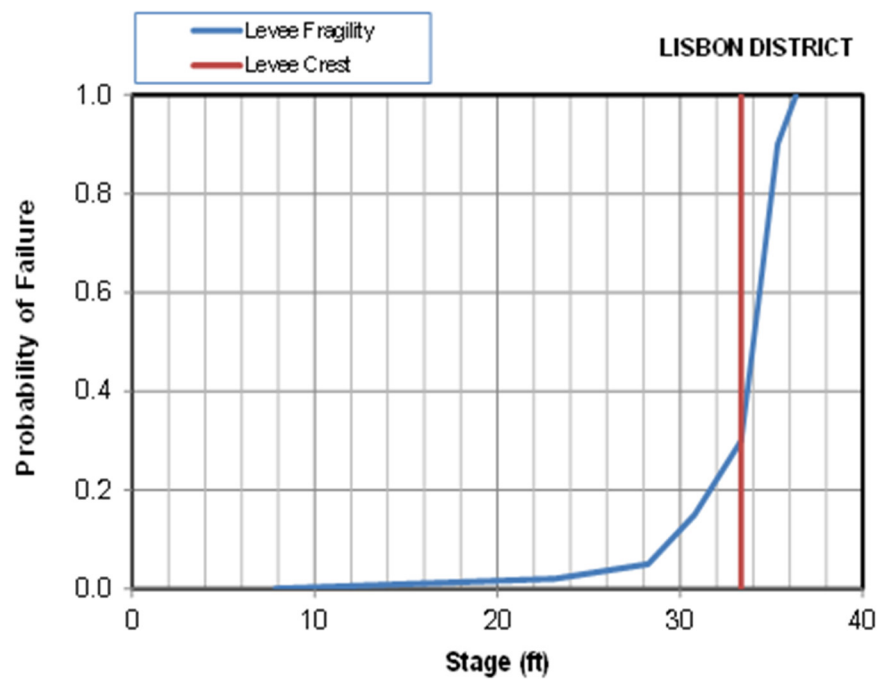


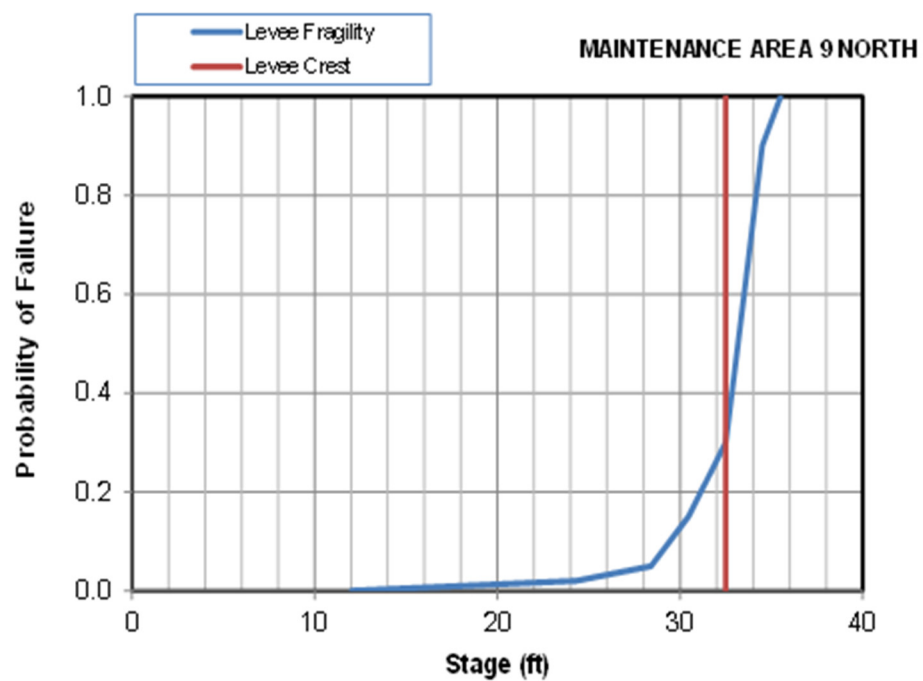
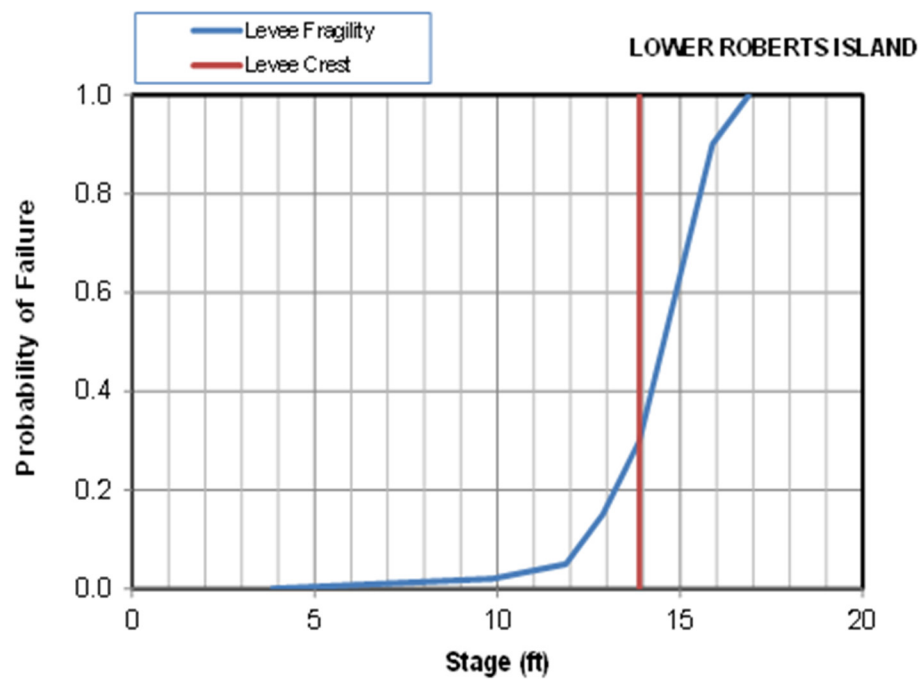


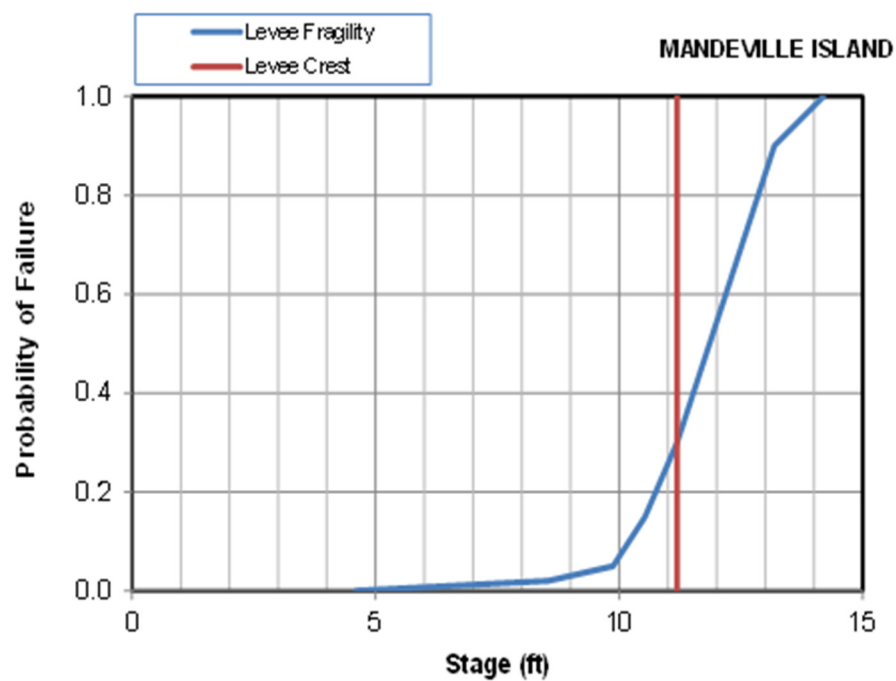
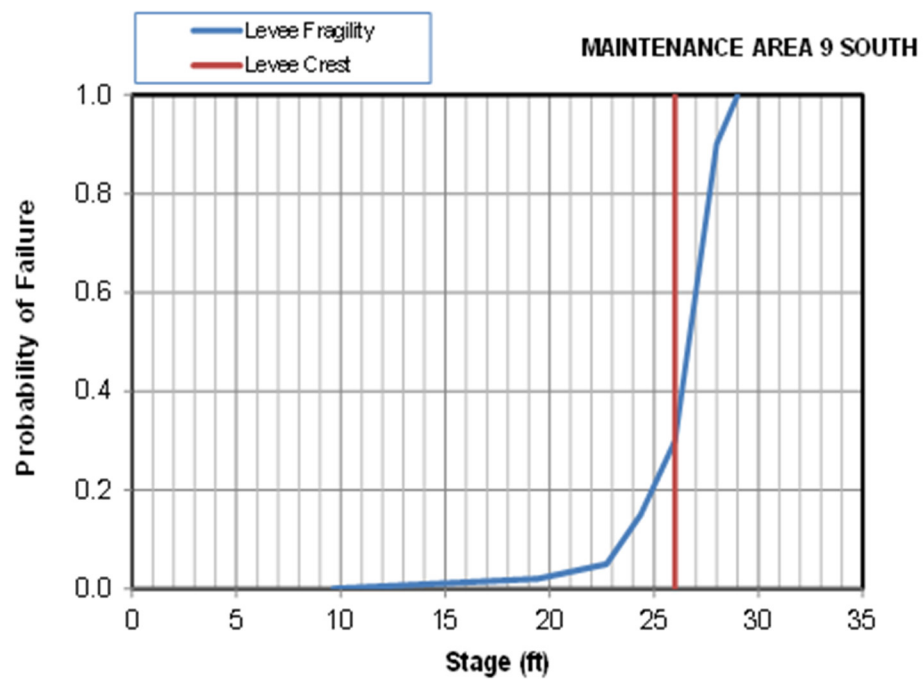


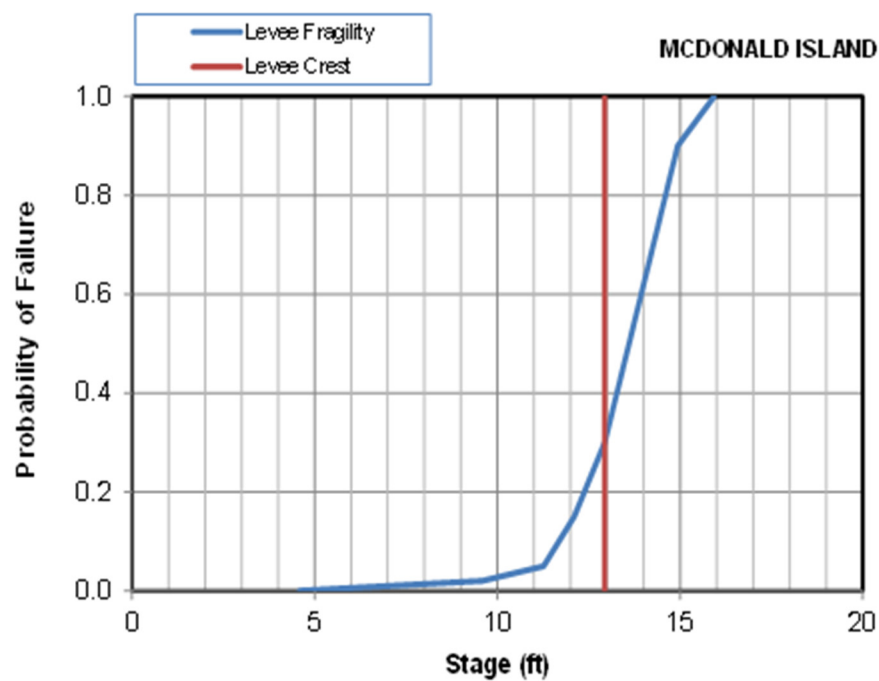
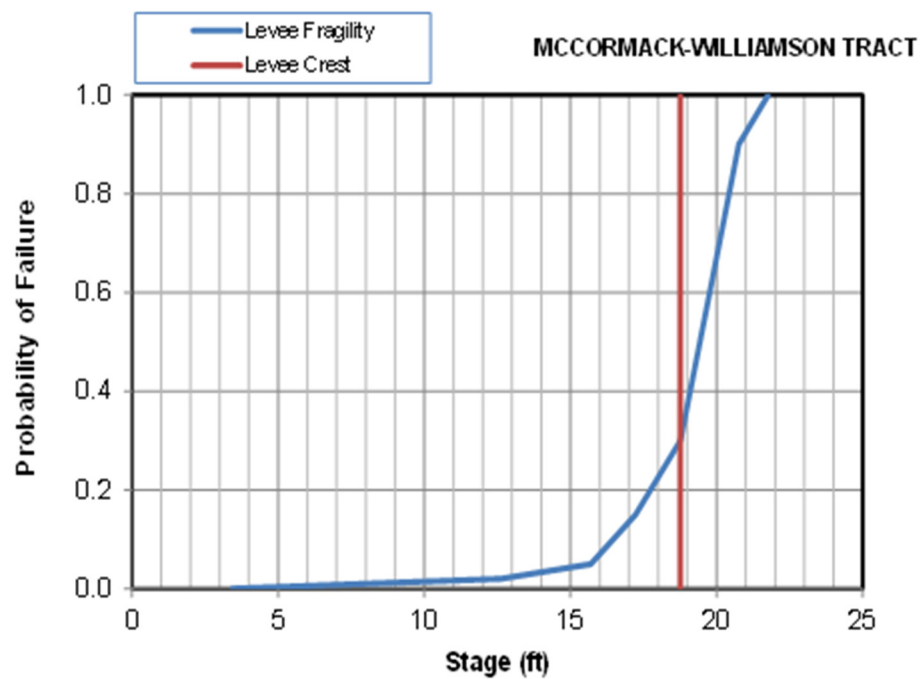


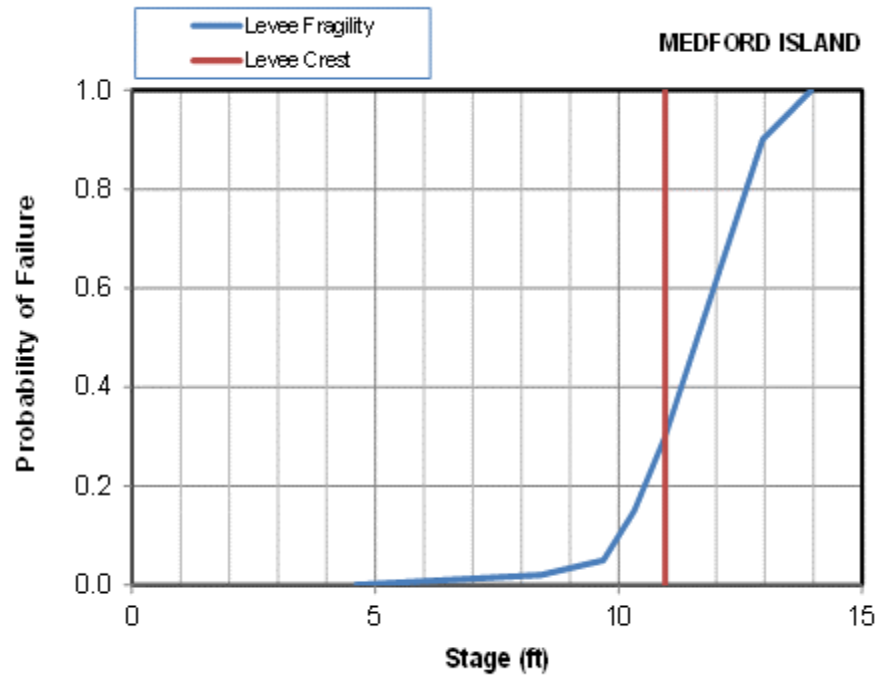
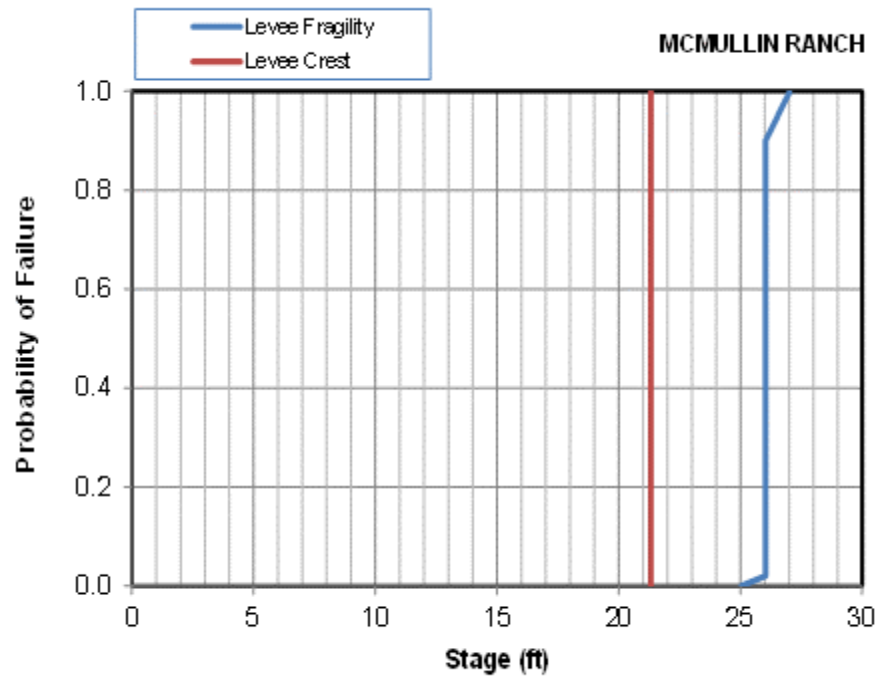


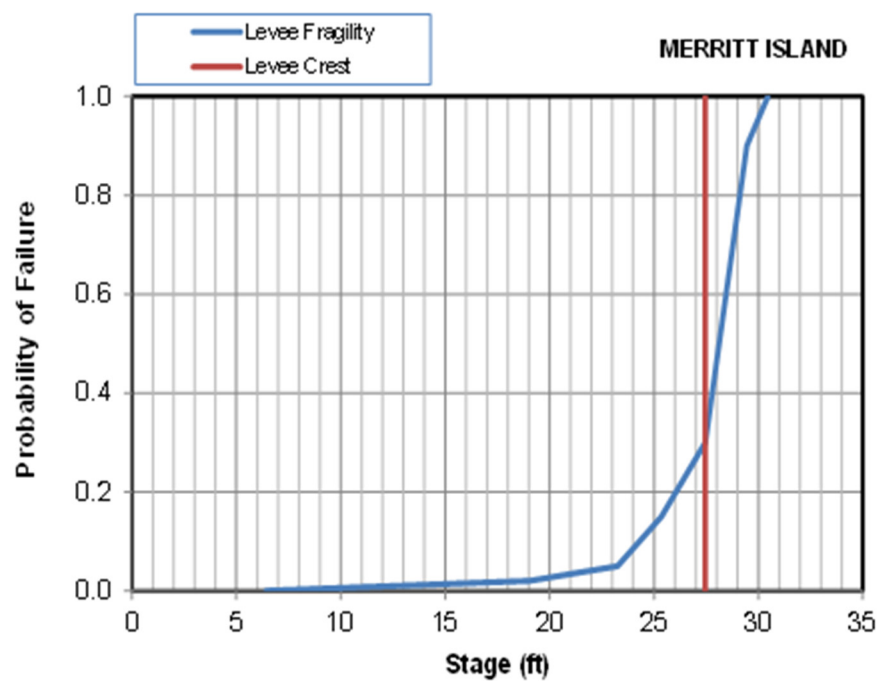
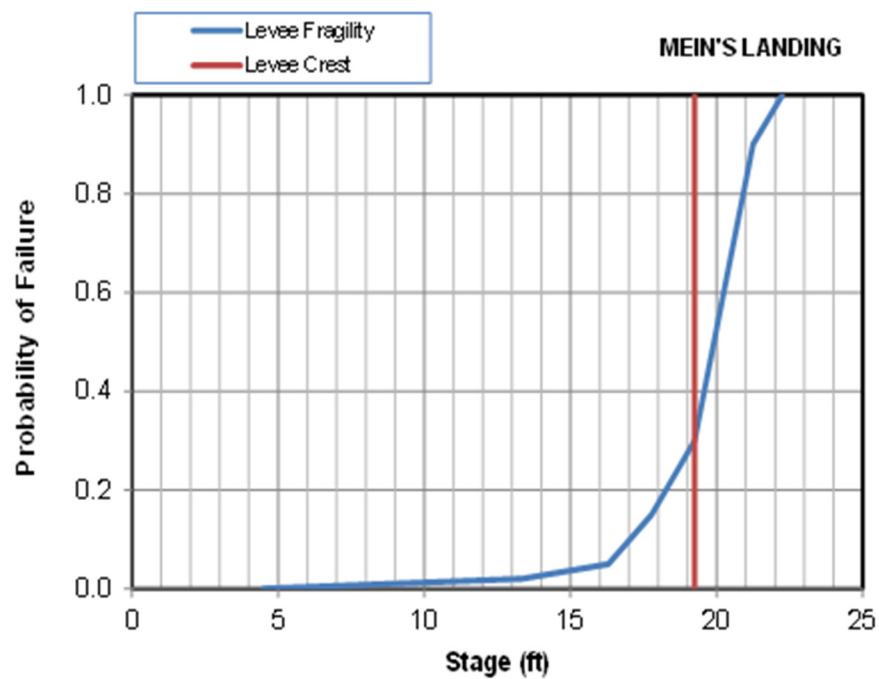


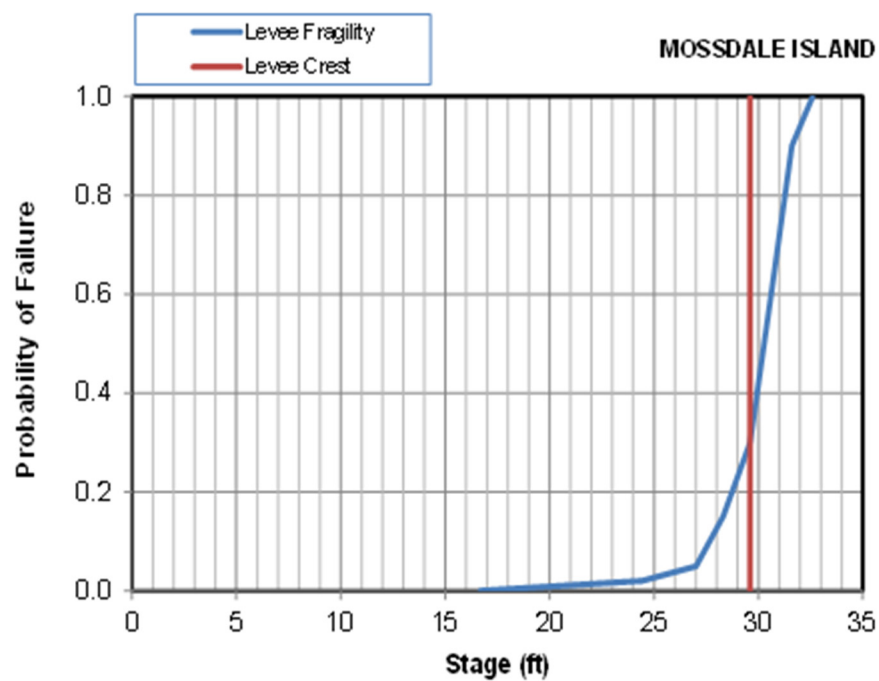
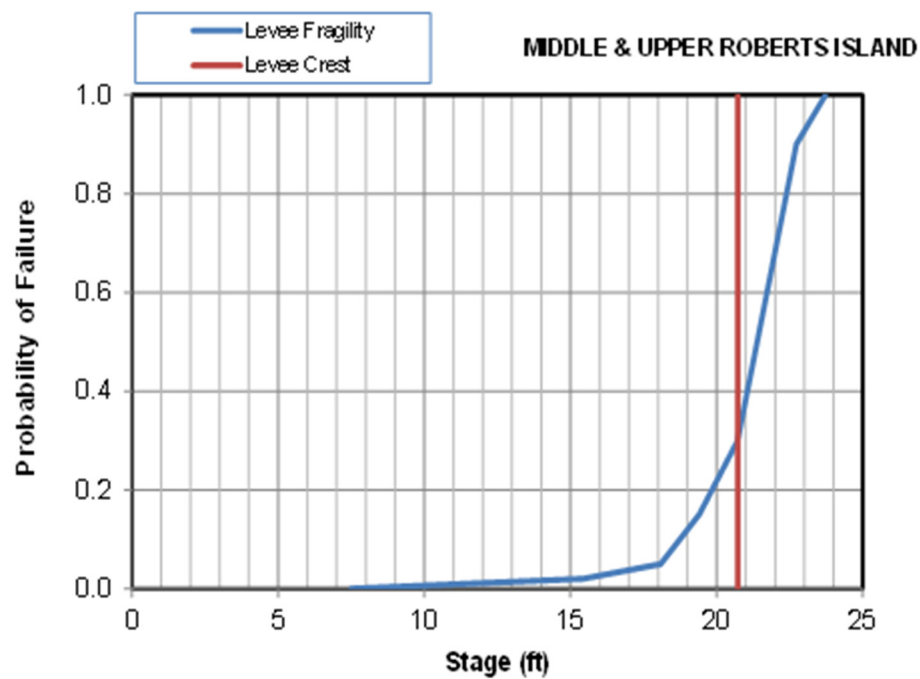


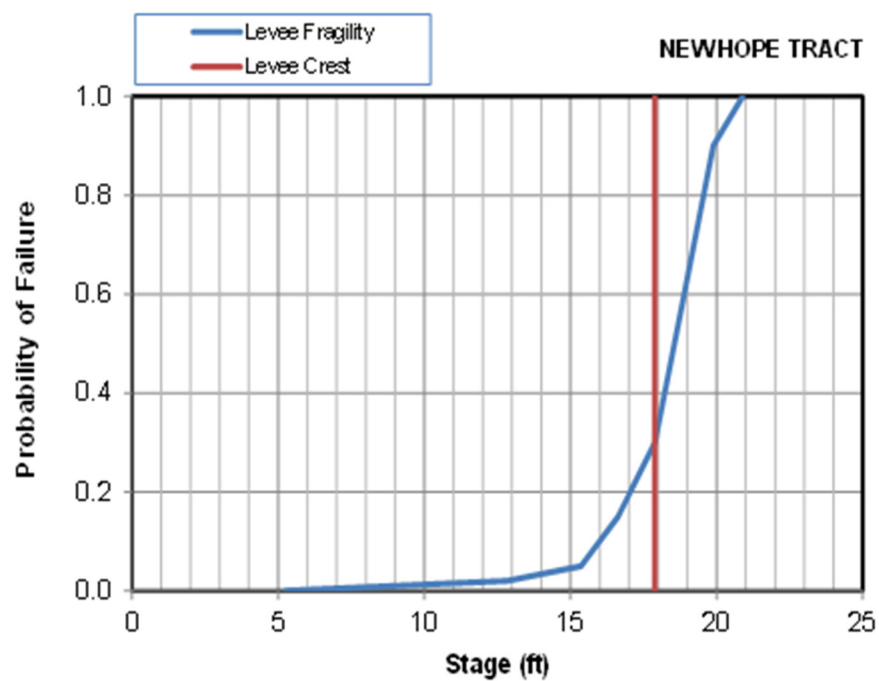
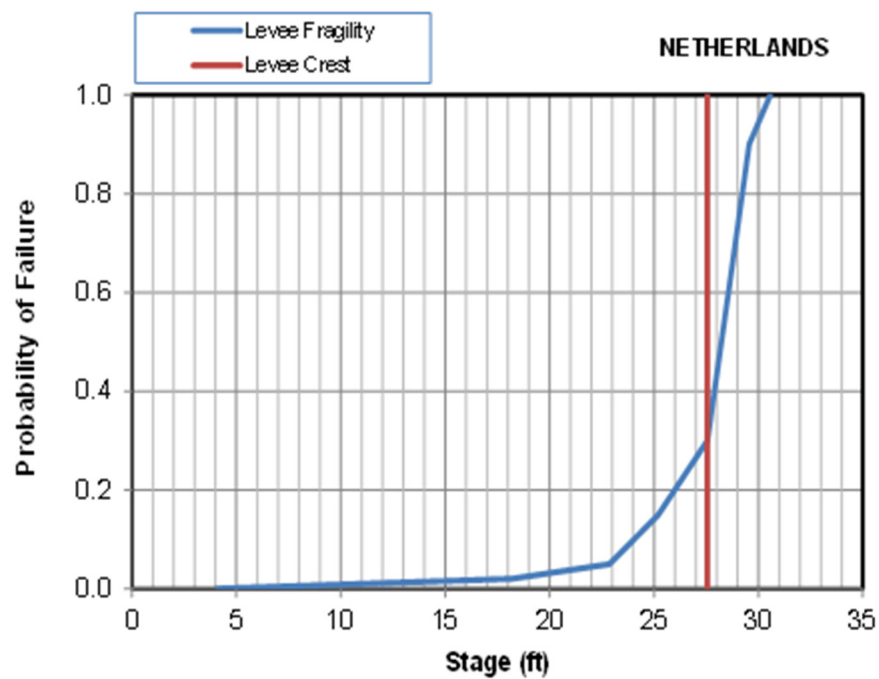


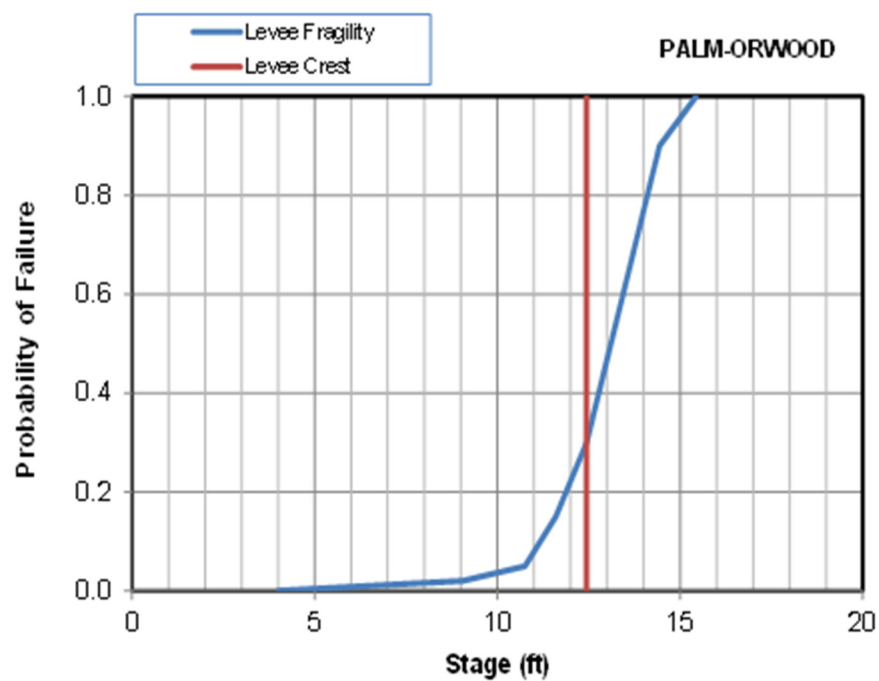
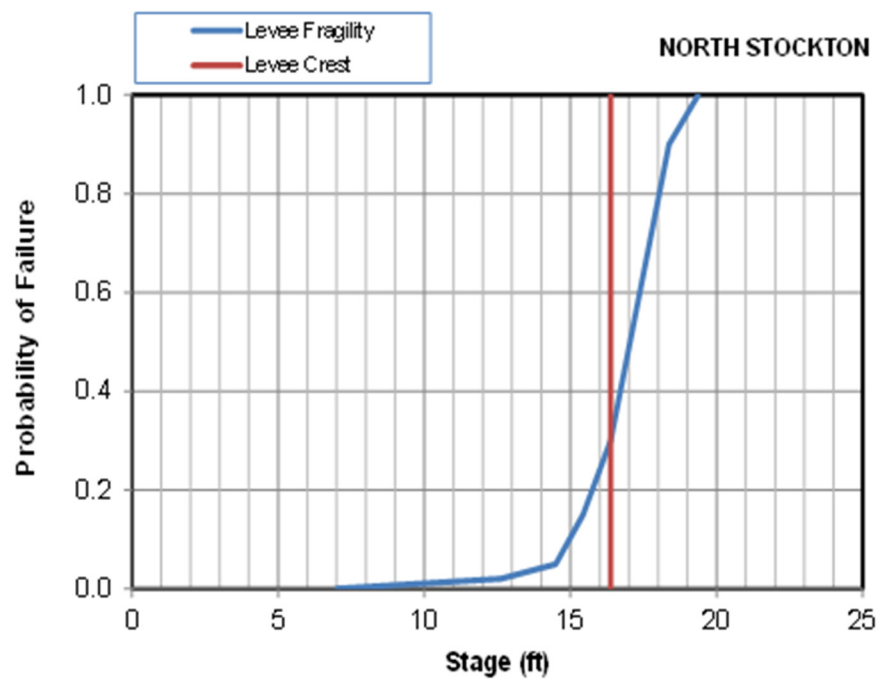


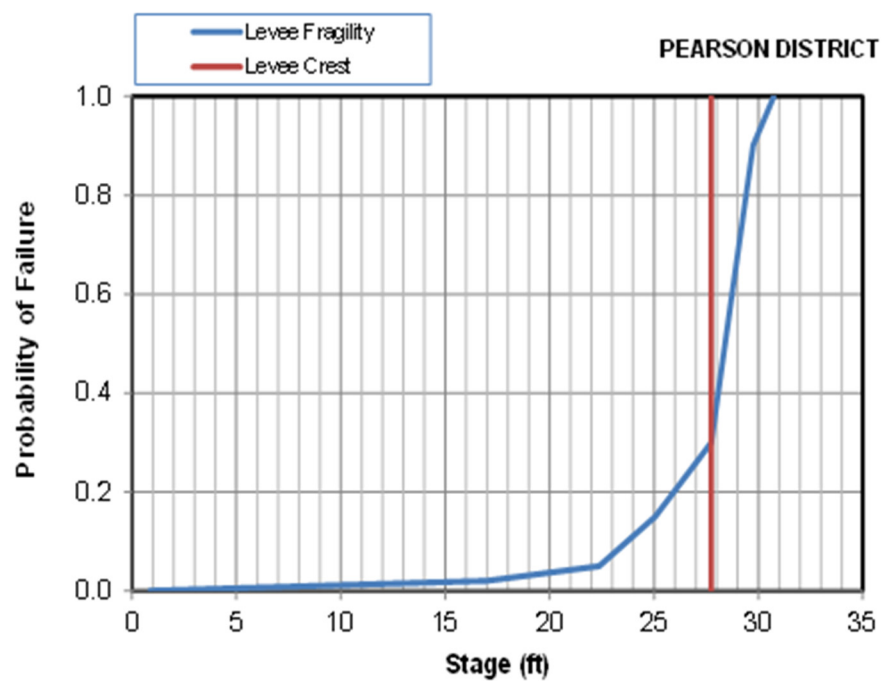
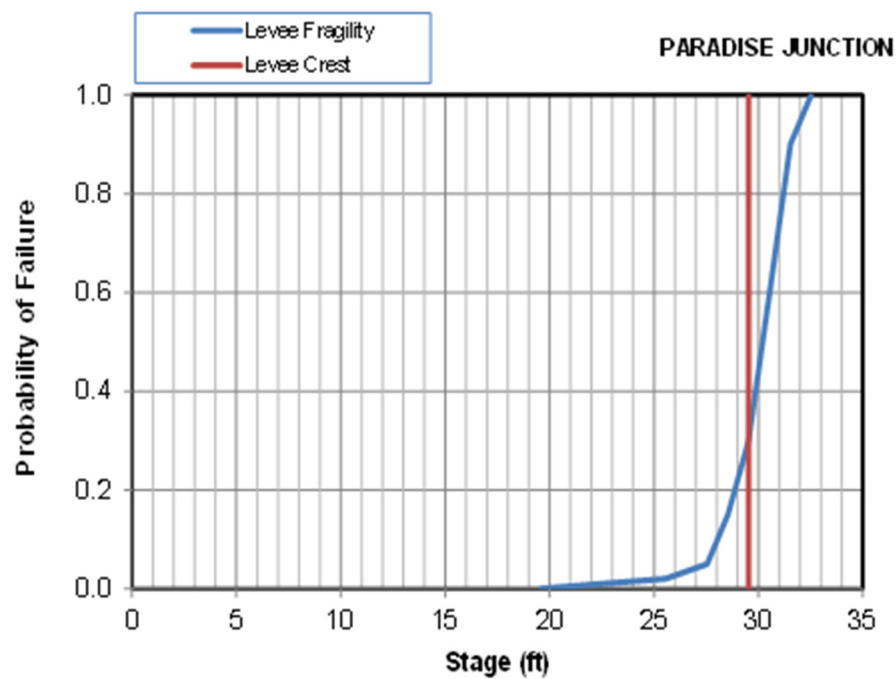


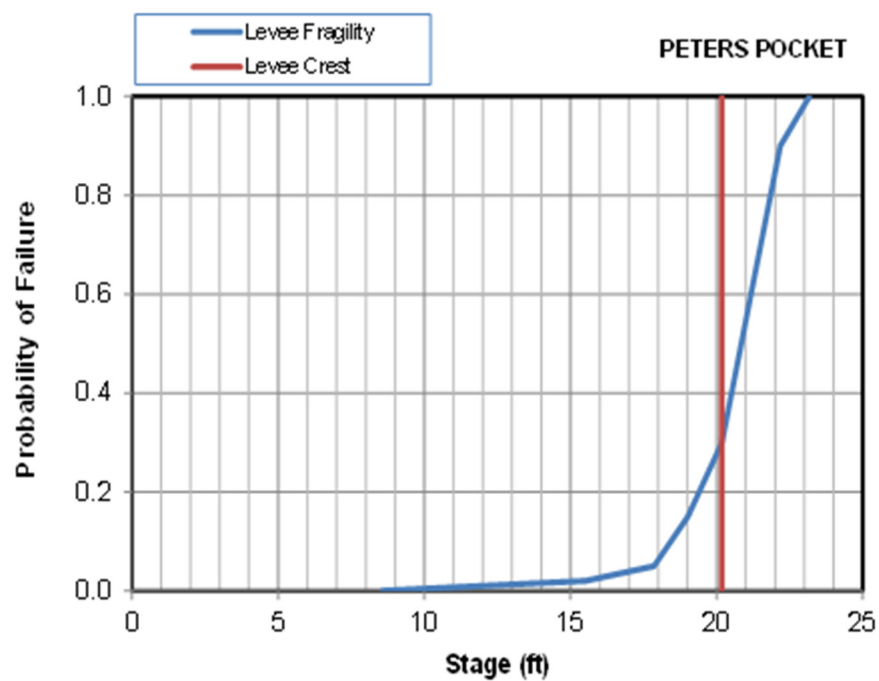
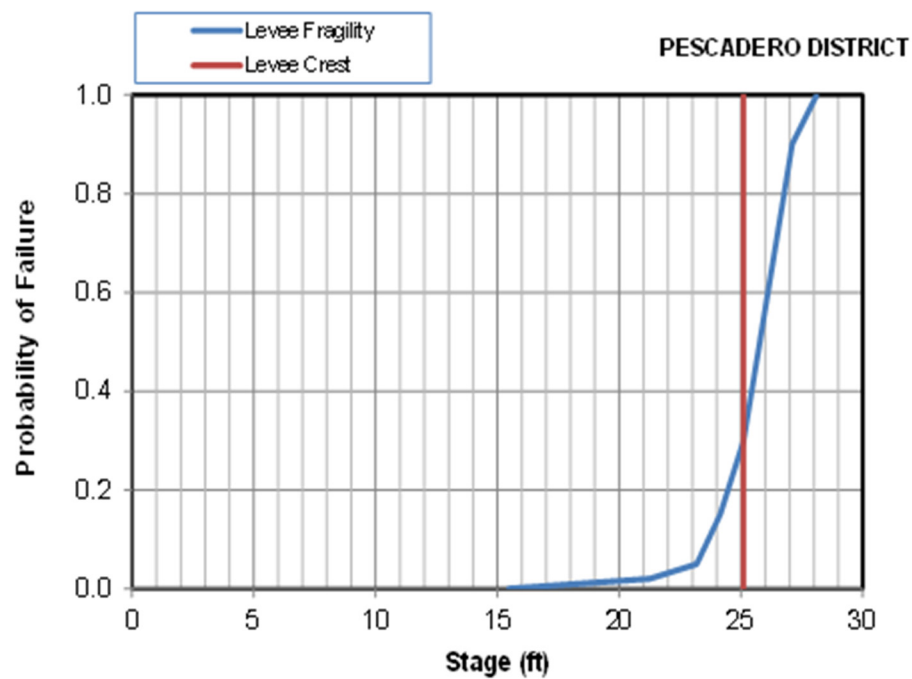


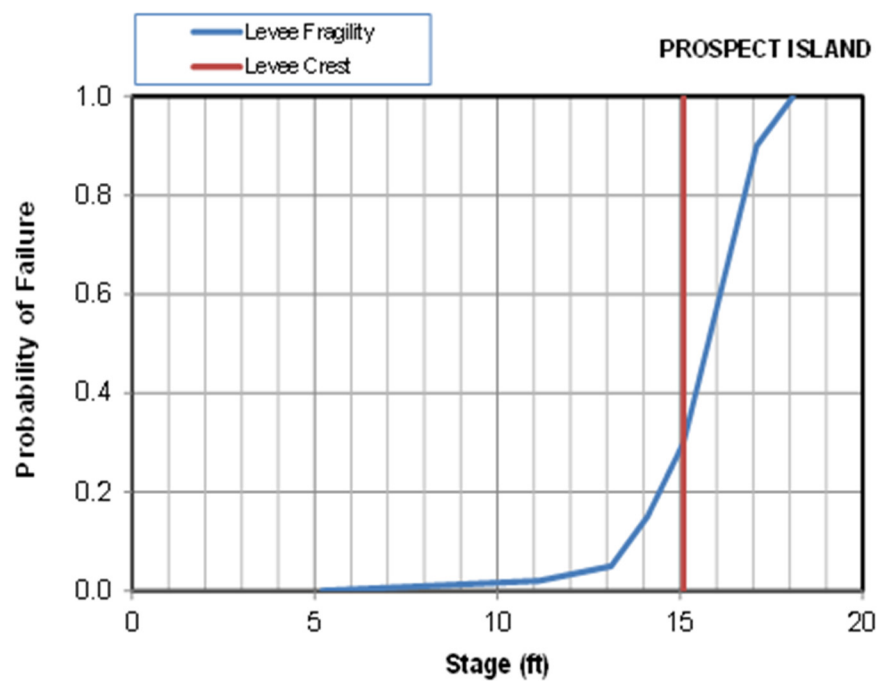
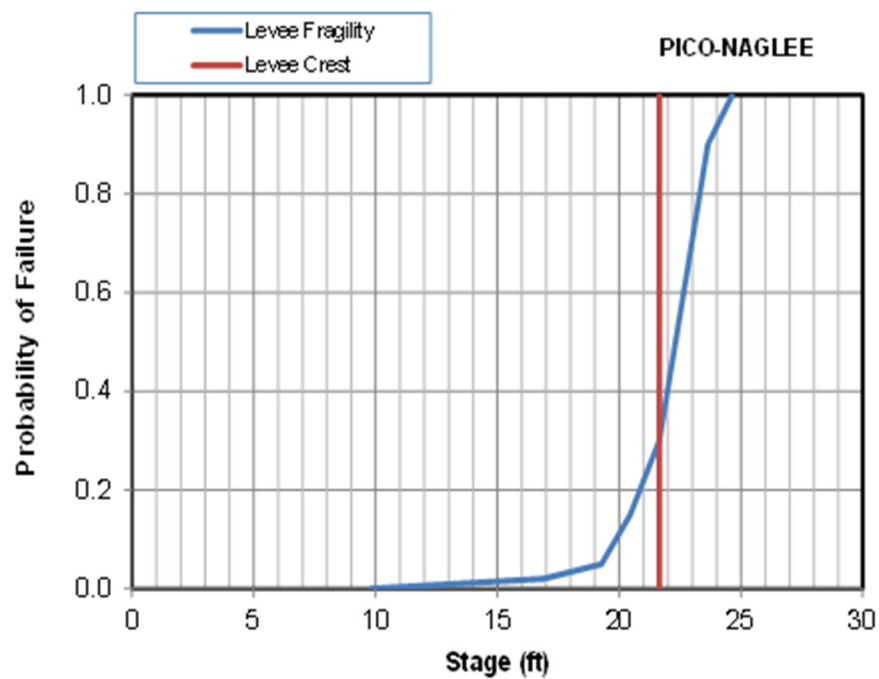


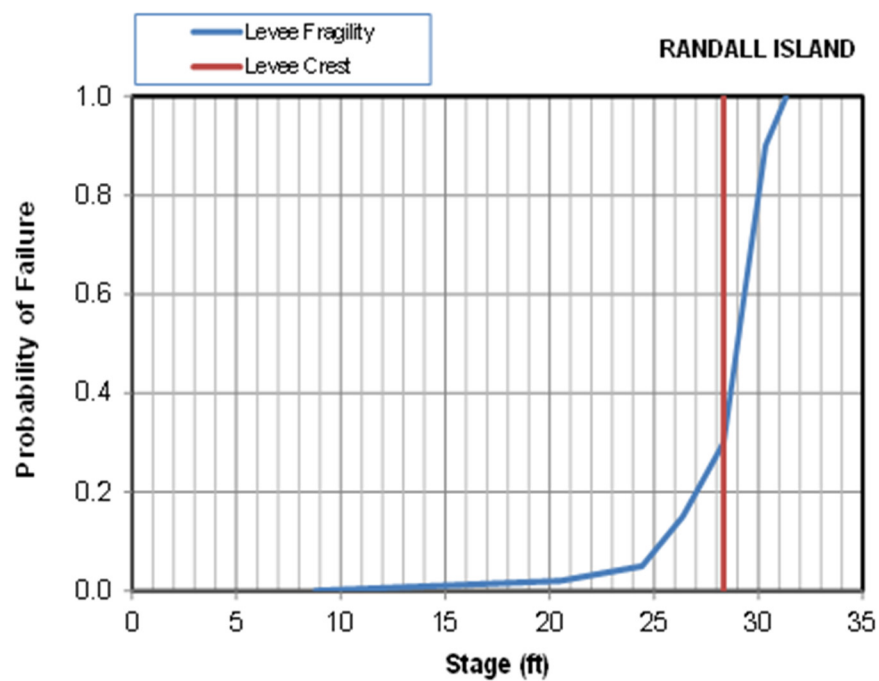
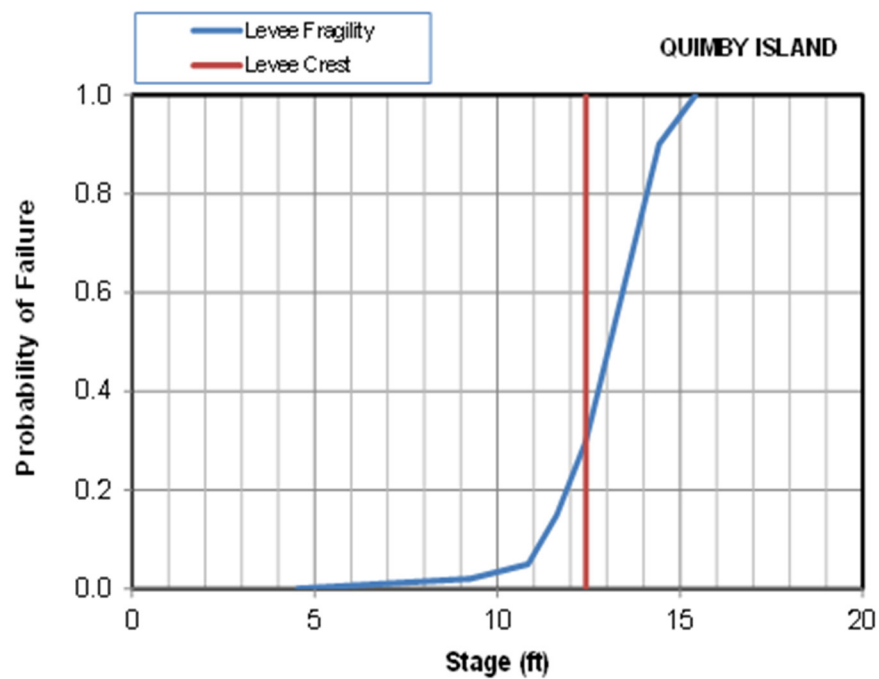


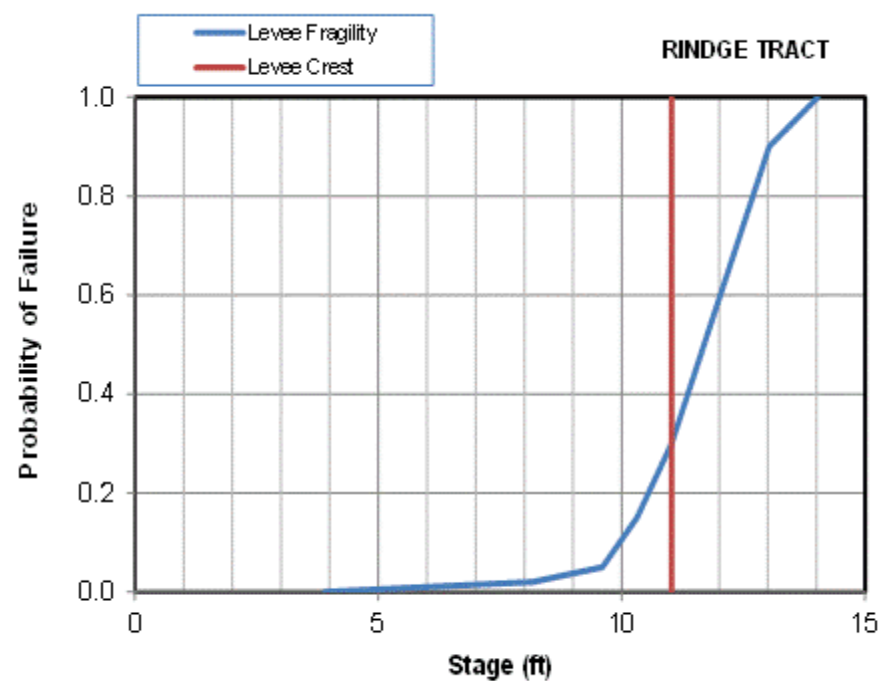
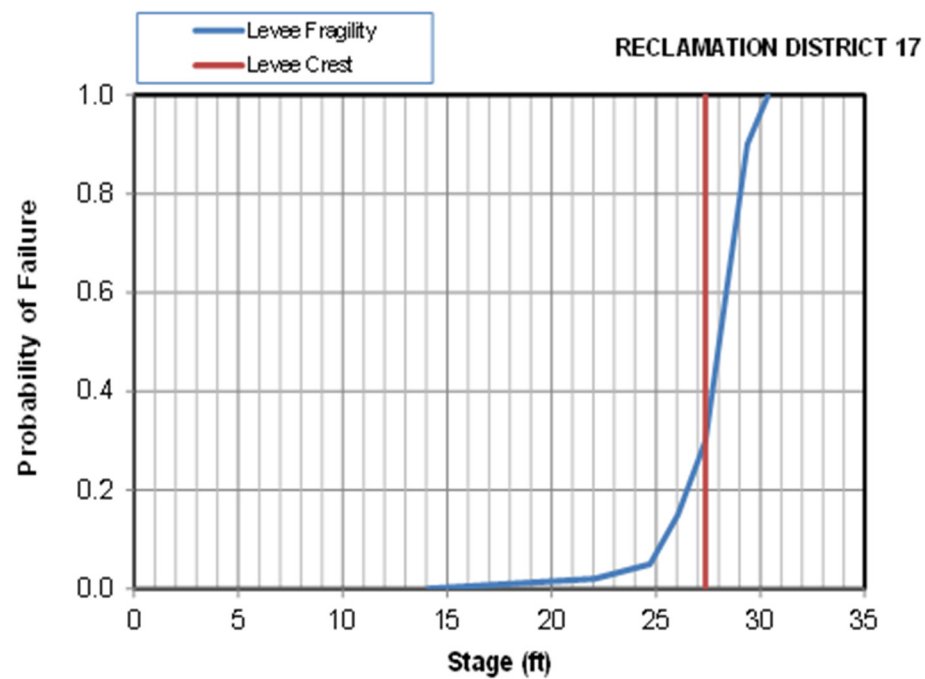


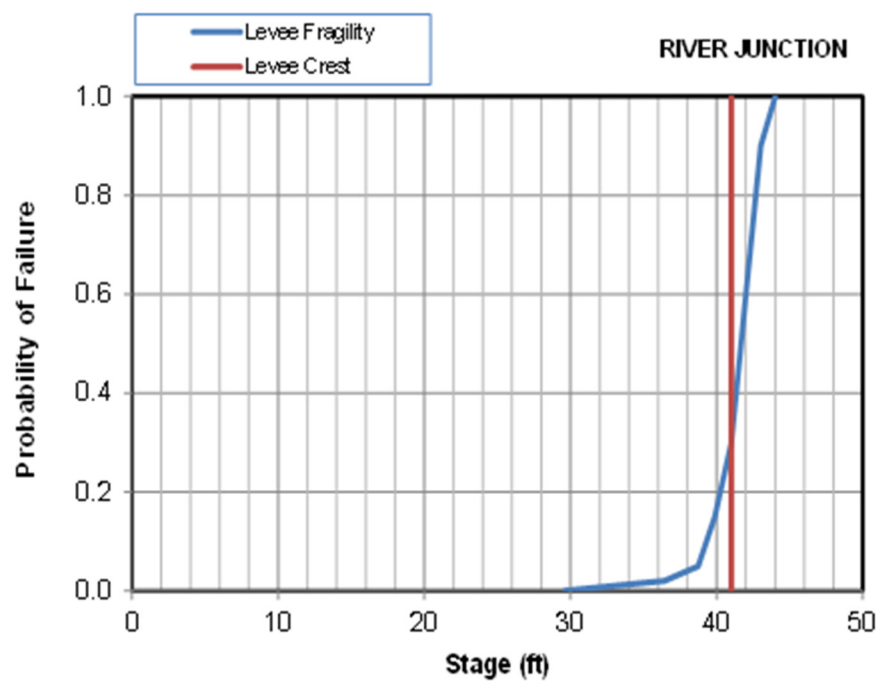
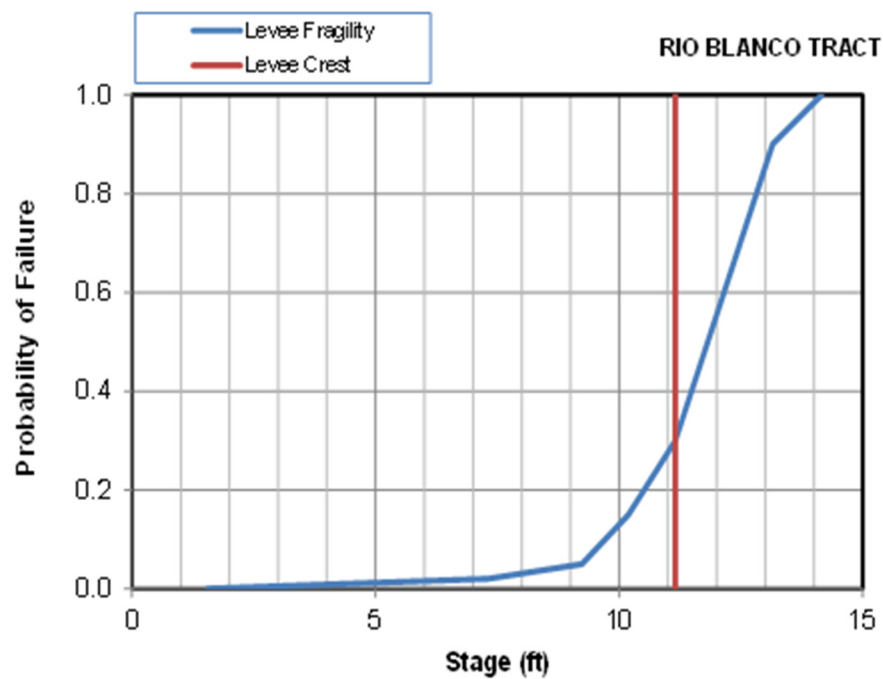


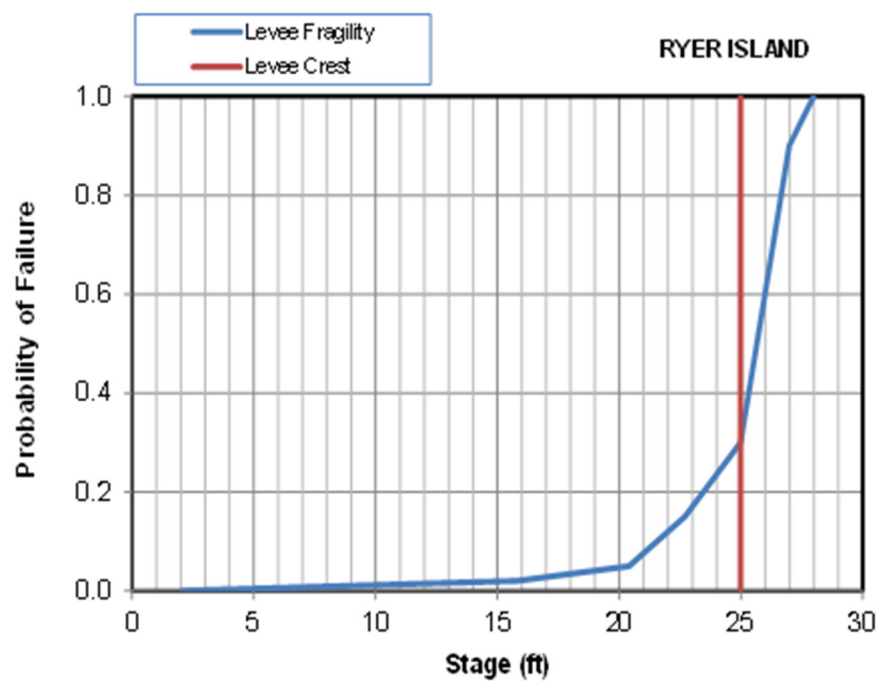
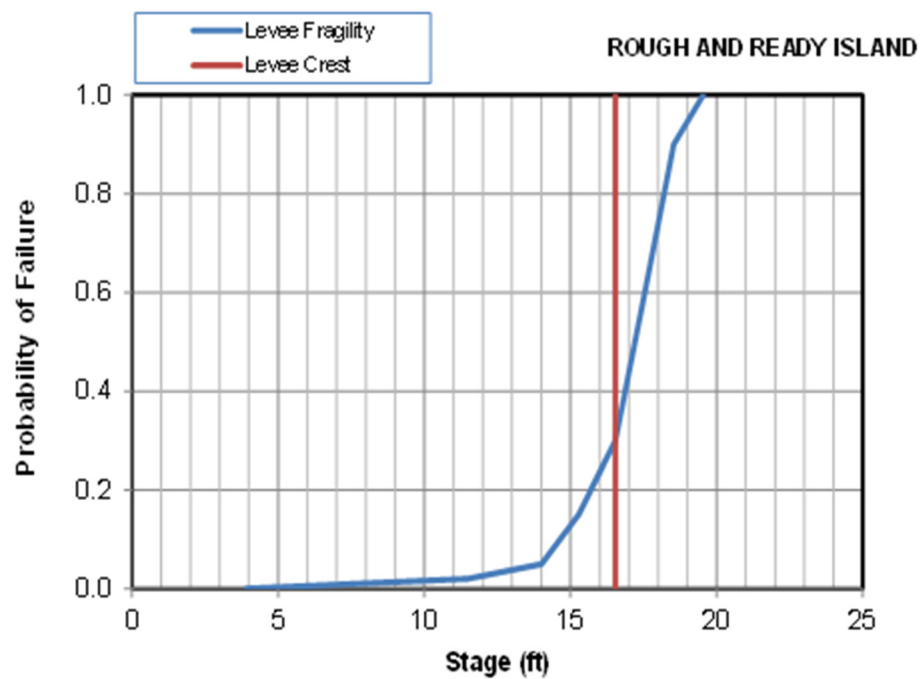


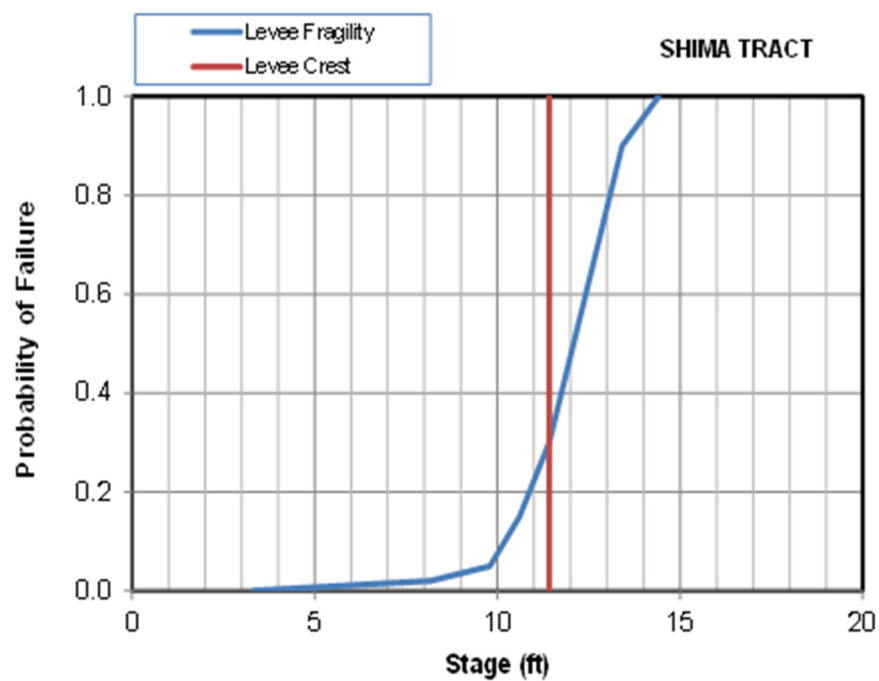
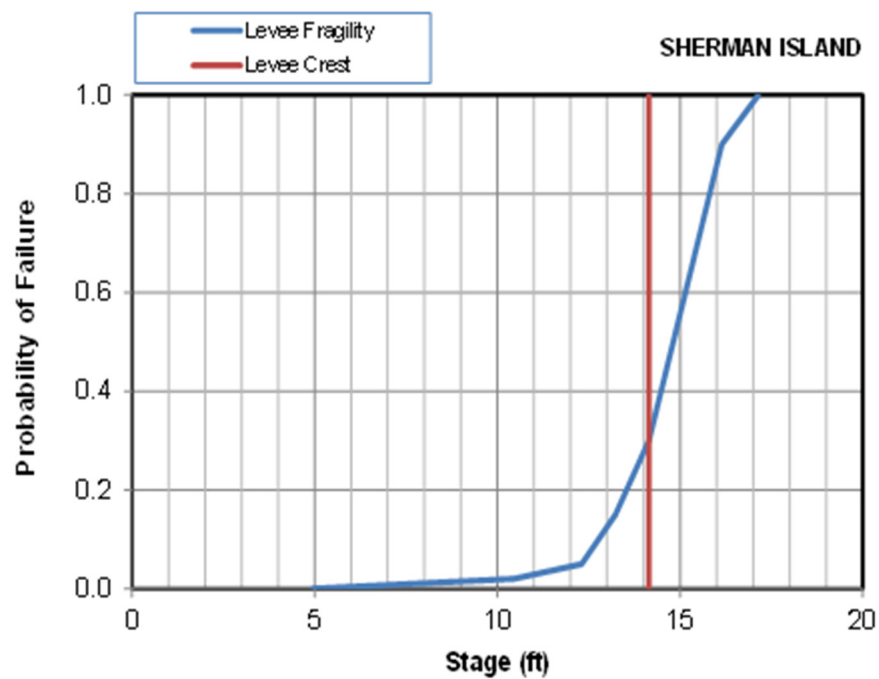


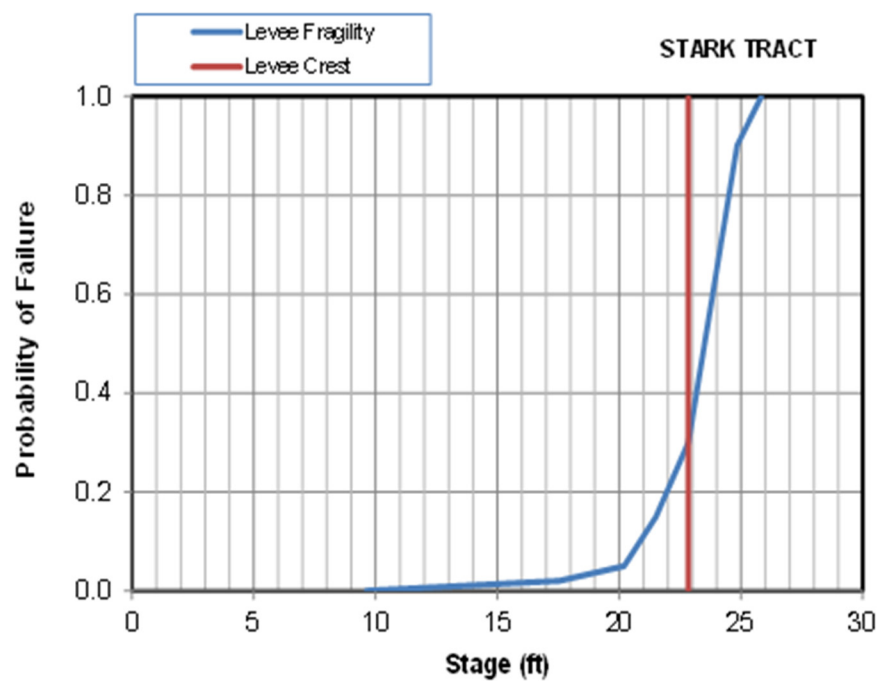
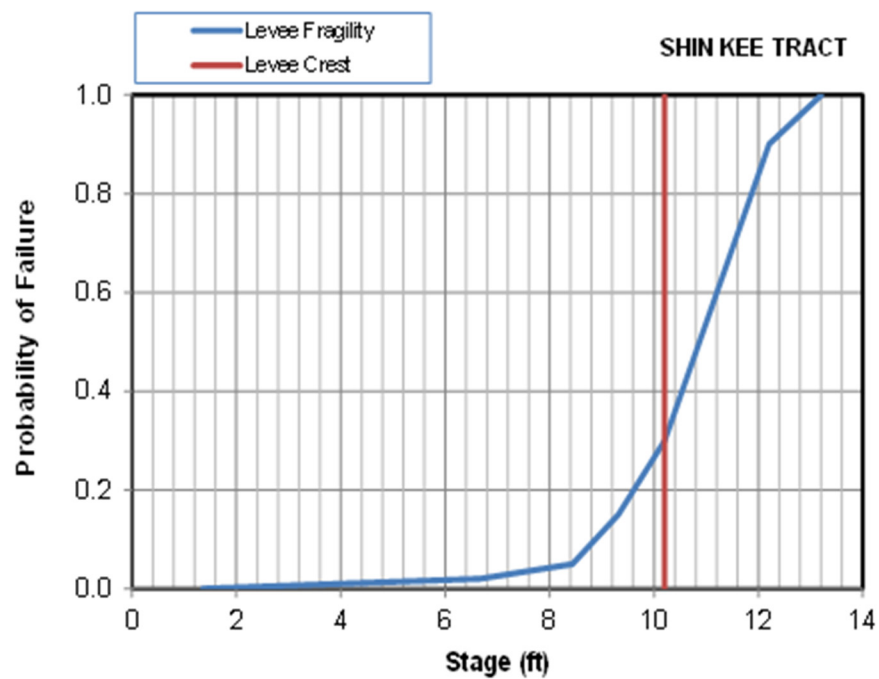


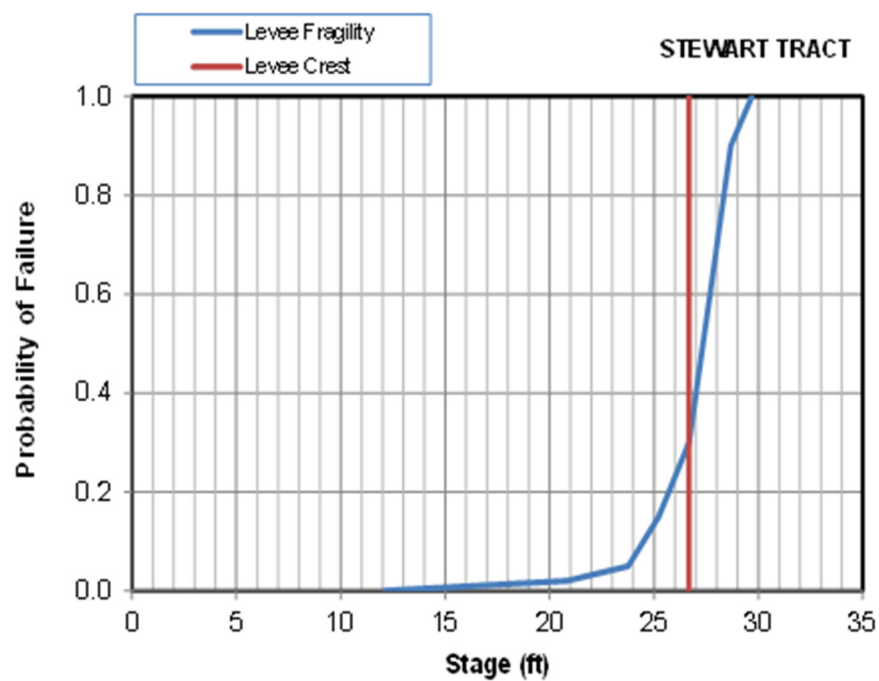
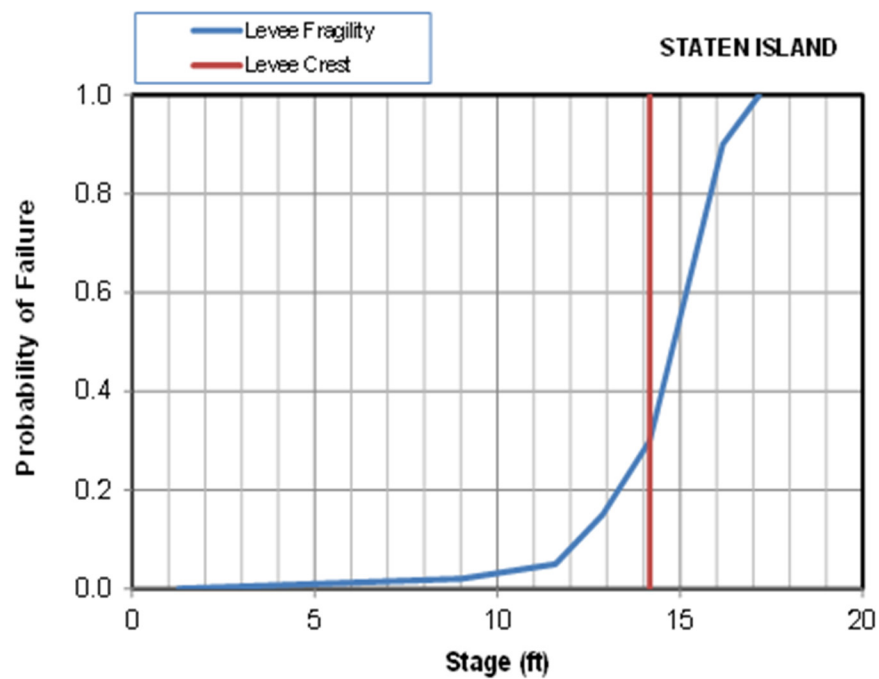


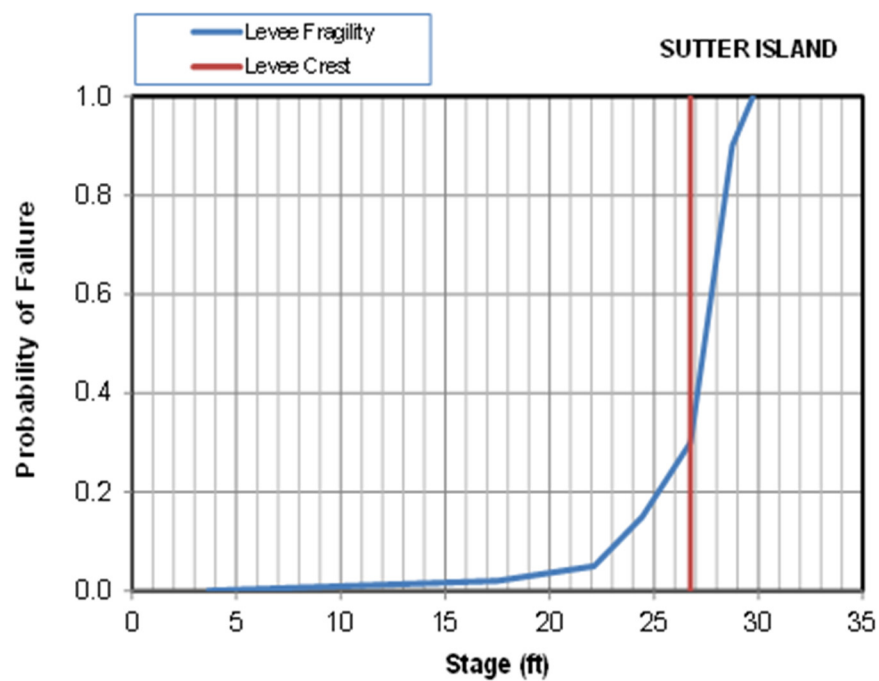
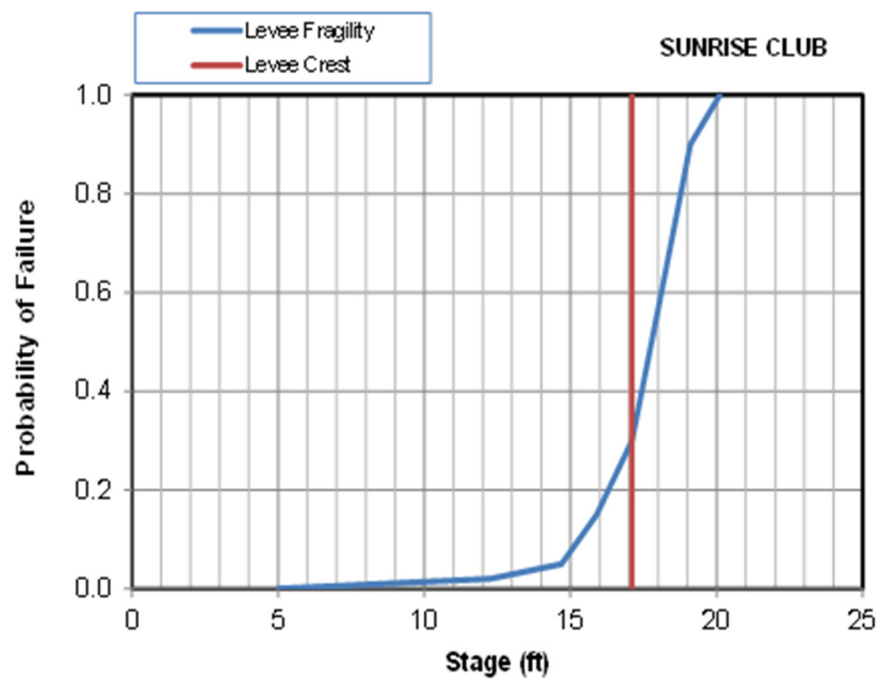


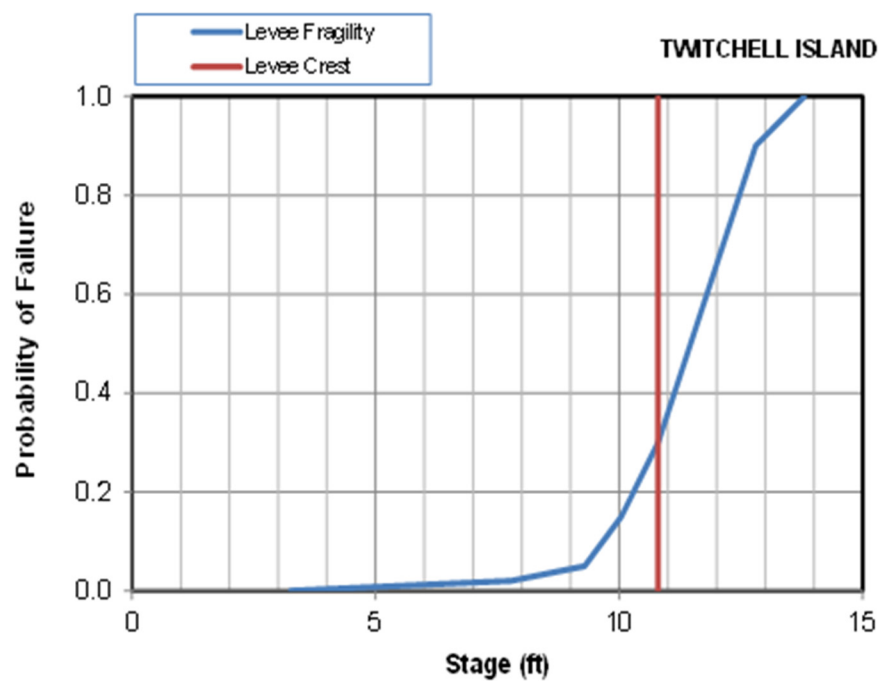
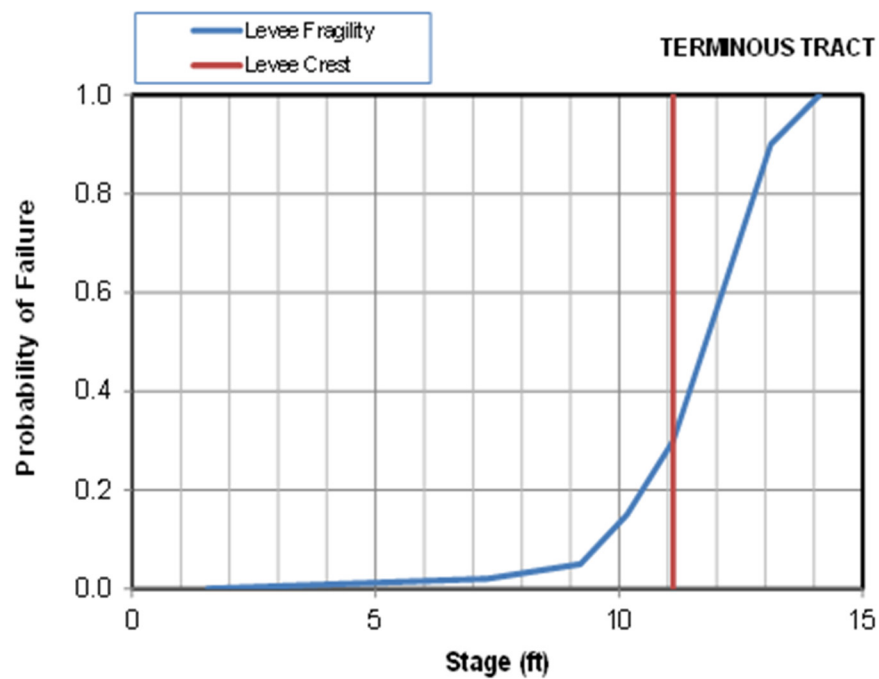


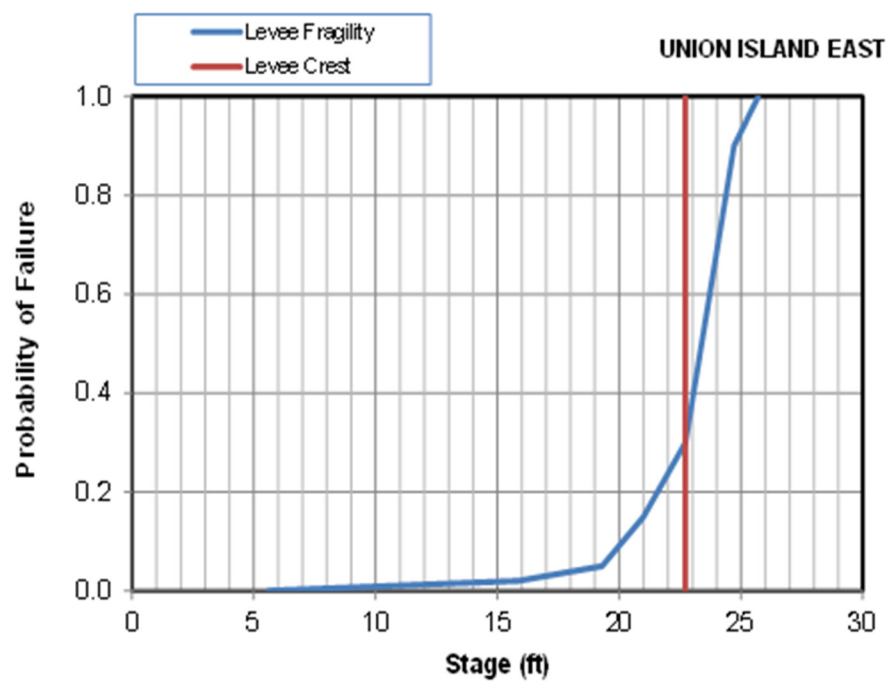
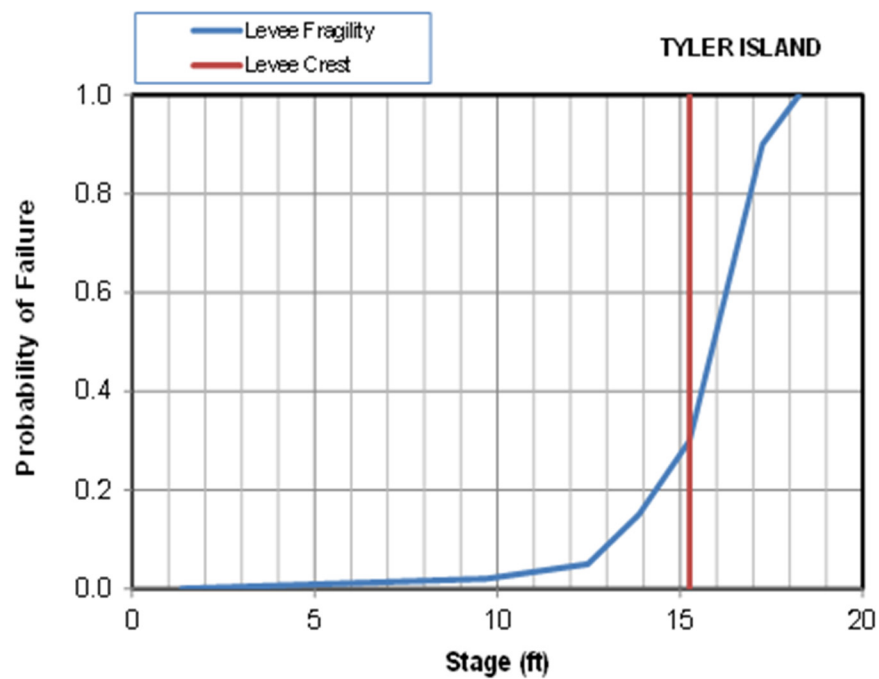


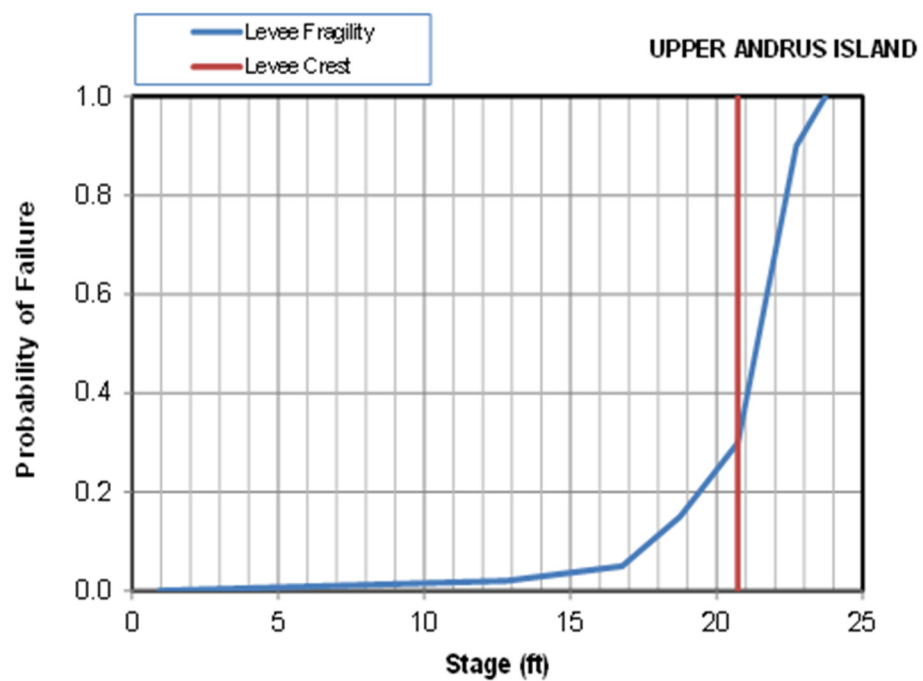
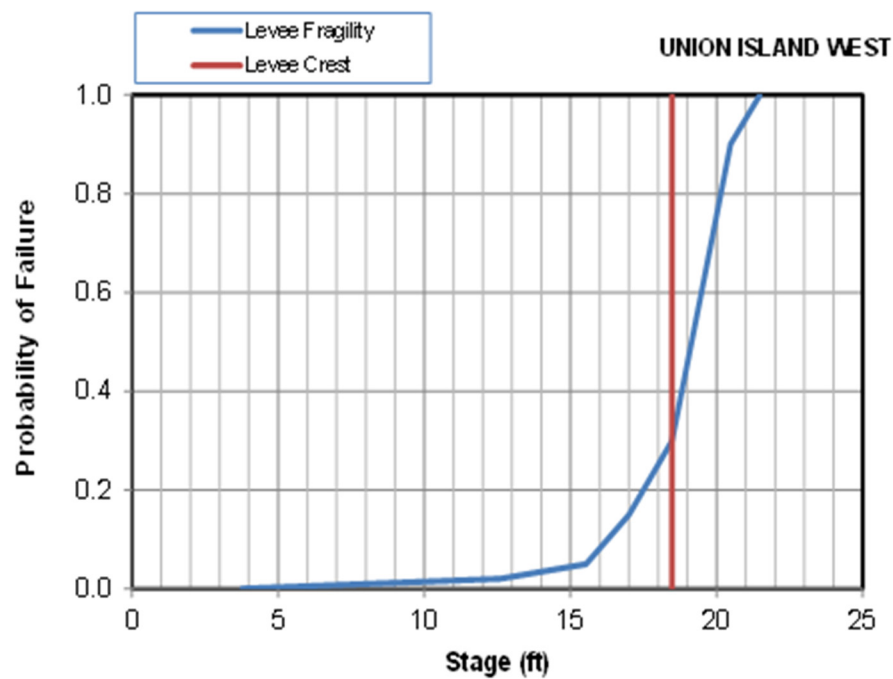


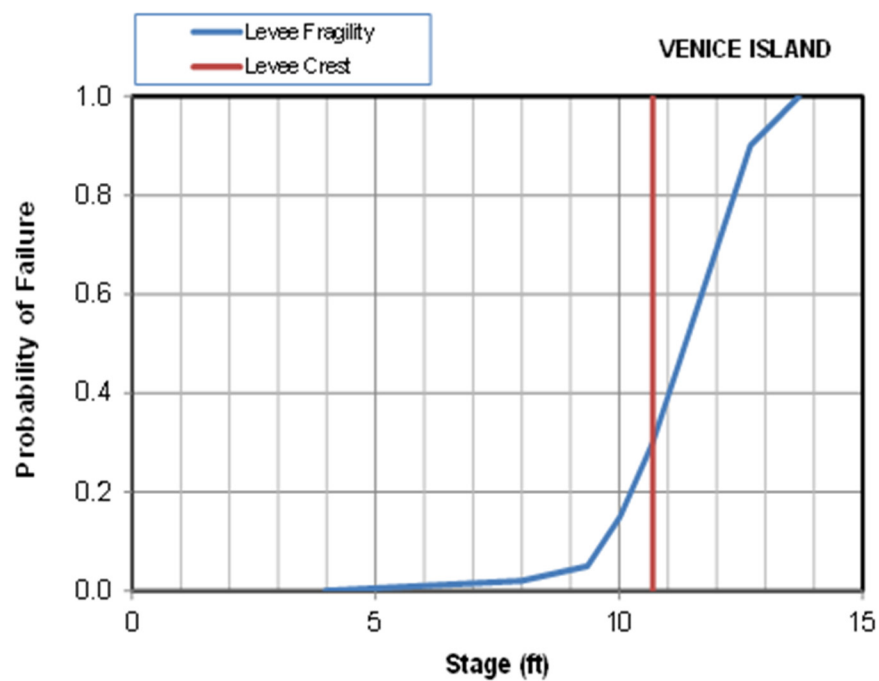
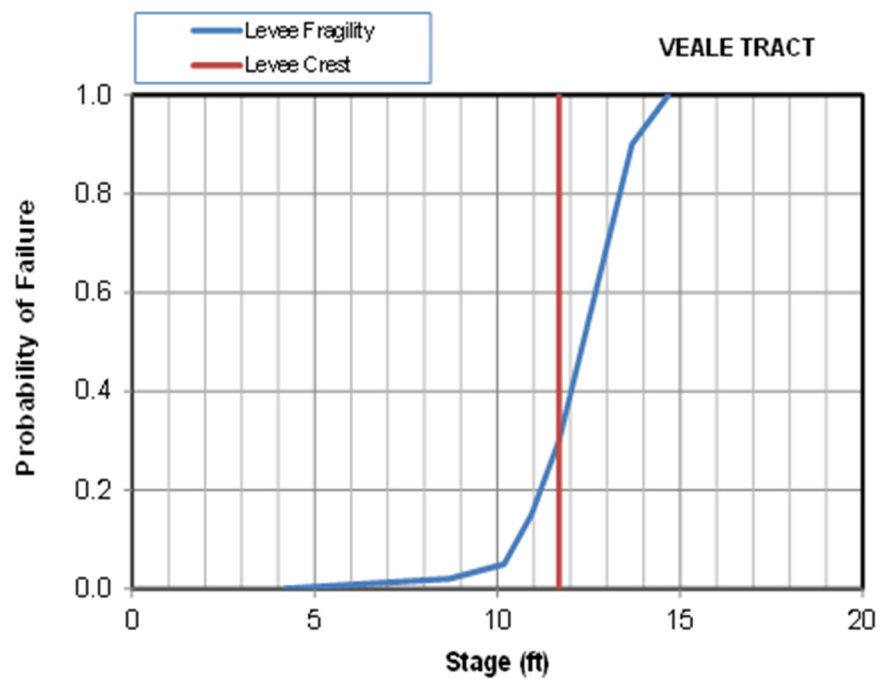


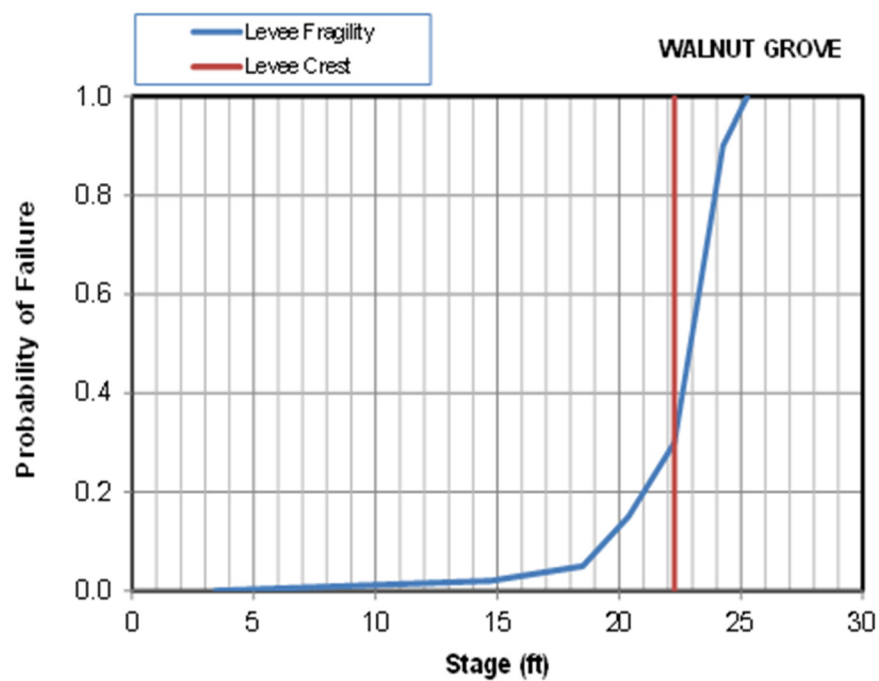
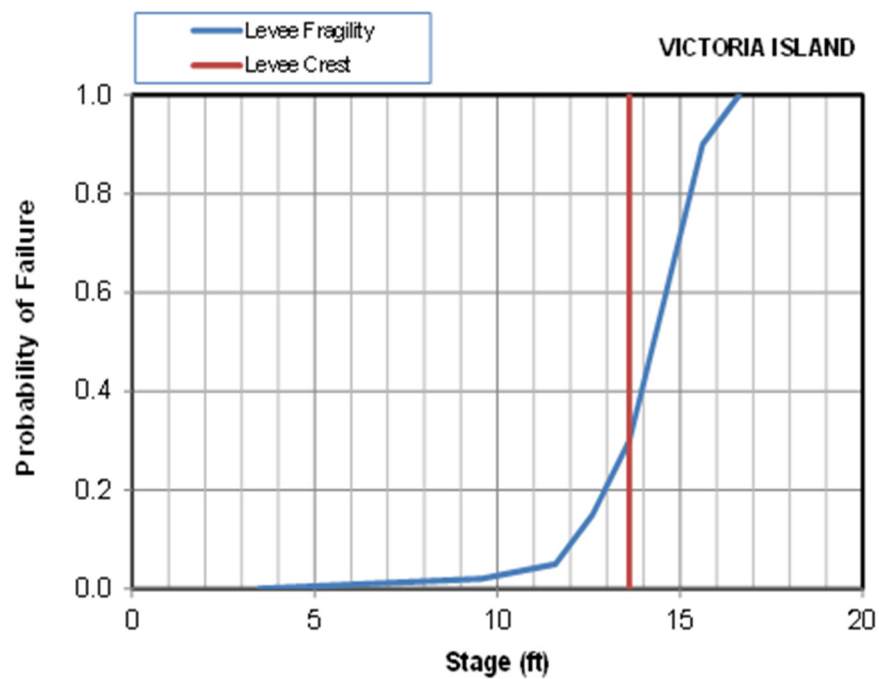


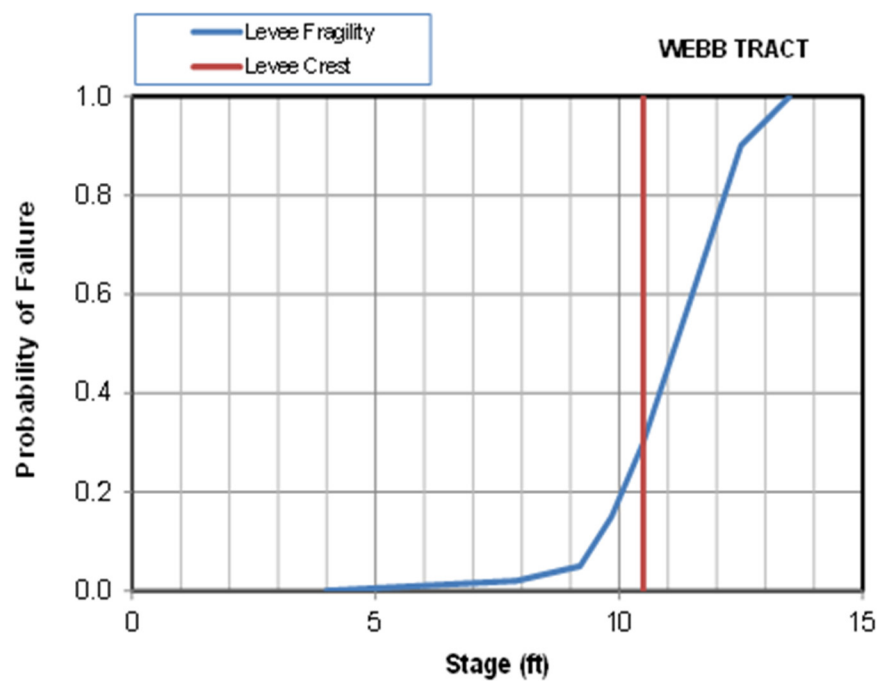
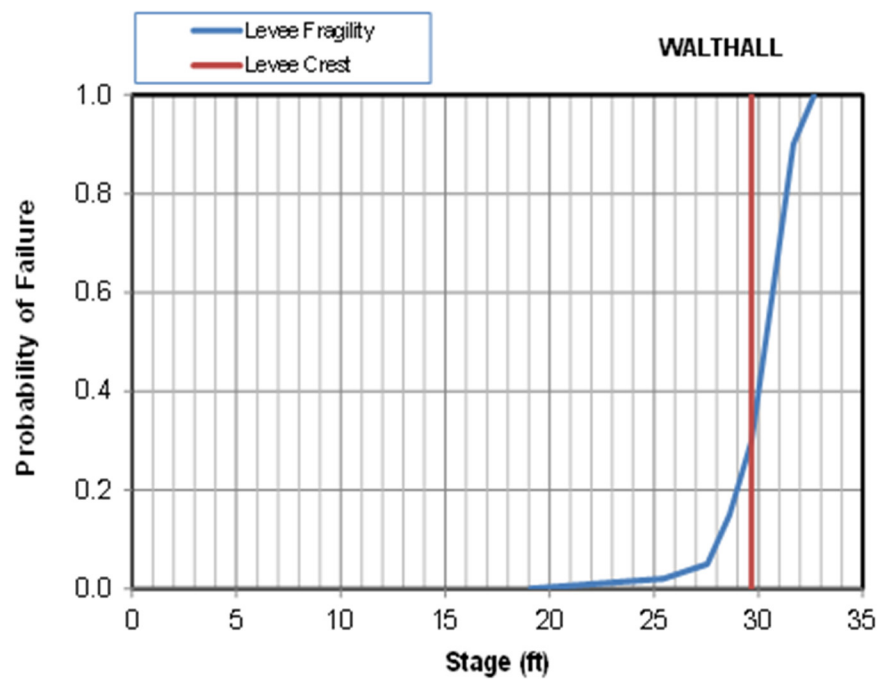


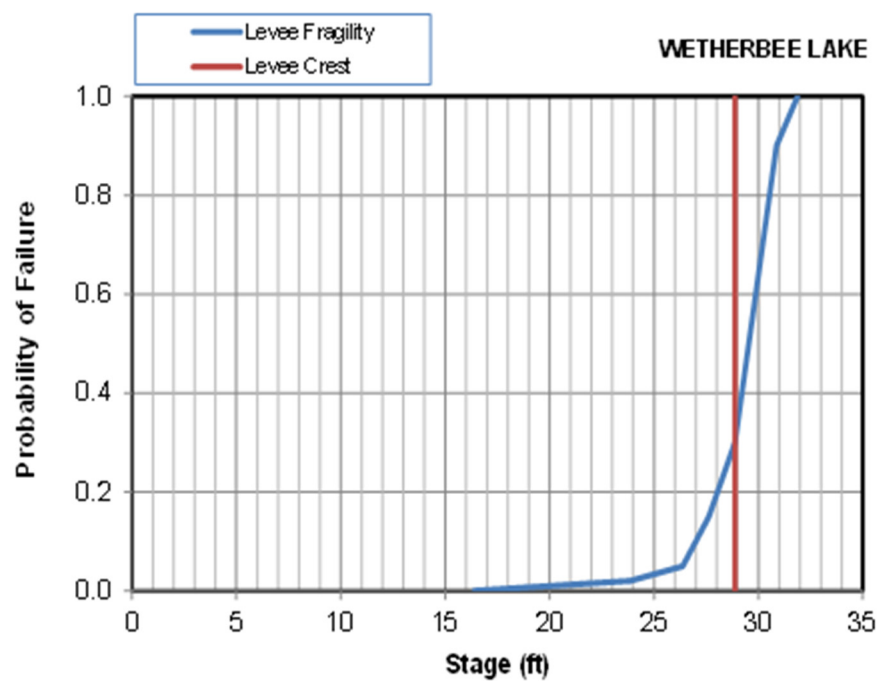
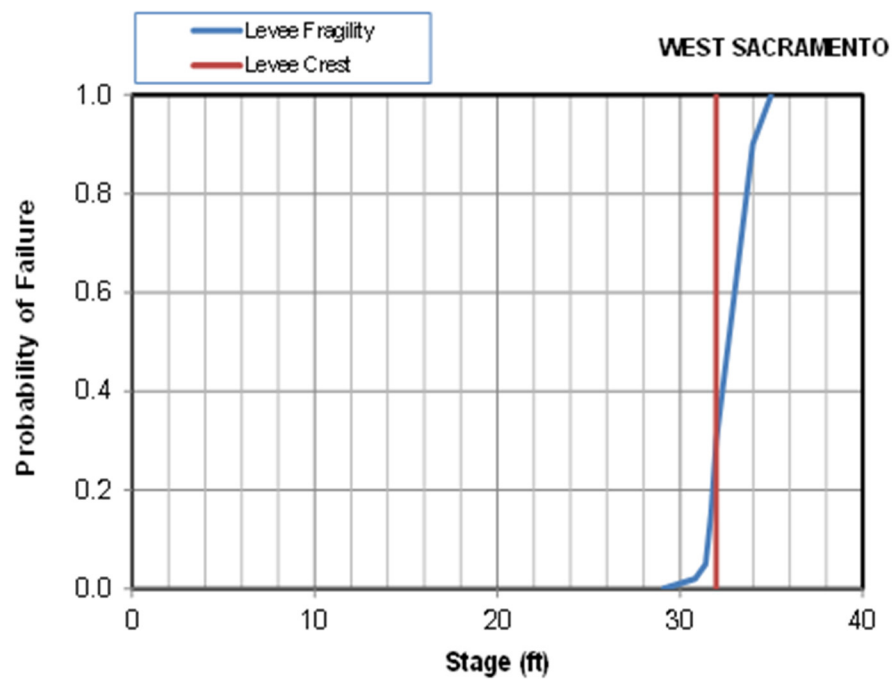


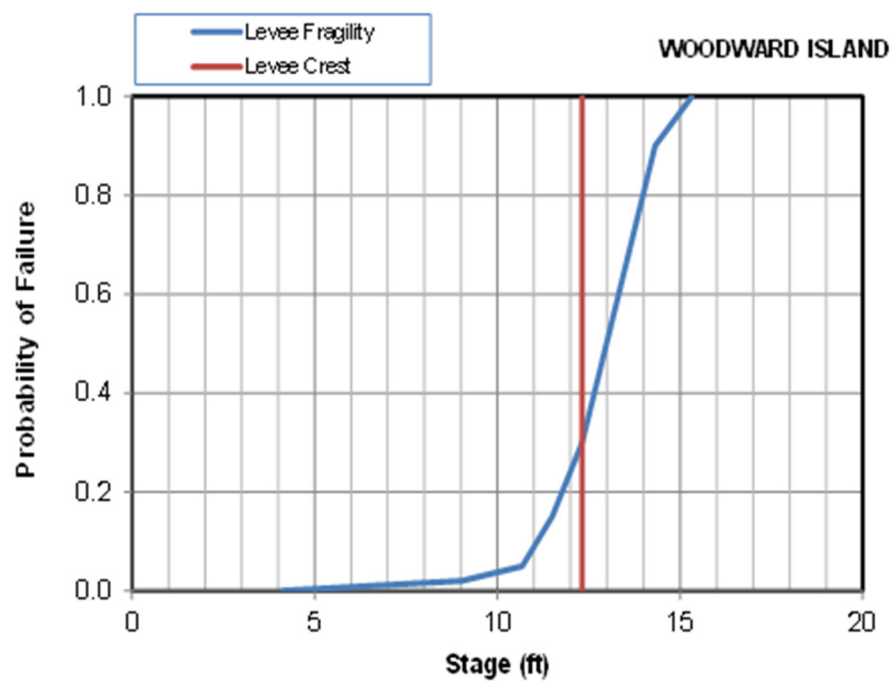
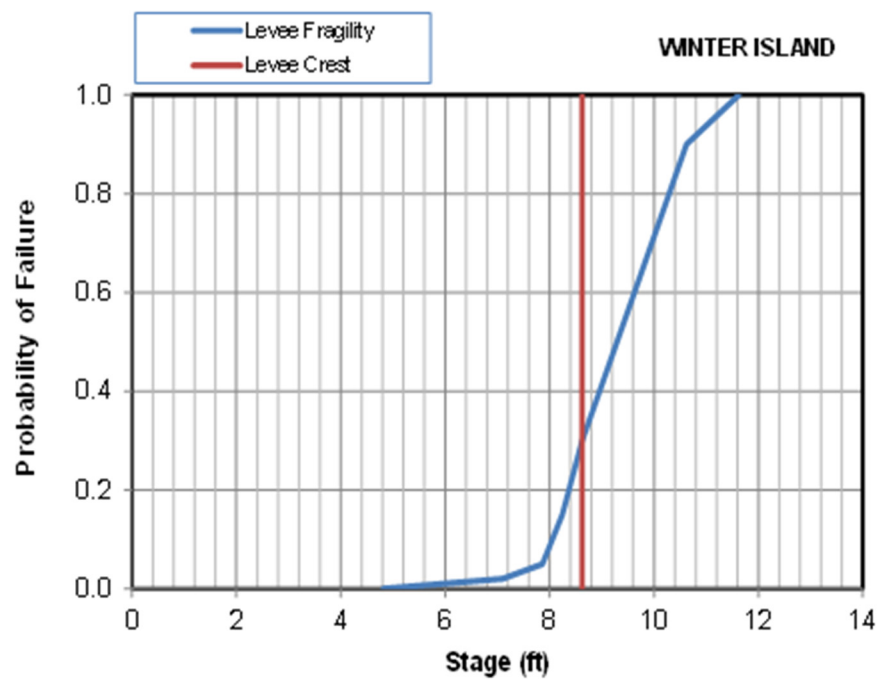


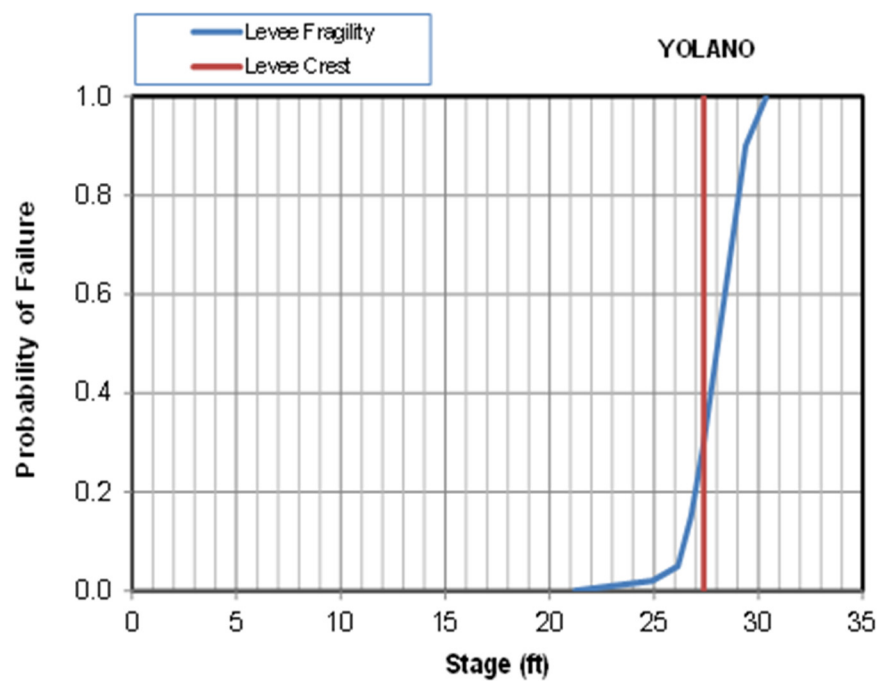
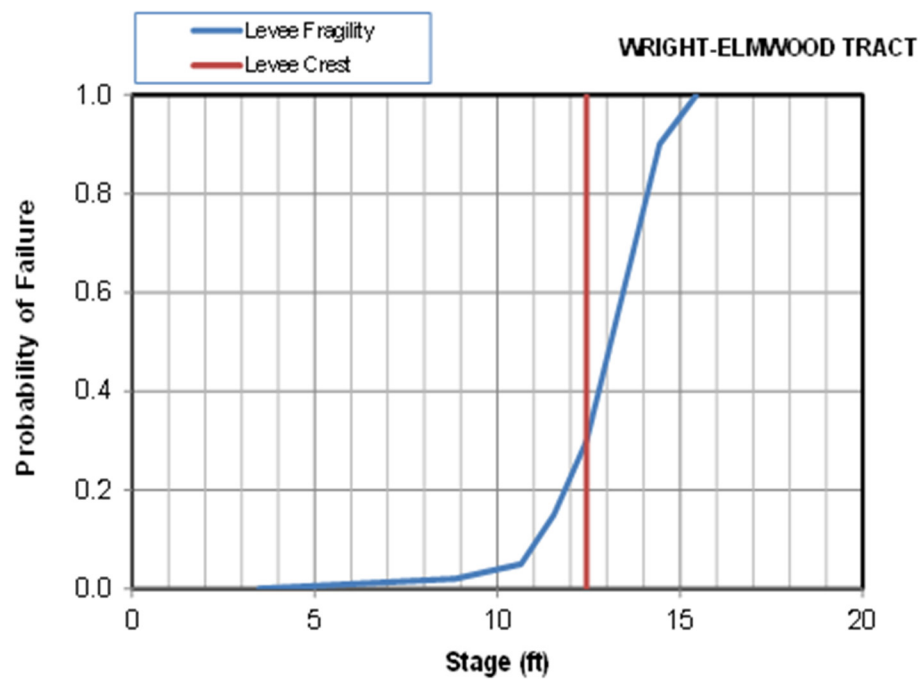












APPENDIX E

EAD and EAF Uncertainty Summaries



	1	2	3	5	6	8	9	10	11
DLIS EAD Uncertainty Summary	ATLAS TRACT	BACON ISLAND	BETHEL ISLAND	BISHOP TRACT	BIXLER TRACT	BOULDIN ISLAND	BRACK TRACT	BRADFORD ISLAND	BRANNAN- ANDRUS
Total Asset Value	\$5,665,496	\$14,406,608	\$141,982,575	\$284,605,903	\$5,099,879	\$22,390,678	\$34,885,971	\$25,821,853	\$638,102,252
Mean EAD	\$4,570	\$226,553	\$3,216,095	\$6,561,011	\$343	\$375,605	\$826,470	\$155,898	\$6,144,569

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$5,094	\$247,210	\$3,343,658	\$6,913,682	\$1,168	\$424,762	\$1,129,290	\$170,460	\$6,427,463
Total Delta Inflow (discharge) - 1 Std Dev	\$4,170	\$215,176	\$3,135,151	\$6,305,882	\$102	\$344,820	\$641,875	\$147,551	\$5,917,109
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$5,339	\$242,926	\$3,363,213	\$7,089,097	\$478	\$420,009	\$1,119,148	\$171,385	\$6,469,029
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$3,925	\$213,672	\$3,064,994	\$6,089,547	\$243	\$341,921	\$615,003	\$143,591	\$5,858,080
Tide +1 Std Dev	\$5,406	\$258,498	\$3,544,344	\$7,122,367	\$681	\$442,190	\$939,805	\$186,478	\$6,532,160
Tide -1 Std Dev	\$3,873	\$202,928	\$2,931,690	\$6,052,784	\$168	\$330,721	\$727,732	\$136,092	\$5,811,077
Fragility, H&H + 1 Std Dev	\$5,148	\$244,159	\$3,491,776	\$7,347,142	\$363	\$420,106	\$892,460	\$171,916	\$6,864,718
Fragility, H&H - 1 Std Dev	\$3,992	\$208,946	\$2,940,414	\$5,774,879	\$324	\$331,103	\$760,480	\$139,880	\$5,424,420
pga Recurrence + 1 Std Dev	\$5,060	\$255,662	\$3,639,252	\$7,289,130	\$356	\$407,119	\$878,213	\$173,131	\$6,822,344
pga Recurrence -1 Std Dev	\$4,155	\$201,955	\$2,858,586	\$5,944,008	\$333	\$348,926	\$782,627	\$141,349	\$5,571,829
Fragility, Seismic + 1 Std Dev	\$5,232	\$263,997	\$3,776,514	\$7,577,561	\$362	\$415,096	\$893,694	\$177,510	\$7,033,029
Fragility, Seismic - 1 Std Dev	\$4,036	\$195,920	\$2,772,668	\$5,770,845	\$326	\$341,881	\$770,366	\$137,945	\$5,430,982
Asset Count & Value +1 Std Dev	\$5,027	\$249,208	\$3,537,704	\$7,217,112	\$378	\$413,165	\$909,117	\$171,488	\$6,759,026
Asset Count & Value -1 Std Dev	\$4,113	\$203,897	\$2,894,485	\$5,904,910	\$309	\$338,044	\$743,823	\$140,308	\$5,530,112
Depth Damage +1 Std Dev	\$5,446	\$276,735	\$3,737,662	\$7,494,859	\$420	\$481,378	\$937,161	\$218,199	\$7,161,876
Depth Damage -1 Std Dev	\$3,695	\$190,157	\$2,801,155	\$5,639,591	\$270	\$305,324	\$723,353	\$119,035	\$5,329,743
Standard Deviation of EAD	\$1,781	\$76,285	\$964,323	\$1,950,770	\$609	\$139,839	\$403,581	\$67,534	\$1,748,244
Coefficient of Variation	39%	34%	30%	30%	177%	37%	49%	43%	28%
Mean Pct. Damage	0.1%	1.6%	2.3%	2.3%	0.0%	1.7%	2.4%	0.6%	1.0%

Percent Variation by Source									
Total Delta Inflow (discharge)	7%	4%	1%	2%	77%	8%	36%	3%	2%
Stage-Discharge (regr. & interp.)	16%	4%	2%	7%	4%	8%	39%	4%	3%
Tide	19%	13%	10%	8%	18%	16%	7%	14%	4%
Fragility, H&H	11%	5%	8%	16%	0%	10%	3%	6%	17%
pga Recurrence	6%	12%	16%	12%	0%	4%	1%	6%	13%
Fragility, Seismic	11%	20%	27%	21%	0%	7%	2%	9%	21%
Asset Count & Value	7%	9%	11%	11%	0%	7%	4%	5%	12%
Depth Damage	24%	32%	24%	23%	2%	40%	7%	54%	27%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	13	14	15	16	18	19	20	22	27	28
DLIS EAD Uncertainty Summary	BYRON TRACT	CACHE HAAS AREA	CANAL RANCH TRACT	CHIPPS ISLAND	Clifton Court Forebay	CONEY ISLAND	DEAD HORSE ISLAND	DLIS-01 (PITTSBURG AREA)	DLIS-06 (OAKLEY AREA)	DLIS-07 (KNIGHTSEN AREA)
Total Asset Value	\$4,590,500	\$66,561,102	\$13,768,652	\$1,726,613	\$20,290,726	\$16,719,134	\$1,473,792	\$1,052,022,510	\$248,074,194	\$15,630,438
Mean EAD	\$21,083	\$59,526	\$473,142	\$1,190	\$4,753	\$108,647	\$64,274	\$14,852	\$6,651	\$514

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	\$23,195	\$94,470	\$638,001	\$1,335	\$11,903	\$118,840	\$77,266	\$30,452	\$19,850	\$2,322
Total Delta Inflow (discharge) - 1 Std Dev	\$19,572	\$40,409	\$375,117	\$1,109	\$1,927	\$102,642	\$55,187	\$7,734	\$2,369	\$91
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$22,086	\$75,253	\$626,724	\$1,372	\$5,764	\$112,491	\$76,720	\$23,679	\$11,099	\$898
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$19,839	\$46,953	\$358,790	\$1,065	\$3,922	\$104,700	\$54,762	\$10,232	\$4,143	\$318
Tide +1 Std Dev	\$23,206	\$66,255	\$523,632	\$1,657	\$5,929	\$115,958	\$68,708	\$46,895	\$18,497	\$1,427
Tide -1 Std Dev	\$18,964	\$53,379	\$428,529	\$857	\$3,808	\$102,001	\$60,383	\$4,397	\$2,461	\$174
Fragility, H&H + 1 Std Dev	\$20,797	\$65,786	\$514,654	\$1,361	\$4,926	\$114,622	\$71,051	\$16,238	\$7,374	\$533
Fragility, H&H - 1 Std Dev	\$18,626	\$53,267	\$431,629	\$1,019	\$4,580	\$102,672	\$57,497	\$13,467	\$5,927	\$495
pga Recurrence + 1 Std Dev	\$23,976	\$64,471	\$508,277	\$1,316	\$4,938	\$124,426	\$68,029	\$16,827	\$7,443	\$524
pga Recurrence -1 Std Dev	\$18,639	\$55,346	\$443,377	\$1,086	\$4,596	\$95,330	\$61,095	\$13,224	\$5,993	\$505
Fragility, Seismic + 1 Std Dev	\$24,786	\$66,028	\$522,064	\$1,360	\$4,924	\$129,750	\$69,455	\$17,520	\$7,881	\$530
Fragility, Seismic - 1 Std Dev	\$18,050	\$54,297	\$435,078	\$1,032	\$4,580	\$92,210	\$60,225	\$12,390	\$5,550	\$500
Asset Count & Value +1 Std Dev	\$23,191	\$65,479	\$520,456	\$1,309	\$5,228	\$119,512	\$70,702	\$16,337	\$7,316	\$565
Asset Count & Value -1 Std Dev	\$18,974	\$53,574	\$425,828	\$1,071	\$4,278	\$97,782	\$57,847	\$13,367	\$5,985	\$463
Depth Damage +1 Std Dev	\$28,416	\$90,691	\$539,627	\$1,465	\$7,226	\$142,301	\$72,598	\$18,925	\$8,511	\$646
Depth Damage -1 Std Dev	\$16,432	\$41,459	\$412,522	\$920	\$3,274	\$87,078	\$56,549	\$10,780	\$4,792	\$382
Standard Deviation of EAD	\$8,309	\$41,329	\$220,070	\$595	\$5,574	\$40,119	\$21,088	\$25,618	\$12,613	\$1,320
Coefficient of Variation	39%	69%	47%	50%	117%	37%	33%	172%	190%	257%
Mean Pct. Damage	0.5%	0.1%	3.4%	0.1%	0.0%	0.6%	4.4%	0.0%	0.0%	0.0%

Percent Variation by Source										
Total Delta Inflow (discharge)	5%	43%	36%	4%	80%	4%	27%	20%	48%	71%
Stage-Discharge (regr. & interp.)	2%	12%	37%	7%	3%	1%	27%	7%	8%	5%
Tide	7%	2%	5%	45%	4%	3%	4%	69%	40%	23%
Fragility, H&H	2%	2%	4%	8%	0%	2%	10%	0%	0%	0%
pga Recurrence	10%	1%	2%	4%	0%	13%	3%	0%	0%	0%
Fragility, Seismic	16%	2%	4%	8%	0%	22%	5%	1%	1%	0%
Asset Count & Value	6%	2%	5%	4%	1%	7%	9%	0%	0%	0%
Depth Damage	52%	35%	8%	21%	13%	47%	14%	3%	2%	1%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	29	31	34	35	36	38	39	40	43
DLIS EAD Uncertainty Summary	DLIS-08 (DISCOVERY BAY AREA)	DLIS-10	DLIS-13 (STOCKTON)	DLIS-14 (CENTRAL STOCKTON)	DLIS-15	DLIS-17	DLIS-18	DLIS-19 (GRIZZLY SLOUGH AREA)	DLIS-22 (RIO VISTA)
Total Asset Value	\$1,062,266,567	\$14,176,608	\$1,976,282,574	\$846,005,281	\$65,950,789	\$11,641,632	\$169,542,723	\$36,710,324	\$18,787,306
Mean EAD	\$102,262	\$1,032	\$6,586,104	\$15,779,119	\$70,756	\$2,301	\$293,771	\$3,580	\$2,639

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$329,635	\$2,878	\$179,277	\$490,527	\$115,214	\$6,711	\$767,236	\$13,794	\$4,250
Total Delta Inflow (discharge) - 1 Std Dev	\$17,489	\$381	\$36,839	\$54,020	\$48,950	\$725	\$100,235	\$759	\$1,618
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$102,430	\$1,260	\$113,093	\$254,468	\$102,819	\$4,292	\$539,897	\$7,440	\$4,390
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$63,516	\$827	\$55,157	\$97,424	\$48,161	\$1,197	\$150,634	\$1,551	\$1,507
Tide +1 Std Dev	\$129,462	\$1,287	\$100,929	\$225,481	\$90,009	\$3,177	\$346,609	\$3,880	\$4,189
Tide -1 Std Dev	\$48,950	\$809	\$61,324	\$110,463	\$55,689	\$1,655	\$245,505	\$3,319	\$1,598
Fragility, H&H + 1 Std Dev	\$107,244	\$1,088	\$4,261,629	\$15,665,950	\$80,696	\$2,364	\$298,410	\$3,580	\$2,976
Fragility, H&H - 1 Std Dev	\$106,112	\$976	\$4,211,041	\$14,355,204	\$60,816	\$2,237	\$289,133	\$3,580	\$2,302
pga Recurrence + 1 Std Dev	\$105,485	\$1,068	\$6,919,636	\$15,948,217	\$74,171	\$2,313	\$294,625	\$3,580	\$2,956
pga Recurrence -1 Std Dev	\$99,585	\$1,003	\$6,306,237	\$15,637,207	\$67,892	\$2,290	\$293,056	\$3,580	\$2,375
Fragility, Seismic + 1 Std Dev	\$107,363	\$1,087	\$7,214,479	\$16,095,490	\$77,088	\$2,324	\$295,348	\$3,580	\$3,148
Fragility, Seismic - 1 Std Dev	\$97,699	\$983	\$6,010,936	\$15,487,452	\$64,984	\$2,279	\$292,338	\$3,580	\$2,182
Asset Count & Value +1 Std Dev	\$112,488	\$1,135	\$7,244,714	\$17,357,031	\$77,832	\$2,531	\$323,149	\$3,938	\$2,903
Asset Count & Value -1 Std Dev	\$92,036	\$929	\$5,927,493	\$14,201,207	\$63,680	\$2,070	\$264,394	\$3,222	\$2,375
Depth Damage +1 Std Dev	\$122,501	\$1,378	\$7,993,633	\$19,026,172	\$85,294	\$2,781	\$341,915	\$4,330	\$3,360
Depth Damage -1 Std Dev	\$82,027	\$785	\$5,178,863	\$12,532,190	\$56,632	\$1,864	\$246,321	\$2,865	\$1,918
Standard Deviation of EAD	\$164,025	\$1,330	\$1,696,360	\$3,692,694	\$50,396	\$3,493	\$393,486	\$7,203	\$2,552
Coefficient of Variation	160%	129%	26%	23%	71%	152%	134%	201%	97%
Mean Pct. Damage	0.0%	0.0%	0.3%	1.9%	0.1%	0.0%	0.2%	0.0%	0.0%

Percent Variation by Source									
Total Delta Inflow (discharge)	91%	88%	0%	0%	43%	73%	72%	82%	27%
Stage-Discharge (regr. & interp.)	1%	3%	0%	0%	29%	20%	24%	17%	32%
Tide	6%	3%	0%	0%	12%	5%	2%	0%	26%
Fragility, H&H	0%	0%	0%	3%	4%	0%	0%	0%	2%
pga Recurrence	0%	0%	3%	0%	0%	0%	0%	0%	1%
Fragility, Seismic	0%	0%	13%	1%	1%	0%	0%	0%	4%
Asset Count & Value	0%	1%	15%	18%	2%	0%	1%	0%	1%
Depth Damage	2%	5%	69%	77%	8%	2%	1%	1%	8%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	46	47	48	49	50	52	53	54	55	56
DLIS EAD Uncertainty Summary	DLIS-25	DLIS-26 (MORROW ISLAND)	DLIS-27	DLIS-28	DLIS-29	DLIS-31 (GARABALDI UNIT)	DLIS-32	DLIS-33	DLIS-34	DLIS-35
Total Asset Value	\$2,160,225	\$7,959,320	\$11,081,462	\$12,445,233	\$19,085,298	\$3,607,664	\$1,255,433	\$236,356	\$4,038,609	\$3,962,322
Mean EAD	\$1,163	\$4,970	\$4,537	\$5,195	\$22,356	\$0	\$538	\$2,358	\$67,424	\$66,731

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	\$1,226	\$5,294	\$5,248	\$5,525	\$24,306	\$1	\$646	\$2,644	\$74,681	\$73,085
Total Delta Inflow (discharge) - 1 Std Dev	\$1,112	\$4,755	\$3,979	\$4,976	\$21,023	\$0	\$462	\$2,170	\$62,341	\$61,947
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$1,296	\$5,541	\$6,108	\$5,846	\$26,412	\$0	\$800	\$2,913	\$84,996	\$85,111
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$1,039	\$4,433	\$3,225	\$4,581	\$19,252	\$0	\$374	\$1,960	\$54,371	\$53,563
Tide +1 Std Dev	\$1,548	\$6,621	\$8,912	\$6,995	\$34,036	\$1	\$1,248	\$4,008	\$115,206	\$112,634
Tide -1 Std Dev	\$835	\$3,637	\$1,640	\$3,867	\$16,403	\$0	\$259	\$1,620	\$44,155	\$44,160
Fragility, H&H + 1 Std Dev	\$1,306	\$5,660	\$4,968	\$5,967	\$25,855	\$0	\$623	\$2,655	\$74,230	\$72,366
Fragility, H&H - 1 Std Dev	\$1,020	\$4,280	\$4,106	\$4,423	\$18,857	\$0	\$453	\$2,061	\$60,619	\$61,096
pga Recurrence + 1 Std Dev	\$1,313	\$5,549	\$5,205	\$5,766	\$24,638	\$0	\$593	\$2,507	\$70,743	\$69,305
pga Recurrence -1 Std Dev	\$1,038	\$4,492	\$3,987	\$4,724	\$20,468	\$0	\$493	\$2,235	\$64,689	\$64,610
Fragility, Seismic + 1 Std Dev	\$1,361	\$5,706	\$5,423	\$5,951	\$25,261	\$0	\$612	\$2,554	\$71,825	\$70,254
Fragility, Seismic - 1 Std Dev	\$978	\$4,251	\$3,716	\$4,480	\$19,560	\$0	\$470	\$2,173	\$63,298	\$63,519
Asset Count & Value +1 Std Dev	\$1,279	\$5,467	\$4,991	\$5,714	\$24,592	\$0	\$592	\$2,594	\$74,167	\$73,404
Asset Count & Value -1 Std Dev	\$1,046	\$4,473	\$4,084	\$4,675	\$20,121	\$0	\$484	\$2,122	\$60,682	\$60,058
Depth Damage +1 Std Dev	\$1,422	\$6,099	\$5,764	\$6,314	\$28,340	\$0	\$879	\$2,796	\$87,766	\$90,379
Depth Damage -1 Std Dev	\$903	\$3,848	\$3,310	\$4,085	\$17,652	\$0	\$348	\$1,941	\$53,748	\$52,324
Standard Deviation of EAD	\$551	\$2,325	\$4,324	\$2,417	\$12,309		\$622	\$1,446	\$44,080	\$43,671
Coefficient of Variation	47%	47%	95%	47%	55%		115%	61%	65%	65%
Mean Pct. Damage	0.1%	0.1%	0.0%	0.0%	0.1%		0.0%	1.0%	1.7%	1.7%

Percent Variation by Source										
Total Delta Inflow (discharge)	1%	1%	2%	1%	2%		2%	3%	2%	2%
Stage-Discharge (regr. & interp.)	5%	6%	11%	7%	8%		12%	11%	12%	13%
Tide	42%	41%	71%	42%	51%		63%	68%	65%	61%
Fragility, H&H	7%	9%	1%	10%	8%		2%	4%	2%	2%
pga Recurrence	6%	5%	2%	5%	3%		1%	1%	0%	0%
Fragility, Seismic	12%	10%	4%	9%	5%		1%	2%	1%	1%
Asset Count & Value	4%	5%	1%	5%	3%		1%	3%	2%	2%
Depth Damage	22%	23%	8%	21%	19%		18%	9%	15%	19%
	100%	100%	100%	100%	100%		100%	100%	100%	100%

	57	58	60	61	62	65	67	68	69	70
DLIS EAD Uncertainty Summary	DLIS-36	DLIS-37 (CHADBOURNE AREA)	DLIS-39	DLIS-40	DLIS-41 (JOICE ISLAND AREA)	DLIS-44 (HILL SLOUGH UNIT)	DLIS-46	DLIS-47	DLIS-48	DLIS-49
Total Asset Value	\$11,825,681	\$11,989,199	\$11,364,582	\$6,862,839	\$9,075,245	\$2,402,317	\$1,843,120	\$4,155,399	\$11,566,441	\$229,048
Mean EAD	\$11,848	\$151,972	\$8,763	\$32,903	\$108,134	\$15,901	\$111,879	\$284,362	\$4,538	\$612

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	\$13,616	\$172,340	\$9,595	\$35,744	\$109,338	\$16,170	\$118,927	\$300,015	\$4,834	\$655
Total Delta Inflow (discharge) - 1 Std Dev	\$10,796	\$136,402	\$8,258	\$30,937	\$107,170	\$15,704	\$105,973	\$272,248	\$4,302	\$574
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$15,390	\$211,237	\$10,751	\$40,370	\$111,997	\$16,849	\$129,323	\$319,890	\$5,181	\$701
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$9,444	\$110,660	\$7,381	\$27,396	\$104,168	\$14,998	\$97,683	\$252,725	\$3,965	\$533
Tide +1 Std Dev	\$22,017	\$298,615	\$13,950	\$51,550	\$116,829	\$17,938	\$149,809	\$361,043	\$5,724	\$777
Tide -1 Std Dev	\$7,671	\$80,770	\$6,470	\$23,138	\$100,076	\$14,307	\$86,546	\$227,549	\$3,529	\$479
Fragility, H&H + 1 Std Dev	\$13,518	\$160,627	\$10,182	\$37,686	\$121,933	\$17,790	\$114,099	\$291,882	\$5,110	\$703
Fragility, H&H - 1 Std Dev	\$10,177	\$143,316	\$7,345	\$28,121	\$94,335	\$14,012	\$109,623	\$276,842	\$3,966	\$520
pga Recurrence + 1 Std Dev	\$12,755	\$155,741	\$9,465	\$35,213	\$114,231	\$16,687	\$112,566	\$286,764	\$5,110	\$680
pga Recurrence -1 Std Dev	\$11,098	\$148,862	\$8,185	\$30,995	\$103,090	\$15,251	\$111,312	\$282,376	\$4,066	\$555
Fragility, Seismic + 1 Std Dev	\$12,976	\$157,006	\$9,749	\$35,838	\$116,137	\$16,981	\$112,838	\$287,628	\$5,339	\$710
Fragility, Seismic - 1 Std Dev	\$10,740	\$147,190	\$7,873	\$30,052	\$100,480	\$14,874	\$110,993	\$281,229	\$3,796	\$523
Asset Count & Value +1 Std Dev	\$13,033	\$167,169	\$9,640	\$36,193	\$118,947	\$17,491	\$123,067	\$312,798	\$4,992	\$673
Asset Count & Value -1 Std Dev	\$10,663	\$136,775	\$7,887	\$29,613	\$97,320	\$14,311	\$100,691	\$255,926	\$4,085	\$550
Depth Damage +1 Std Dev	\$14,412	\$247,845	\$10,591	\$41,339	\$202,460	\$23,869	\$218,485	\$462,510	\$5,496	\$840
Depth Damage -1 Std Dev	\$9,309	\$100,250	\$7,031	\$26,373	\$60,104	\$11,414	\$58,239	\$188,451	\$3,612	\$463
Standard Deviation of EAD	\$8,655	\$143,191	\$4,951	\$18,767	\$74,516	\$7,121	\$88,566	\$159,477	\$1,983	\$302
Coefficient of Variation	73%	94%	56%	57%	69%	45%	79%	56%	44%	49%
Mean Pct. Damage	0.1%	1.3%	0.1%	0.5%	1.2%	0.7%	6.1%	6.8%	0.0%	0.3%

Percent Variation by Source										
Total Delta Inflow (discharge)	3%	2%	2%	2%	0%	0%	1%	1%	2%	2%
Stage-Discharge (regr. & interp.)	12%	12%	12%	12%	0%	2%	3%	4%	9%	8%
Tide	69%	58%	57%	57%	1%	7%	13%	18%	31%	24%
Fragility, H&H	4%	0%	8%	6%	3%	7%	0%	0%	8%	9%
pga Recurrence	1%	0%	2%	1%	1%	1%	0%	0%	7%	4%
Fragility, Seismic	2%	0%	4%	2%	1%	2%	0%	0%	15%	10%
Asset Count & Value	2%	1%	3%	3%	2%	5%	2%	3%	5%	4%
Depth Damage	9%	27%	13%	16%	91%	76%	82%	74%	23%	39%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	71	74	75	76	77	78	80	83	84	85	86
DLIS EAD Uncertainty Summary	DLIS-50	DLIS-53	DLIS-54	DLIS-55	DLIS-56	DLIS-57	DLIS-59	DLIS-62	DLIS-63 (GRIZZLY ISLAND AREA)	DREXLER POCKET	DREXLER TRACT
Total Asset Value	\$113,729	\$589,276	\$2,816,700	\$4,363,738	\$407,578	\$1,574,965	\$5,709,355	\$14,748,523	\$152,178,674	\$2,578,061	\$35,140,390
Mean EAD	\$1,269	\$37	\$28,465	\$25,028	\$2,098	\$12,015	\$14,945	\$124,487	\$798,330	\$18,156	\$357,733

Uncertainty Source											
Total Delta Inflow (discharge) + 1 Std Dev	\$1,311	\$61	\$28,982	\$25,384	\$2,132	\$12,189	\$15,171	\$125,475	\$1,012,949	\$25,972	\$431,025
Total Delta Inflow (discharge) - 1 Std Dev	\$1,231	\$22	\$28,027	\$24,761	\$2,072	\$11,863	\$14,755	\$123,711	\$637,414	\$13,810	\$315,634
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$1,357	\$56	\$29,257	\$25,605	\$2,146	\$12,344	\$15,441	\$126,785	\$1,195,828	\$21,067	\$389,345
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$1,189	\$24	\$27,671	\$24,541	\$2,055	\$11,696	\$14,437	\$122,413	\$532,089	\$15,624	\$325,882
Tide +1 Std Dev	\$1,424	\$70	\$29,770	\$26,053	\$2,178	\$12,553	\$15,820	\$128,419	\$2,091,247	\$25,790	\$451,084
Tide -1 Std Dev	\$1,125	\$19	\$27,207	\$24,183	\$2,030	\$11,489	\$14,053	\$120,953	\$297,247	\$12,696	\$291,373
Fragility, H&H + 1 Std Dev	\$1,496	\$41	\$33,602	\$29,518	\$2,481	\$13,889	\$17,561	\$146,038	\$830,472	\$20,593	\$387,282
Fragility, H&H - 1 Std Dev	\$1,041	\$34	\$23,327	\$20,538	\$1,715	\$10,140	\$12,330	\$102,937	\$766,187	\$15,718	\$328,184
pga Recurrence + 1 Std Dev	\$1,385	\$43	\$31,042	\$27,297	\$2,283	\$13,302	\$16,372	\$136,573	\$811,842	\$19,149	\$392,069
pga Recurrence -1 Std Dev	\$1,172	\$33	\$26,329	\$23,153	\$1,945	\$10,949	\$13,767	\$114,519	\$787,176	\$17,326	\$328,690
Fragility, Seismic + 1 Std Dev	\$1,440	\$45	\$32,170	\$28,186	\$2,365	\$13,868	\$16,985	\$141,263	\$815,981	\$19,890	\$400,375
Fragility, Seismic - 1 Std Dev	\$1,115	\$30	\$25,008	\$22,084	\$1,857	\$10,336	\$13,099	\$109,288	\$781,269	\$16,602	\$321,340
Asset Count & Value +1 Std Dev	\$1,396	\$41	\$31,311	\$27,531	\$2,308	\$13,216	\$16,440	\$136,936	\$878,163	\$19,971	\$393,506
Asset Count & Value -1 Std Dev	\$1,142	\$34	\$25,618	\$22,525	\$1,888	\$10,813	\$13,451	\$112,038	\$718,497	\$16,340	\$321,960
Depth Damage +1 Std Dev	\$1,568	\$47	\$41,585	\$50,026	\$4,196	\$18,482	\$21,746	\$190,579	\$1,180,870	\$21,532	\$444,074
Depth Damage -1 Std Dev	\$1,055	\$28	\$21,048	\$12,527	\$1,049	\$8,470	\$11,053	\$88,318	\$568,770	\$15,230	\$298,010
Standard Deviation of EAD	\$450	\$39	\$12,681	\$19,819	\$1,664	\$5,911	\$6,649	\$60,253	\$1,025,441	\$10,485	\$144,100
Coefficient of Variation	35%	104%	45%	79%	79%	49%	44%	48%	128%	58%	40%
Mean Pct. Damage	1.1%	0.0%	1.0%	0.6%	0.5%	0.8%	0.3%	0.8%	0.5%	0.7%	1.0%

Percent Variation by Source											
Total Delta Inflow (discharge)	1%	25%	0%	0%	0%	0%	0%	0%	3%	34%	16%
Stage-Discharge (regr. & interp.)	3%	17%	0%	0%	0%	0%	1%	0%	10%	7%	5%
Tide	11%	45%	1%	0%	0%	1%	2%	0%	77%	39%	31%
Fragility, H&H	26%	1%	16%	5%	5%	10%	15%	13%	0%	5%	4%
pga Recurrence	6%	2%	3%	1%	1%	4%	4%	3%	0%	1%	5%
Fragility, Seismic	13%	4%	8%	2%	2%	9%	9%	7%	0%	2%	8%
Asset Count & Value	8%	1%	5%	2%	2%	4%	5%	4%	1%	3%	6%
Depth Damage	33%	6%	66%	89%	89%	72%	65%	72%	9%	9%	26%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	87	88	89	90	91	92	94	95	96
DLIS EAD Uncertainty Summary	DUTCH SLOUGH	EGBERT TRACT	EHRHEARDT CLUB	EMPIRE TRACT	FABIAN TRACT	FAY ISLAND	GLANVILLE	GLIDE DISTRICT	GRAND ISLAND
Total Asset Value	\$6,077,326	\$250,440,401	\$20,054,541	\$16,514,693	\$841,291,449	\$195,146	\$402,122,596	\$4,805,816	\$270,291,329
Mean EAD	\$10,075	\$265,964	\$591,831	\$840,870	\$792,162	\$4,119	\$4,829,056	\$11,991	\$9,935,737

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$12,685	\$301,305	\$786,539	\$1,037,856	\$906,062	\$5,290	\$7,505,669	\$16,219	\$10,249,428
Total Delta Inflow (discharge) - 1 Std Dev	\$8,653	\$234,595	\$459,279	\$715,983	\$697,935	\$3,457	\$3,073,199	\$9,249	\$9,602,478
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$12,031	\$304,087	\$769,228	\$1,027,655	\$858,195	\$4,776	\$7,477,755	\$14,257	\$10,235,820
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$8,404	\$230,692	\$460,144	\$707,526	\$736,293	\$3,564	\$3,008,961	\$10,021	\$9,643,691
Tide +1 Std Dev	\$14,882	\$288,779	\$620,991	\$1,108,661	\$932,031	\$5,491	\$5,192,571	\$13,135	\$10,107,475
Tide -1 Std Dev	\$6,960	\$243,929	\$563,147	\$668,135	\$663,586	\$3,142	\$4,467,719	\$10,923	\$9,767,326
Fragility, H&H + 1 Std Dev	\$11,499	\$294,696	\$669,782	\$919,357	\$851,742	\$4,618	\$5,001,743	\$14,370	\$11,836,541
Fragility, H&H - 1 Std Dev	\$8,652	\$237,231	\$513,879	\$762,383	\$732,583	\$3,619	\$4,656,369	\$9,611	\$8,034,934
pga Recurrence + 1 Std Dev	\$11,060	\$298,060	\$607,910	\$894,286	\$899,831	\$4,418	\$4,906,932	\$12,677	\$10,705,017
pga Recurrence -1 Std Dev	\$9,258	\$238,863	\$578,363	\$795,618	\$700,873	\$3,870	\$4,763,003	\$11,416	\$9,288,987
Fragility, Seismic + 1 Std Dev	\$11,627	\$308,930	\$621,086	\$907,645	\$886,803	\$4,602	\$4,927,245	\$13,261	\$11,451,655
Fragility, Seismic - 1 Std Dev	\$8,690	\$232,402	\$565,143	\$783,817	\$690,114	\$3,687	\$4,744,709	\$10,829	\$8,851,548
Asset Count & Value +1 Std Dev	\$11,083	\$292,560	\$651,014	\$924,957	\$871,379	\$4,530	\$5,311,962	\$13,190	\$10,929,311
Asset Count & Value -1 Std Dev	\$9,068	\$239,367	\$532,648	\$756,783	\$712,946	\$3,707	\$4,346,150	\$10,792	\$8,942,164
Depth Damage +1 Std Dev	\$12,648	\$324,812	\$672,541	\$964,938	\$944,884	\$4,569	\$5,497,101	\$13,767	\$11,343,354
Depth Damage -1 Std Dev	\$7,968	\$216,799	\$517,105	\$732,421	\$640,135	\$3,668	\$4,217,188	\$10,356	\$8,720,100
Standard Deviation of EAD	\$5,876	\$98,752	\$260,987	\$364,762	\$291,840	\$1,869	\$3,274,393	\$5,454	\$2,955,207
Coefficient of Variation	58%	37%	44%	43%	37%	45%	68%	45%	30%
Mean Pct. Damage	0.2%	0.1%	3.0%	5.1%	0.1%	2.1%	1.2%	0.2%	3.7%

Percent Variation by Source									
Total Delta Inflow (discharge)	12%	11%	39%	19%	13%	24%	46%	41%	1%
Stage-Discharge (regr. & interp.)	10%	14%	35%	19%	4%	11%	47%	15%	1%
Tide	45%	5%	1%	36%	21%	40%	1%	4%	0%
Fragility, H&H	6%	8%	9%	5%	4%	7%	0%	19%	41%
pga Recurrence	2%	9%	0%	2%	12%	2%	0%	1%	6%
Fragility, Seismic	6%	15%	1%	3%	11%	6%	0%	5%	19%
Asset Count & Value	3%	7%	5%	5%	7%	5%	2%	5%	11%
Depth Damage	16%	30%	9%	10%	27%	6%	4%	10%	20%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	97	98	99	101	102	104	105	106	108
DLIS EAD Uncertainty Summary	HASTINGS TRACT	HOLLAND TRACT	HOLT STATION	HONKER LAKE TRACT	HOTCHKISS TRACT	JERSEY ISLAND	KASSON DISTRICT	KING ISLAND	LIBBY MCNEIL
Total Asset Value	\$88,621,732	\$109,806,595	\$14,857,836	\$88,763,386	\$163,341,470	\$86,100,394	\$44,307,149	\$45,105,010	\$8,852,277
Mean EAD	\$93,440	\$461,868	\$327,620	\$311,884	\$1,636,626	\$204,844	\$0	\$939,759	\$53,246

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$139,617	\$499,837	\$407,400	\$327,938	\$1,798,181	\$217,375	\$0	\$1,057,962	\$62,765
Total Delta Inflow (discharge) - 1 Std Dev	\$66,799	\$440,268	\$259,661	\$301,186	\$1,535,002	\$197,117	\$0	\$874,702	\$45,497
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$118,244	\$496,836	\$388,913	\$322,046	\$1,818,211	\$218,194	\$0	\$1,042,113	\$63,404
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$73,356	\$432,093	\$272,082	\$301,438	\$1,471,573	\$189,473	\$0	\$858,643	\$44,406
Tide +1 Std Dev	\$105,338	\$530,266	\$478,883	\$335,555	\$1,996,414	\$238,542	\$0	\$1,057,452	\$56,366
Tide -1 Std Dev	\$82,659	\$408,083	\$217,863	\$290,324	\$1,331,830	\$174,728	\$0	\$849,149	\$50,251
Fragility, H&H + 1 Std Dev	\$102,895	\$501,885	\$337,179	\$373,455	\$1,862,335	\$228,030	\$0	\$1,052,601	\$63,143
Fragility, H&H - 1 Std Dev	\$83,985	\$421,850	\$318,061	\$250,312	\$1,410,916	\$181,659	\$0	\$826,916	\$43,348
pga Recurrence + 1 Std Dev	\$102,820	\$519,975	\$329,786	\$334,716	\$1,816,986	\$229,860	\$0	\$1,028,443	\$57,259
pga Recurrence -1 Std Dev	\$85,520	\$412,771	\$325,810	\$292,796	\$1,486,782	\$183,917	\$0	\$864,604	\$49,888
Fragility, Seismic + 1 Std Dev	\$104,538	\$540,396	\$331,450	\$351,467	\$1,923,506	\$230,050	\$0	\$1,060,448	\$62,562
Fragility, Seismic - 1 Std Dev	\$83,664	\$400,694	\$324,179	\$275,582	\$1,379,917	\$172,263	\$0	\$843,381	\$46,826
Asset Count & Value +1 Std Dev	\$102,784	\$508,055	\$360,382	\$343,072	\$1,800,288	\$225,329	\$0	\$1,033,734	\$58,570
Asset Count & Value -1 Std Dev	\$84,096	\$415,681	\$294,858	\$280,696	\$1,472,963	\$184,360	\$0	\$845,783	\$47,921
Depth Damage +1 Std Dev	\$125,217	\$549,297	\$378,509	\$377,189	\$1,881,785	\$266,590	\$0	\$1,070,332	\$62,208
Depth Damage -1 Std Dev	\$71,537	\$394,720	\$284,535	\$264,237	\$1,403,781	\$164,999	\$0	\$824,535	\$45,003
Standard Deviation of EAD	\$55,125	\$152,078	\$171,148	\$103,096	\$627,500	\$78,910		\$287,782	\$21,211
Coefficient of Variation	59%	33%	52%	33%	38%	39%		31%	40%
Mean Pct. Damage	0.1%	0.4%	2.2%	0.4%	1.0%	0.2%		2.1%	0.6%

Percent Variation by Source									
Total Delta Inflow (discharge)	44%	4%	19%	2%	4%	2%		10%	17%
Stage-Discharge (regr. & interp.)	17%	5%	12%	1%	8%	3%		10%	20%
Tide	4%	16%	58%	5%	28%	16%		13%	2%
Fragility, H&H	3%	7%	0%	36%	13%	9%		15%	22%
pga Recurrence	2%	12%	0%	4%	7%	8%		8%	3%
Fragility, Seismic	4%	21%	0%	14%	19%	13%		14%	14%
Asset Count & Value	3%	9%	4%	9%	7%	7%		11%	6%
Depth Damage	24%	26%	8%	30%	15%	41%		18%	16%
	100%	100%	100%	100%	100%	100%		100%	100%

	110	111	116	117	118	119	120	121	122
DLIS EAD Uncertainty Summary	LISBON DISTRICT	LITTLE EGBERT TRACT	LOWER ROBERTS ISLAND	MAINTENANCE AREA 9 NORTH	MANDEVILLE ISLAND	MCCORMACK- WILLIAMSON TRACT	MCDONALD ISLAND	MCMULLIN RANCH	MEDFORD ISLAND
Total Asset Value	\$65,018,995	\$17,421,881	\$449,079,256	\$2,718,073,646	\$15,075,927	\$9,081,945	\$465,783,237	\$53,315,739	\$475,327
Mean EAD	\$553,274	\$705,345	\$906,600	\$30,950,213	\$348,902	\$212,555	\$2,734,304	\$0	\$17,422

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$650,458	\$834,461	\$989,979	\$31,767,573	\$378,103	\$289,476	\$2,838,715	\$0	\$19,307
Total Delta Inflow (discharge) - 1 Std Dev	\$476,546	\$603,202	\$851,132	\$23,885,131	\$332,826	\$162,413	\$2,666,058	\$0	\$16,392
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$626,803	\$859,919	\$979,424	\$31,445,212	\$375,320	\$289,049	\$2,868,193	\$0	\$19,027
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$485,499	\$586,584	\$844,777	\$24,006,923	\$326,545	\$157,539	\$2,608,261	\$0	\$16,175
Tide +1 Std Dev	\$569,100	\$864,181	\$1,042,133	\$27,696,574	\$402,194	\$228,519	\$2,985,734	\$0	\$20,677
Tide -1 Std Dev	\$537,716	\$583,782	\$785,757	\$27,359,064	\$309,185	\$198,087	\$2,496,272	\$0	\$15,209
Fragility, H&H + 1 Std Dev	\$675,491	\$749,886	\$1,035,656	\$39,667,771	\$384,315	\$231,741	\$2,999,577	\$0	\$19,182
Fragility, H&H - 1 Std Dev	\$431,057	\$660,763	\$777,544	\$26,424,368	\$313,489	\$193,368	\$2,469,031	\$0	\$15,662
pga Recurrence + 1 Std Dev	\$583,846	\$731,520	\$1,002,410	\$32,393,859	\$388,887	\$221,779	\$3,069,938	\$0	\$19,328
pga Recurrence -1 Std Dev	\$527,608	\$683,220	\$826,463	\$29,738,810	\$315,082	\$204,730	\$2,449,728	\$0	\$15,810
Fragility, Seismic + 1 Std Dev	\$610,295	\$737,858	\$1,077,193	\$33,595,679	\$403,643	\$224,376	\$3,091,439	\$0	\$19,940
Fragility, Seismic - 1 Std Dev	\$499,799	\$677,719	\$752,415	\$28,483,100	\$306,324	\$202,518	\$2,394,852	\$0	\$15,395
Asset Count & Value +1 Std Dev	\$608,601	\$775,880	\$997,260	\$34,045,234	\$383,792	\$233,810	\$3,007,734	\$0	\$19,164
Asset Count & Value -1 Std Dev	\$497,946	\$634,811	\$815,940	\$27,855,192	\$314,012	\$191,299	\$2,460,874	\$0	\$15,680
Depth Damage +1 Std Dev	\$635,327	\$891,930	\$1,040,960	\$34,786,600	\$417,382	\$246,887	\$3,057,430	\$0	\$19,378
Depth Damage -1 Std Dev	\$479,555	\$580,300	\$791,863	\$27,140,243	\$296,485	\$183,482	\$2,416,478	\$0	\$15,467
Standard Deviation of EAD	\$201,759	\$290,570	\$316,671	\$10,282,678	\$114,564	\$102,998	\$741,316		\$5,463
Coefficient of Variation	36%	41%	35%	33%	33%	48%	27%		31%
Mean Pct. Damage	0.9%	4.0%	0.2%	1.1%	2.3%	2.3%	0.6%		3.7%

Percent Variation by Source									
Total Delta Inflow (discharge)	19%	16%	5%	15%	4%	38%	1%		7%
Stage-Discharge (regr. & interp.)	12%	22%	5%	13%	5%	41%	3%		7%
Tide	1%	23%	16%	0%	16%	2%	11%		25%
Fragility, H&H	37%	2%	17%	41%	10%	3%	13%		10%
pga Recurrence	2%	1%	8%	2%	10%	1%	17%		10%
Fragility, Seismic	7%	1%	26%	6%	18%	1%	22%		17%
Asset Count & Value	8%	6%	8%	9%	9%	4%	14%		10%
Depth Damage	15%	29%	15%	14%	28%	9%	19%		13%
	100%	100%	100%	100%	100%	100%	100%		100%

	123	124	125	127	128	129	130	131	132
DLIS EAD Uncertainty Summary	MEIN'S LANDING	MERRITT ISLAND	MIDDLE & UPPER ROBERTS ISLAND	MOSSDALE ISLAND	NETHERLANDS	NEW HOPE TRACT	PALM-ORWOOD	PARADISE JUNCTION	PEARSON DISTRICT
Total Asset Value	\$4,421,335	\$66,874,759	\$163,527,538	\$23,352,518	\$260,416,494	\$171,360,928	\$305,778,099	\$207,856,578	\$149,462,488
Mean EAD	\$10,779	\$1,578,266	\$1,795,673	\$67,989	\$4,190,891	\$1,385,606	\$519,505	\$668,255	\$3,744,587

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$11,047	\$1,751,422	\$932,427	\$96,802	\$4,887,949	\$2,510,545	\$603,223	\$939,837	\$3,947,609
Total Delta Inflow (discharge) - 1 Std Dev	\$10,549	\$1,420,433	\$748,092	\$52,223	\$3,690,046	\$789,881	\$473,197	\$522,978	\$3,528,652
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$11,483	\$1,735,077	\$899,743	\$71,662	\$4,640,876	\$2,276,055	\$564,225	\$701,506	\$3,916,895
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$10,001	\$1,431,776	\$750,594	\$64,441	\$3,774,471	\$836,525	\$481,446	\$636,931	\$3,574,630
Tide +1 Std Dev	\$12,097	\$1,593,858	\$969,191	\$81,980	\$4,484,363	\$1,545,755	\$614,973	\$787,699	\$3,789,335
Tide -1 Std Dev	\$9,438	\$1,562,980	\$696,348	\$56,231	\$3,912,206	\$1,241,654	\$449,833	\$567,503	\$3,699,122
Fragility, H&H + 1 Std Dev	\$12,430	\$1,903,087	\$2,655,943	\$78,193	\$4,971,533	\$1,480,117	\$570,680	\$753,581	\$4,518,259
Fragility, H&H - 1 Std Dev	\$9,127	\$1,253,445	\$1,749,014	\$57,784	\$3,410,248	\$1,291,095	\$468,330	\$582,929	\$2,970,915
pga Recurrence + 1 Std Dev	\$11,959	\$1,680,014	\$1,919,206	\$72,163	\$4,481,835	\$1,447,260	\$586,101	\$710,015	\$4,003,844
pga Recurrence -1 Std Dev	\$9,805	\$1,493,012	\$1,691,827	\$64,498	\$3,947,413	\$1,333,356	\$464,140	\$633,391	\$3,526,861
Fragility, Seismic + 1 Std Dev	\$12,433	\$1,822,201	\$1,992,902	\$75,469	\$4,871,987	\$1,469,879	\$627,491	\$725,852	\$4,344,908
Fragility, Seismic - 1 Std Dev	\$9,271	\$1,409,636	\$1,597,858	\$61,253	\$3,720,775	\$1,318,569	\$422,884	\$609,030	\$3,344,736
Asset Count & Value +1 Std Dev	\$11,857	\$1,736,093	\$1,975,240	\$74,788	\$4,609,980	\$1,524,167	\$571,455	\$735,080	\$4,119,046
Asset Count & Value -1 Std Dev	\$9,701	\$1,420,440	\$1,616,106	\$61,190	\$3,771,802	\$1,247,045	\$467,554	\$601,429	\$3,370,128
Depth Damage +1 Std Dev	\$13,537	\$1,792,166	\$2,044,917	\$84,377	\$4,830,851	\$1,606,013	\$616,721	\$787,308	\$4,223,980
Depth Damage -1 Std Dev	\$8,857	\$1,379,164	\$1,560,803	\$55,117	\$3,628,347	\$1,186,922	\$445,011	\$554,330	\$3,298,733
Standard Deviation of EAD	\$3,925	\$524,386	\$617,311	\$33,245	\$1,475,640	\$1,167,202	\$199,076	\$294,622	\$1,155,411
Coefficient of Variation	36%	33%	34%	49%	35%	84%	38%	44%	31%
Mean Pct. Damage	0.2%	2.4%	1.1%	0.3%	1.6%	0.8%	0.2%	0.3%	2.5%

Percent Variation by Source									
Total Delta Inflow (discharge)	0%	10%	2%	45%	16%	54%	11%	50%	3%
Stage-Discharge (regr. & interp.)	4%	8%	1%	1%	9%	38%	4%	1%	2%
Tide	11%	0%	5%	15%	4%	2%	17%	14%	0%
Fragility, H&H	18%	38%	54%	9%	28%	1%	7%	8%	45%
pga Recurrence	8%	3%	3%	1%	3%	0%	9%	2%	4%
Fragility, Seismic	16%	15%	10%	5%	15%	0%	26%	4%	19%
Asset Count & Value	8%	9%	8%	4%	8%	1%	7%	5%	11%
Depth Damage	36%	16%	15%	19%	17%	3%	19%	16%	16%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	133	134	135	136	137	138	139	140	141
DLIS EAD Uncertainty Summary	PESCADERO DISTRICT	PETERS POCKET	PICO-NAGLEE	PROSPECT ISLAND	QUIMBY ISLAND	RANDALL ISLAND	RECLAMATION DISTRICT 17	RINDGE TRACT	RIO BLANCO TRACT
Total Asset Value	\$366,226,887	\$21,731,427	\$389,111,813	\$5,533,470	\$5,333,067	\$15,034,388	\$2,213,651,549	\$32,608,649	\$1,446,547
Mean EAD	\$73,646	\$17,940	\$114,186	\$64,410	\$59,525	\$357,464	\$15,588,482	\$1,047,988	\$38,764

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$135,168	\$35,465	\$176,662	\$96,288	\$61,513	\$403,217	\$16,683,411	\$1,164,161	\$51,433
Total Delta Inflow (discharge) - 1 Std Dev	\$41,497	\$9,307	\$72,787	\$43,904	\$58,181	\$314,349	\$14,701,295	\$984,606	\$30,695
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$81,801	\$24,389	\$129,884	\$88,520	\$62,343	\$401,721	\$16,101,966	\$1,134,450	\$51,689
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$66,026	\$13,103	\$99,402	\$46,394	\$56,895	\$314,976	\$15,081,660	\$983,204	\$29,000
Tide +1 Std Dev	\$104,179	\$20,835	\$160,977	\$84,544	\$64,770	\$364,261	\$17,102,947	\$1,189,544	\$48,231
Tide -1 Std Dev	\$51,227	\$15,453	\$79,028	\$48,542	\$54,670	\$350,756	\$14,156,551	\$939,585	\$31,255
Fragility, H&H + 1 Std Dev	\$81,731	\$19,470	\$123,688	\$69,284	\$64,084	\$433,385	\$17,942,410	\$1,165,956	\$42,402
Fragility, H&H - 1 Std Dev	\$65,562	\$16,411	\$104,685	\$59,535	\$54,965	\$281,542	\$13,234,553	\$930,019	\$35,125
pga Recurrence + 1 Std Dev	\$83,002	\$18,166	\$130,988	\$65,688	\$67,680	\$381,659	\$17,209,196	\$1,154,990	\$40,770
pga Recurrence -1 Std Dev	\$65,838	\$17,755	\$100,199	\$63,344	\$52,632	\$337,233	\$14,233,601	\$957,332	\$37,063
Fragility, Seismic + 1 Std Dev	\$86,583	\$18,423	\$135,978	\$66,439	\$70,608	\$400,501	\$17,848,507	\$1,188,818	\$41,543
Fragility, Seismic - 1 Std Dev	\$60,499	\$17,446	\$91,997	\$62,512	\$50,918	\$318,560	\$13,220,355	\$932,101	\$36,588
Asset Count & Value +1 Std Dev	\$81,011	\$19,734	\$125,605	\$70,851	\$65,477	\$393,210	\$17,147,330	\$1,152,787	\$42,640
Asset Count & Value -1 Std Dev	\$66,282	\$16,146	\$102,768	\$57,969	\$53,572	\$321,717	\$14,029,633	\$943,189	\$34,887
Depth Damage +1 Std Dev	\$91,957	\$27,499	\$142,983	\$85,845	\$84,278	\$405,305	\$18,286,464	\$1,181,581	\$45,125
Depth Damage -1 Std Dev	\$55,352	\$12,533	\$85,395	\$50,616	\$44,982	\$310,301	\$12,905,905	\$923,344	\$33,064
Standard Deviation of EAD	\$60,457	\$16,492	\$79,869	\$42,831	\$25,130	\$123,982	\$5,117,601	\$311,790	\$19,557
Coefficient of Variation	82%	92%	70%	66%	42%	35%	33%	30%	50%
Mean Pct. Damage	0.0%	0.1%	0.0%	1.2%	1.1%	2.4%	0.7%	3.2%	2.7%

Percent Variation by Source									
Total Delta Inflow (discharge)	60%	63%	42%	37%	0%	13%	4%	8%	28%
Stage-Discharge (regr. & interp.)	2%	12%	4%	24%	1%	12%	1%	6%	34%
Tide	19%	3%	26%	18%	4%	0%	8%	16%	19%
Fragility, H&H	2%	1%	1%	1%	3%	37%	21%	14%	3%
pga Recurrence	2%	0%	4%	0%	9%	3%	8%	10%	1%
Fragility, Seismic	5%	0%	8%	0%	15%	11%	20%	17%	2%
Asset Count & Value	1%	1%	2%	2%	6%	8%	9%	11%	4%
Depth Damage	9%	21%	13%	17%	61%	15%	28%	17%	10%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	142	143	144	145	146	147	148	151	152
DLIS EAD Uncertainty Summary	RIVER JUNCTION	ROUGH AND READY ISLAND	RYER ISLAND	NORTH STOCKTON	SHERMAN ISLAND	SHIMA TRACT	SHIN KEE TRACT	STARK TRACT	STATEN ISLAND
Total Asset Value	\$50,223,262	\$78,428,017	\$111,475,504	\$3,427,598,233	\$135,565,721	\$21,298,838	\$3,077,519	\$6,255,466	\$37,904,020
Mean EAD	\$6,575	\$111,513	\$2,388,743	\$34,774,983	\$902,214	\$367,093	\$84,199	\$2,152	\$702,563

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$9,801	\$126,162	\$2,456,238	\$2,005,352	\$916,794	\$408,538	\$115,117	\$3,265	\$773,045
Total Delta Inflow (discharge) - 1 Std Dev	\$4,319	\$100,545	\$2,313,059	\$818,225	\$890,274	\$342,600	\$63,694	\$1,460	\$651,950
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$7,010	\$125,225	\$2,455,123	\$1,702,865	\$932,819	\$408,044	\$116,847	\$2,390	\$767,923
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$6,187	\$99,882	\$2,322,752	\$952,016	\$864,774	\$330,945	\$60,302	\$1,942	\$649,781
Tide +1 Std Dev	\$12,624	\$130,051	\$2,454,902	\$1,798,818	\$969,577	\$416,092	\$104,780	\$2,959	\$764,636
Tide -1 Std Dev	\$3,200	\$95,470	\$2,322,665	\$900,718	\$830,705	\$324,028	\$67,461	\$1,542	\$651,661
Fragility, H&H + 1 Std Dev	\$7,038	\$122,253	\$2,807,780	\$56,790,938	\$961,063	\$413,378	\$90,178	\$2,431	\$793,456
Fragility, H&H - 1 Std Dev	\$6,113	\$100,773	\$1,969,705	\$39,498,231	\$843,364	\$320,808	\$78,217	\$1,874	\$611,670
pga Recurrence + 1 Std Dev	\$7,552	\$125,350	\$2,599,357	\$36,798,301	\$1,034,194	\$402,934	\$87,555	\$2,402	\$754,967
pga Recurrence -1 Std Dev	\$5,758	\$99,784	\$2,212,126	\$33,077,332	\$790,913	\$336,706	\$81,354	\$1,944	\$658,054
Fragility, Seismic + 1 Std Dev	\$8,329	\$130,564	\$2,843,838	\$38,343,272	\$1,074,398	\$415,259	\$88,593	\$2,480	\$748,016
Fragility, Seismic - 1 Std Dev	\$4,947	\$96,454	\$2,110,094	\$31,492,614	\$765,933	\$327,972	\$80,558	\$1,808	\$656,434
Asset Count & Value +1 Std Dev	\$7,233	\$122,664	\$2,627,617	\$38,252,481	\$992,435	\$403,802	\$92,618	\$2,368	\$772,819
Asset Count & Value -1 Std Dev	\$5,918	\$100,362	\$2,149,868	\$31,297,485	\$811,992	\$330,384	\$75,779	\$1,937	\$632,307
Depth Damage +1 Std Dev	\$8,416	\$135,806	\$2,904,917	\$41,109,929	\$1,120,455	\$417,179	\$94,843	\$2,605	\$840,747
Depth Damage -1 Std Dev	\$4,735	\$87,658	\$2,014,560	\$28,441,302	\$751,968	\$317,465	\$73,554	\$1,700	\$597,273
Standard Deviation of EAD	\$6,131	\$43,556	\$785,364	\$11,952,621	\$300,479	\$116,914	\$45,324	\$1,364	\$206,902
Coefficient of Variation	93%	39%	33%	34%	33%	32%	54%	63%	29%
Mean Pct. Damage	0.0%	0.1%	2.1%	1.0%	0.7%	1.7%	2.7%	0.0%	1.9%

Percent Variation by Source									
Total Delta Inflow (discharge)	20%	9%	1%	0%	0%	8%	32%	44%	9%
Stage-Discharge (regr. & interp.)	0%	8%	1%	0%	1%	11%	39%	3%	8%
Tide	59%	16%	1%	0%	5%	16%	17%	27%	7%
Fragility, H&H	1%	6%	28%	52%	4%	16%	2%	4%	19%
pga Recurrence	2%	9%	6%	2%	16%	8%	0%	3%	5%
Fragility, Seismic	8%	15%	22%	8%	26%	14%	1%	6%	5%
Asset Count & Value	1%	7%	9%	8%	9%	10%	3%	2%	12%
Depth Damage	9%	31%	32%	28%	38%	18%	6%	11%	35%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	153	154	155	156	157	158	159	160	161
DLIS EAD Uncertainty Summary	STEWART TRACT	SUNRISE CLUB	SUTTER ISLAND	TERMINOUS TRACT	TWITCHELL ISLAND	TYLER ISLAND	UNION ISLAND EAST	UNION ISLAND WEST	UPPER ANDRUS ISLAND
Total Asset Value	\$18,462,846	\$458,402	\$41,755,943	\$250,309,479	\$199,842,702	\$144,186,822	\$113,871,081	\$103,239,034	\$56,802,534
Mean EAD	\$70,357	\$6,031	\$2,182,396	\$4,571,950	\$1,054,947	\$2,587,651	\$768,776	\$773,226	\$1,466,629

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	\$100,859	\$6,151	\$2,319,219	\$6,275,294	\$1,133,413	\$2,853,884	\$840,454	\$819,720	\$1,540,959
Total Delta Inflow (discharge) - 1 Std Dev	\$51,649	\$5,930	\$2,043,459	\$3,537,889	\$1,002,578	\$2,394,640	\$704,619	\$733,239	\$1,390,580
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$75,428	\$6,432	\$2,297,851	\$6,174,027	\$1,143,396	\$2,845,905	\$816,405	\$806,238	\$1,536,822
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$65,649	\$5,624	\$2,068,658	\$3,440,961	\$981,183	\$2,384,545	\$716,343	\$743,726	\$1,400,823
Tide +1 Std Dev	\$88,025	\$6,935	\$2,219,193	\$5,465,738	\$1,190,389	\$2,811,204	\$914,138	\$859,855	\$1,508,823
Tide -1 Std Dev	\$55,798	\$5,219	\$2,145,985	\$3,842,587	\$951,341	\$2,406,537	\$634,452	\$689,132	\$1,425,861
Fragility, H&H + 1 Std Dev	\$82,454	\$6,822	\$2,610,233	\$5,089,120	\$1,163,331	\$2,891,582	\$837,813	\$842,052	\$1,684,068
Fragility, H&H - 1 Std Dev	\$58,260	\$5,239	\$1,754,559	\$4,054,780	\$946,563	\$2,283,719	\$699,738	\$704,401	\$1,249,191
pga Recurrence + 1 Std Dev	\$75,448	\$6,776	\$2,346,282	\$4,754,794	\$1,176,309	\$2,783,382	\$868,176	\$882,628	\$1,596,363
pga Recurrence -1 Std Dev	\$66,099	\$5,416	\$2,045,050	\$4,418,846	\$952,455	\$2,422,101	\$684,623	\$681,896	\$1,356,750
Fragility, Seismic + 1 Std Dev	\$77,559	\$7,065	\$2,538,845	\$4,886,824	\$1,200,093	\$2,855,548	\$904,347	\$890,515	\$1,634,549
Fragility, Seismic - 1 Std Dev	\$62,816	\$5,085	\$1,942,374	\$4,280,160	\$928,268	\$2,379,257	\$662,125	\$632,642	\$1,326,323
Asset Count & Value +1 Std Dev	\$77,393	\$6,634	\$2,400,636	\$5,029,145	\$1,160,442	\$2,846,416	\$845,653	\$850,549	\$1,613,292
Asset Count & Value -1 Std Dev	\$63,321	\$5,428	\$1,964,156	\$4,114,755	\$949,452	\$2,328,886	\$691,898	\$695,904	\$1,319,967
Depth Damage +1 Std Dev	\$82,710	\$6,886	\$2,449,863	\$5,265,864	\$1,193,709	\$2,953,642	\$900,407	\$896,391	\$1,653,941
Depth Damage -1 Std Dev	\$58,973	\$5,220	\$1,923,830	\$3,985,758	\$926,983	\$2,263,774	\$643,595	\$666,213	\$1,292,701
Standard Deviation of EAD	\$36,081	\$2,010	\$667,056	\$2,325,037	\$311,136	\$717,312	\$277,357	\$246,561	\$389,250
Coefficient of Variation	51%	33%	31%	51%	29%	28%	36%	32%	27%
Mean Pct. Damage	0.4%	1.3%	5.2%	1.8%	0.5%	1.8%	0.7%	0.7%	2.6%

Percent Variation by Source									
Total Delta Inflow (discharge)	47%	0%	4%	35%	4%	10%	6%	3%	4%
Stage-Discharge (regr. & interp.)	2%	4%	3%	35%	7%	10%	3%	2%	3%
Tide	20%	18%	0%	12%	15%	8%	25%	12%	1%
Fragility, H&H	11%	16%	41%	5%	12%	18%	6%	8%	31%
pga Recurrence	2%	11%	5%	1%	13%	6%	11%	17%	9%
Fragility, Seismic	4%	24%	20%	2%	19%	11%	19%	27%	16%
Asset Count & Value	4%	9%	11%	4%	11%	13%	8%	10%	14%
Depth Damage	11%	17%	16%	8%	18%	23%	21%	22%	22%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	162	164	165	166	167	168	169	171	172	173
DLIS EAD Uncertainty Summary	JONES TRACT (Lower and Upper)	VEALE TRACT	VENICE ISLAND	VICTORIA ISLAND	WALNUT GROVE	WALTHALL	WEBB TRACT	WEST SACRAMENTO	WETHERBEE LAKE	WINTER ISLAND
Total Asset Value	\$32,149,041	\$25,880,816	\$5,864,701	\$53,878,331	\$35,896,342	\$11,986,540	\$22,065,222	\$3,181,461,757	\$105,978,664	\$26,502
Mean EAD	\$514,416	\$105,742	\$170,138	\$725,509	\$511,066	\$102,074	\$355,615	\$12,902,356	\$314,240	\$419

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	\$624,448	\$124,462	\$190,901	\$791,125	\$557,293	\$141,538	\$386,502	\$4,750,881	\$432,481	\$553
Total Delta Inflow (discharge) - 1 Std Dev	\$454,671	\$94,882	\$158,146	\$687,485	\$469,575	\$79,604	\$337,757	\$359,117	\$248,988	\$331
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$573,999	\$118,307	\$188,252	\$750,231	\$559,551	\$107,511	\$386,581	\$2,336,467	\$328,539	\$564
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$459,975	\$94,378	\$156,153	\$702,991	\$466,315	\$96,996	\$330,858	\$807,978	\$300,254	\$336
Tide +1 Std Dev	\$669,442	\$133,287	\$203,672	\$784,018	\$528,961	\$127,793	\$412,487	\$1,867,423	\$376,978	\$868
Tide -1 Std Dev	\$405,835	\$85,194	\$148,233	\$679,908	\$493,244	\$81,503	\$316,458	\$1,030,887	\$264,012	\$215
Fragility, H&H + 1 Std Dev	\$585,771	\$114,066	\$189,046	\$777,552	\$582,442	\$116,903	\$391,907	\$13,075,351	\$358,089	\$454
Fragility, H&H - 1 Std Dev	\$443,061	\$97,418	\$151,230	\$673,467	\$439,690	\$87,245	\$319,322	\$12,729,362	\$270,392	\$385
pga Recurrence + 1 Std Dev	\$556,786	\$118,895	\$186,767	\$832,654	\$559,168	\$107,025	\$395,327	\$12,930,070	\$327,690	\$437
pga Recurrence -1 Std Dev	\$479,053	\$94,635	\$156,063	\$636,142	\$470,333	\$97,932	\$322,053	\$12,879,000	\$302,974	\$404
Fragility, Seismic + 1 Std Dev	\$586,679	\$123,260	\$190,641	\$944,574	\$576,330	\$109,261	\$403,724	\$12,949,655	\$338,936	\$444
Fragility, Seismic - 1 Std Dev	\$448,838	\$92,003	\$152,515	\$570,947	\$459,186	\$94,641	\$313,981	\$12,856,330	\$291,834	\$396
Asset Count & Value +1 Std Dev	\$565,857	\$116,317	\$187,152	\$798,060	\$562,173	\$112,281	\$391,176	\$14,192,592	\$345,665	\$461
Asset Count & Value -1 Std Dev	\$462,974	\$95,168	\$153,124	\$652,959	\$459,959	\$91,867	\$320,053	\$11,612,121	\$282,816	\$377
Depth Damage +1 Std Dev	\$599,620	\$131,562	\$204,854	\$827,712	\$583,905	\$119,737	\$439,184	\$15,218,391	\$359,751	\$509
Depth Damage -1 Std Dev	\$445,348	\$85,518	\$144,003	\$636,336	\$443,613	\$85,891	\$296,215	\$10,596,873	\$270,746	\$329
Standard Deviation of EAD	\$218,579	\$45,195	\$58,872	\$260,067	\$149,821	\$46,978	\$121,339	\$3,552,181	\$131,931	\$379
Coefficient of Variation	42%	43%	35%	36%	29%	46%	34%	28%	42%	90%
Mean Pct. Damage	1.6%	0.4%	2.9%	1.3%	1.4%	0.9%	1.6%	0.4%	0.3%	1.6%

Percent Variation by Source										
Total Delta Inflow (discharge)	15%	11%	8%	4%	9%	43%	4%	38%	48%	9%
Stage-Discharge (regr. & interp.)	7%	7%	7%	1%	10%	1%	5%	5%	1%	9%
Tide	36%	28%	22%	4%	1%	24%	16%	1%	18%	74%
Fragility, H&H	11%	3%	10%	4%	23%	10%	9%	0%	11%	1%
pga Recurrence	3%	7%	7%	14%	9%	1%	9%	0%	1%	0%
Fragility, Seismic	10%	12%	10%	52%	15%	2%	14%	0%	3%	0%
Asset Count & Value	6%	5%	8%	8%	12%	5%	9%	13%	6%	1%
Depth Damage	12%	26%	27%	14%	22%	13%	35%	42%	11%	6%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	174	175	176	177
DLIS EAD Uncertainty Summary	WOODWARD ISLAND	WRIGHT- ELMWOOD TRACT	YOLANO	MAINTENANCE AREA 9 SOUTH
Total Asset Value	\$147,675,889	\$26,328,480	\$121,945,411	\$165,045,570
Mean EAD	\$417,547	\$167,368	\$2,701	\$797,354

Uncertainty Source				
Total Delta Inflow (discharge) + 1 Std Dev	\$459,393	\$178,206	\$12,426	\$0
Total Delta Inflow (discharge) - 1 Std Dev	\$393,392	\$160,868	\$411	\$0
Stage-Discharge (regr. & interp.) + 1 Std Dev	\$441,383	\$177,162	\$4,061	\$0
Stage-Discharge (regr. & interp.) - 1 Std Dev	\$394,389	\$158,176	\$1,754	\$0
Tide +1 Std Dev	\$471,809	\$181,230	\$2,971	\$0
Tide -1 Std Dev	\$374,011	\$154,480	\$2,482	\$0
Fragility, H&H + 1 Std Dev	\$444,911	\$184,669	\$2,803	\$29,716,274
Fragility, H&H - 1 Std Dev	\$390,183	\$150,066	\$2,598	\$29,716,274
pga Recurrence + 1 Std Dev	\$475,016	\$187,044	\$2,732	\$538,593
pga Recurrence -1 Std Dev	\$368,961	\$150,691	\$2,674	\$538,593
Fragility, Seismic + 1 Std Dev	\$495,927	\$194,042	\$2,753	\$881,652
Fragility, Seismic - 1 Std Dev	\$356,663	\$145,975	\$2,653	\$716,787
Asset Count & Value +1 Std Dev	\$459,302	\$184,105	\$2,971	\$877,089
Asset Count & Value -1 Std Dev	\$375,792	\$150,631	\$2,430	\$717,618
Depth Damage +1 Std Dev	\$464,230	\$193,545	\$3,423	\$932,166
Depth Damage -1 Std Dev	\$370,864	\$145,741	\$2,169	\$667,302
Standard Deviation of EAD	\$127,923	\$49,019	\$6,161	\$175,189
Coefficient of Variation	31%	29%	228%	22%
Mean Pct. Damage	0.3%	0.6%	0.0%	0.5%

Percent Variation by Source				
Total Delta Inflow (discharge)	7%	3%	95%	0%
Stage-Discharge (regr. & interp.)	3%	4%	4%	0%
Tide	15%	7%	0%	0%
Fragility, H&H	5%	12%	0%	0%
pga Recurrence	17%	14%	0%	0%
Fragility, Seismic	30%	24%	0%	22%
Asset Count & Value	11%	12%	0%	21%
Depth Damage	13%	24%	1%	57%
	100%	100%	100%	100%

DLIS EAF Uncertainty Summary	2	3	5	6	8	9	10	11	13	14	15	18	19	20	22	27	28	29
	BACON ISLAND	BETHEL ISLAND	BISHOP TRACT	BIXLER TRACT	BOULDIN ISLAND	BRACK TRACT	BRADFORD ISLAND	BRANNAN-ANDRUS	BYRON TRACT	CACHE HAAS AREA	CANAL RANCH TRACT	Clifton Court Forebay	CONEY ISLAND	DEAD HORSE ISLAND	DLIS-01 (PITTSBURG AREA)	DLIS-06 (OAKLEY AREA)	DLIS-07 (KNIGHTSEN AREA)	DLIS-08 (DISCOVERY BAY AREA)
Population	41	2137	4543	14	31	14	13	1586	55	16	46	3	2	4	261	2028	216	10383
Mean EAF	0.010	0.284	0.252	0.000	0.010	0.002	0.003	0.360	0.005	0.000	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.009

Uncertainty Source																		
Total Delta Inflow (discharge) + 1 Std Dev	0.011	0.301	0.274	0.000	0.011	0.004	0.003	0.382	0.005	0.001	0.009	0.000	0.000	0.001	0.000	0.001	0.000	0.021
Total Delta Inflow (discharge) - 1 Std Dev	0.009	0.273	0.237	0.000	0.009	0.002	0.003	0.342	0.004	0.000	0.004	0.000	0.000	0.001	0.000	0.000	0.000	0.002
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.011	0.304	0.283	0.000	0.011	0.003	0.003	0.385	0.005	0.001	0.009	0.000	0.000	0.001	0.000	0.000	0.000	0.009
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.009	0.279	0.227	0.000	0.009	0.002	0.003	0.337	0.005	0.000	0.004	0.000	0.000	0.001	0.000	0.000	0.000	0.010
Tide +1 Std Dev	0.012	0.328	0.285	0.000	0.012	0.003	0.004	0.390	0.005	0.001	0.007	0.000	0.000	0.001	0.000	0.001	0.000	0.011
Tide -1 Std Dev	0.009	0.277	0.226	0.000	0.008	0.002	0.003	0.334	0.004	0.000	0.005	0.000	0.000	0.001	0.000	0.000	0.000	0.008
Fragility, H&H + 1 Std Dev	0.011	0.309	0.283	0.000	0.011	0.003	0.003	0.402	0.005	0.001	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.015
Fragility, H&H - 1 Std Dev	0.009	0.259	0.222	0.000	0.009	0.002	0.003	0.317	0.006	0.000	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.015
pga Recurrence + 1 Std Dev	0.011	0.321	0.280	0.000	0.011	0.003	0.003	0.399	0.005	0.001	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.013
pga Recurrence -1 Std Dev	0.009	0.253	0.229	0.000	0.009	0.002	0.003	0.327	0.004	0.000	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.009
Fragility, Seismic + 1 Std Dev	0.011	0.333	0.291	0.000	0.011	0.003	0.004	0.411	0.006	0.001	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.017
Fragility, Seismic - 1 Std Dev	0.009	0.270	0.240	0.000	0.009	0.002	0.003	0.342	0.005	0.000	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.009
Population +1 Std Dev	0.009	0.255	0.222	0.000	0.072	0.009	0.002	0.003	0.322	0.319	0.000	0.005	0.000	0.000	0.001	0.000	0.000	0.000
Population -1 Std Dev	0.010	0.284	0.252	0.000	0.010	0.002	0.003	0.360	0.005	0.000	0.006	0.000	0.000	0.001	0.000	0.000	0.000	0.009
Mortality +1 Std Dev	0.009	0.252	0.222	0.000	0.009	0.002	0.003	0.323	0.004	0.000	0.005	0.000	0.000	0.001	0.000	0.000	0.000	0.008
Mortality -1 Std Dev	0.011	0.319	0.287	0.000	0.011	0.003	0.003	0.400	0.005	0.001	0.007	0.000	0.000	0.001	0.000	0.000	0.000	0.010
Warning and Evacuation +1 Std Dev	0.007	0.211	0.188	0.000	0.007	0.002	0.002	0.268	0.004	0.000	0.004	0.000	0.000	0.001	0.000	0.000	0.000	0.009
Warning and Evacuation -1 Std Dev	0.012	0.355	0.316	0.000	0.012	0.003	0.004	0.450	0.006	0.001	0.007	0.000	0.000	0.001	0.000	0.000	0.000	0.010
Standard Deviation of EAF	0.004	0.097	0.094	0.000	0.031	0.004	0.001	0.216	0.159	0.159	0.005	0.003	0.000	0.000	0.000	0.001	0.000	0.011
Coefficient of Variation	36%	34%	37%	76%	319%	149%	42%	60%	3334%	32270%	79%	6784%	55%	59%	229%	266%	188%	125%
Fatality %	0.02%	0.01%	0.01%	0.00%	0.03%	0.02%	0.02%	0.02%	0.01%	0.00%	0.01%	0.00%	0.01%	0.02%	0.00%	0.00%	0.00%	0.00%

Percent Variation by Source																		
Total Delta Inflow (discharge)	7%	2%	4%	67%	0%	7%	4%	1%	0%	0%	28%	0%	5%	17%	4%	64%	24%	66%
Stage-Discharge (regr. & interp.)	5%	2%	9%	6%	0%	6%	6%	1%	0%	0%	22%	0%	1%	17%	0%	5%	3%	0%
Tide	13%	7%	10%	22%	0%	1%	20%	2%	0%	0%	3%	0%	2%	2%	6%	30%	5%	2%
Fragility, H&H	5%	7%	11%	0%	0%	0%	6%	4%	0%	0%	1%	0%	0%	2%	1%	0%	0%	0%
pga Recurrence	10%	12%	7%	1%	0%	0%	6%	3%	0%	0%	0%	0%	5%	1%	1%	0%	0%	3%
Fragility, Seismic	8%	11%	7%	2%	0%	0%	5%	3%	0%	0%	1%	0%	5%	1%	1%	0%	0%	13%
Population	2%	2%	3%	1%	98%	81%	15%	68%	100%	100%	35%	100%	60%	40%	87%	1%	67%	16%
Mortality	2%	3%	3%	1%	0%	0%	2%	1%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%
Warning and Evacuation	49%	55%	47%	1%	1%	3%	37%	18%	0%	0%	11%	0%	21%	19%	0%	0%	0%	0%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	31	34	35	36	39	40	43	47	48	49	55	58	61	62	67	69	74	75
DLIS EAF Uncertainty Summary	DLIS-10	DLIS-13 (STOCKTON)	DLIS-14 (CENTRAL STOCKTON)	DLIS-15	DLIS-18	DLIS-19 (GRIZZLY SLOUGH AREA)	DLIS-22 (RIO VISTA)	DLIS-26 (MORROW ISLAND)	DLIS-27	DLIS-28	DLIS-34	DLIS-37 (CHADBOURNE AREA)	DLIS-40	DLIS-41 (JOICE ISLAND AREA)	DLIS-46	DLIS-48	DLIS-53	DLIS-54
Population	5	47904	16750	61	125	50	158	1	1	3	3	2	4	1	6	4	2	10
Mean EAF	0.000	0.339	0.746	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001

Uncertainty Source																		
Total Delta Inflow (discharge) + 1 Std Dev	0.000	0.014	0.022	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.014	0.000	0.000	0.001
Total Delta Inflow (discharge) - 1 Std Dev	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.012	0.000	0.000	0.001
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.000	0.009	0.014	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.015	0.000	0.000	0.001
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.000	0.008	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.001
Tide +1 Std Dev	0.000	0.011	0.012	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.018	0.000	0.000	0.001
Tide -1 Std Dev	0.000	0.009	0.008	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.001
Fragility, H&H + 1 Std Dev	0.000	0.261	0.746	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001
Fragility, H&H - 1 Std Dev	0.000	0.257	0.702	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001
pga Recurrence + 1 Std Dev	0.000	0.350	0.750	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001
pga Recurrence -1 Std Dev	0.000	0.331	0.742	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001
Fragility, Seismic + 1 Std Dev	0.000	0.361	0.753	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001
Fragility, Seismic - 1 Std Dev	0.000	0.322	0.708	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.012	0.000	0.000	0.001
Population +1 Std Dev	0.000	0.000	0.024	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.012	0.000	0.000	0.001
Population -1 Std Dev	0.000	0.339	0.746	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.013	0.000	0.000	0.001
Mortality +1 Std Dev	0.000	0.294	0.646	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.012	0.000	0.000	0.001
Mortality -1 Std Dev	0.000	0.391	0.859	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.014	0.000	0.000	0.001
Warning and Evacuation +1 Std Dev	0.000	0.252	0.553	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.001
Warning and Evacuation -1 Std Dev	0.000	0.425	0.934	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.016	0.000	0.000	0.001
Standard Deviation of EAF	0.000	0.193	0.412	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000
Coefficient of Variation	1081%	57%	55%	83%	140%	197%	78%	61%	124%	54%	62%	78%	51%	32%	45%	48%	60%	36%
Fatality %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.01%	0.03%	0.22%	0.00%	0.00%	0.01%

Percent Variation by Source																		
Total Delta Inflow (discharge)	0%	0%	0%	47%	72%	81%	32%	2%	5%	2%	2%	2%	2%	0%	2%	2%	19%	1%
Stage-Discharge (regr. & interp.)	0%	0%	0%	28%	23%	17%	31%	8%	13%	9%	12%	15%	10%	2%	13%	12%	9%	2%
Tide	0%	0%	0%	11%	2%	0%	22%	59%	76%	50%	63%	70%	49%	7%	50%	36%	21%	6%
Fragility, H&H	0%	0%	0%	3%	0%	0%	1%	5%	0%	7%	3%	1%	8%	16%	0%	7%	9%	25%
pga Recurrence	0%	0%	0%	0%	0%	0%	6%	3%	1%	3%	1%	0%	2%	3%	0%	6%	4%	5%
Fragility, Seismic	0%	1%	0%	1%	0%	0%	5%	3%	1%	3%	1%	0%	2%	4%	0%	6%	34%	7%
Population	99%	77%	77%	1%	0%	0%	1%	1%	0%	2%	1%	1%	1%	3%	1%	2%	1%	2%
Mortality	0%	1%	1%	1%	0%	0%	1%	1%	0%	2%	1%	1%	1%	3%	1%	2%	1%	2%
Warning and Evacuation	0%	20%	21%	9%	3%	2%	1%	17%	4%	22%	17%	11%	25%	64%	32%	28%	1%	50%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	77	78	83	84	85	86	87	88	89	90	91	94	95	96	97	98	99	101
DLIS EAF Uncertainty Summary	DLIS-56	DLIS-57	DLIS-62	DLIS-63 (GRIZZLY ISLAND AREA)	DREXLER POCKET	DREXLER TRACT	DUTCH SLOUGH	EGBERT TRACT	EHRHEARDT CLUB	EMPIRE TRACT	FABIAN TRACT	GLANVILLE	GLIDE DISTRICT	GRAND ISLAND	HASTINGS TRACT	HOLLAND TRACT	HOLT STATION	HONKER LAKE TRACT
Population	8	8	62	32	29	33	4	10	28	18	160	66	11	1388	52	18	23	36
Mean EAF	0.001	0.001	0.013	0.006	0.001	0.006	0.000	0.000	0.002	0.008	0.005	0.010	0.000	0.259	0.001	0.003	0.011	0.004

Uncertainty Source																		
Total Delta Inflow (discharge) + 1 Std Dev	0.001	0.001	0.014	0.008	0.002	0.007	0.000	0.000	0.003	0.011	0.006	0.016	0.000	0.274	0.002	0.003	0.014	0.004
Total Delta Inflow (discharge) - 1 Std Dev	0.001	0.001	0.013	0.005	0.001	0.005	0.000	0.000	0.002	0.007	0.004	0.006	0.000	0.244	0.001	0.003	0.009	0.004
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.002	0.001	0.014	0.009	0.001	0.006	0.000	0.000	0.003	0.010	0.005	0.016	0.000	0.274	0.002	0.003	0.014	0.004
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.001	0.001	0.013	0.005	0.001	0.005	0.000	0.000	0.002	0.007	0.004	0.006	0.000	0.245	0.001	0.003	0.009	0.004
Tide +1 Std Dev	0.002	0.001	0.014	0.015	0.002	0.008	0.000	0.000	0.003	0.011	0.006	0.011	0.000	0.268	0.001	0.004	0.017	0.004
Tide -1 Std Dev	0.001	0.001	0.013	0.003	0.001	0.004	0.000	0.000	0.002	0.006	0.004	0.009	0.000	0.251	0.001	0.003	0.007	0.004
Fragility, H&H + 1 Std Dev	0.002	0.001	0.016	0.007	0.001	0.006	0.000	0.000	0.003	0.009	0.005	0.010	0.000	0.310	0.001	0.003	0.012	0.005
Fragility, H&H - 1 Std Dev	0.001	0.001	0.011	0.006	0.001	0.005	0.000	0.000	0.002	0.008	0.005	0.010	0.000	0.210	0.001	0.003	0.011	0.003
pga Recurrence + 1 Std Dev	0.002	0.001	0.015	0.007	0.001	0.006	0.000	0.000	0.002	0.009	0.006	0.010	0.000	0.278	0.001	0.004	0.011	0.004
pga Recurrence -1 Std Dev	0.001	0.001	0.012	0.006	0.001	0.005	0.000	0.000	0.002	0.008	0.004	0.010	0.000	0.243	0.001	0.003	0.011	0.004
Fragility, Seismic + 1 Std Dev	0.002	0.001	0.015	0.007	0.001	0.006	0.000	0.000	0.002	0.009	0.005	0.010	0.000	0.299	0.001	0.004	0.011	0.005
Fragility, Seismic - 1 Std Dev	0.001	0.001	0.013	0.006	0.001	0.005	0.000	0.000	0.002	0.008	0.005	0.009	0.000	0.246	0.001	0.003	0.011	0.004
Population +1 Std Dev	0.001	0.001	0.012	0.006	0.001	0.005	0.000	0.000	0.002	0.007	0.004	0.009	0.000	0.231	0.001	0.003	0.010	0.004
Population -1 Std Dev	0.001	0.001	0.013	0.006	0.001	0.006	0.000	0.000	0.002	0.008	0.005	0.010	0.000	0.259	0.001	0.003	0.011	0.004
Mortality +1 Std Dev	0.001	0.001	0.012	0.006	0.001	0.005	0.000	0.000	0.002	0.007	0.004	0.009	0.000	0.231	0.001	0.003	0.010	0.004
Mortality -1 Std Dev	0.002	0.001	0.015	0.007	0.001	0.006	0.000	0.000	0.003	0.009	0.006	0.011	0.000	0.289	0.001	0.004	0.013	0.004
Warning and Evacuation +1 Std Dev	0.001	0.001	0.010	0.005	0.001	0.004	0.000	0.000	0.002	0.006	0.004	0.007	0.000	0.192	0.001	0.002	0.008	0.003
Warning and Evacuation -1 Std Dev	0.002	0.001	0.017	0.008	0.001	0.007	0.000	0.000	0.003	0.010	0.006	0.013	0.000	0.324	0.002	0.004	0.014	0.005
Standard Deviation of EAF	0.001	0.000	0.005	0.007	0.001	0.003	0.000	0.000	0.001	0.004	0.002	0.008	0.000	0.094	0.001	0.001	0.007	0.001
Coefficient of Variation	35%	35%	35%	107%	61%	47%	54%	39%	56%	52%	41%	76%	60%	36%	57%	36%	58%	37%
Fatality %	0.02%	0.01%	0.02%	0.02%	0.00%	0.02%	0.00%	0.00%	0.01%	0.05%	0.00%	0.02%	0.00%	0.02%	0.00%	0.02%	0.05%	0.01%

Percent Variation by Source																		
Total Delta Inflow (discharge)	1%	1%	0%	3%	37%	20%	10%	12%	37%	18%	15%	45%	53%	3%	48%	5%	18%	3%
Stage-Discharge (regr. & interp.)	1%	2%	1%	11%	5%	6%	9%	14%	33%	18%	5%	41%	13%	3%	17%	4%	10%	1%
Tide	3%	5%	1%	79%	32%	34%	42%	5%	1%	32%	23%	1%	3%	1%	4%	11%	50%	6%
Fragility, H&H	26%	19%	24%	0%	4%	3%	7%	8%	4%	3%	0%	0%	9%	28%	3%	6%	0%	29%
pga Recurrence	5%	8%	7%	0%	1%	3%	3%	8%	0%	1%	9%	0%	1%	4%	3%	10%	0%	3%
Fragility, Seismic	7%	8%	8%	0%	1%	3%	4%	7%	1%	1%	4%	0%	2%	8%	2%	9%	0%	6%
Population	2%	2%	2%	0%	1%	1%	2%	2%	1%	1%	3%	1%	1%	2%	1%	2%	1%	2%
Mortality	2%	2%	2%	0%	1%	1%	1%	3%	1%	1%	3%	1%	1%	2%	1%	2%	1%	2%
Warning and Evacuation	52%	52%	54%	6%	18%	29%	22%	42%	21%	24%	39%	11%	18%	50%	20%	50%	19%	48%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	102	104	105	106	108	110	111	116	117	118	119	120	121	122	123	124	125	127
DLIS EAF Uncertainty Summary	HOTCHKISS TRACT	JERSEY ISLAND	KASSON DISTRICT	KING ISLAND	LIBBY MCNEIL	LISBON DISTRICT	LITTLE EGBERT TRACT	LOWER ROBERTS ISLAND	MAINTENANCE AREA 9 NORTH	MANDEVILLE ISLAND	MCCORMACK-WILLIAMSON TRACT	MCDONALD ISLAND	MC MULLIN RANCH	MEDFORD ISLAND	MEIN'S LANDING	MERRITT ISLAND	MIDDLE & UPPER ROBERTS ISLAND	MOSSDALE ISLAND
Population	1490	3	441	81	108	163	4	183	45552	26	19	85	293	1	7	173	510	14
Mean EAF	0.059	0.000	0.000	0.014	0.003	0.007	0.002	0.013	2.533	0.006	0.003	0.023	0.000	0.000	0.001	0.009	0.044	0.000

Uncertainty Source																		
Total Delta Inflow (discharge) + 1 Std Dev	0.067	0.000	0.000	0.016	0.004	0.008	0.002	0.014	2.453	0.007	0.005	0.024	0.000	0.000	0.001	0.010	0.021	0.001
Total Delta Inflow (discharge) - 1 Std Dev	0.054	0.000	0.000	0.013	0.002	0.005	0.001	0.012	1.683	0.006	0.002	0.022	0.000	0.000	0.000	0.008	0.016	0.000
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.067	0.000	0.000	0.016	0.004	0.008	0.002	0.014	2.421	0.007	0.005	0.025	0.000	0.000	0.001	0.010	0.020	0.000
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.053	0.000	0.000	0.012	0.002	0.005	0.001	0.012	1.690	0.006	0.002	0.023	0.000	0.000	0.000	0.008	0.016	0.000
Tide +1 Std Dev	0.075	0.000	0.000	0.016	0.003	0.007	0.002	0.015	2.039	0.008	0.004	0.026	0.000	0.000	0.001	0.009	0.021	0.001
Tide -1 Std Dev	0.048	0.000	0.000	0.012	0.003	0.006	0.001	0.011	2.006	0.006	0.003	0.023	0.000	0.000	0.000	0.009	0.015	0.000
Fragility, H&H + 1 Std Dev	0.067	0.000	0.000	0.015	0.003	0.008	0.002	0.015	3.201	0.007	0.004	0.026	0.000	0.000	0.001	0.011	0.064	0.000
Fragility, H&H - 1 Std Dev	0.051	0.000	0.000	0.012	0.002	0.005	0.002	0.011	2.193	0.006	0.003	0.021	0.000	0.000	0.000	0.007	0.043	0.000
pga Recurrence + 1 Std Dev	0.065	0.000	0.000	0.015	0.003	0.007	0.002	0.014	2.634	0.007	0.004	0.026	0.000	0.000	0.001	0.010	0.046	0.000
pga Recurrence -1 Std Dev	0.054	0.000	0.000	0.013	0.003	0.006	0.002	0.012	2.449	0.006	0.003	0.021	0.000	0.000	0.000	0.008	0.041	0.000
Fragility, Seismic + 1 Std Dev	0.069	0.000	0.000	0.016	0.003	0.007	0.002	0.015	2.718	0.007	0.004	0.026	0.000	0.000	0.001	0.010	0.048	0.000
Fragility, Seismic - 1 Std Dev	0.056	0.000	0.000	0.013	0.003	0.006	0.002	0.012	2.407	0.006	0.003	0.022	0.000	0.000	0.000	0.009	0.041	0.000
Population +1 Std Dev	0.051	0.000	0.000	0.012	0.003	0.006	0.002	0.012	3.456	0.006	0.003	0.021	0.000	0.000	0.000	0.008	0.014	0.000
Population -1 Std Dev	0.059	0.000	0.000	0.014	0.003	0.007	0.002	0.013	2.533	0.006	0.003	0.023	0.000	0.000	0.001	0.009	0.044	0.000
Mortality +1 Std Dev	0.052	0.000	0.000	0.012	0.003	0.006	0.002	0.012	2.248	0.006	0.003	0.021	0.000	0.000	0.000	0.008	0.038	0.000
Mortality -1 Std Dev	0.067	0.000	0.000	0.015	0.003	0.007	0.002	0.014	2.848	0.007	0.004	0.026	0.000	0.000	0.001	0.010	0.049	0.000
Warning and Evacuation +1 Std Dev	0.044	0.000	0.000	0.010	0.002	0.005	0.001	0.010	1.880	0.005	0.003	0.017	0.000	0.000	0.000	0.007	0.032	0.000
Warning and Evacuation -1 Std Dev	0.074	0.000	0.000	0.017	0.004	0.008	0.002	0.016	3.173	0.008	0.004	0.029	0.000	0.000	0.001	0.011	0.055	0.001
Standard Deviation of EAF	0.026	0.000	0.000	0.005	0.001	0.003	0.001	0.005	1.104	0.002	0.002	0.008	0.000	0.000	0.000	0.004	0.023	0.000
Coefficient of Variation	44%	37%	0%	39%	46%	46%	48%	39%	44%	36%	62%	33%	0%	39%	37%	41%	52%	56%
Fatality %	0.00%	0.01%	0.00%	0.02%	0.00%	0.00%	0.04%	0.01%	0.01%	0.02%	0.02%	0.03%	0.00%	0.02%	0.01%	0.01%	0.01%	0.00%

Percent Variation by Source																		
Total Delta Inflow (discharge)	6%	2%	0%	11%	19%	26%	17%	6%	12%	5%	40%	2%	0%	8%	1%	12%	1%	53%
Stage-Discharge (regr. & interp.)	8%	4%	0%	11%	21%	14%	24%	5%	11%	4%	37%	2%	0%	7%	4%	11%	1%	1%
Tide	27%	19%	0%	14%	2%	1%	25%	14%	0%	13%	2%	5%	0%	20%	12%	0%	2%	14%
Fragility, H&H	10%	9%	0%	9%	16%	23%	1%	13%	21%	8%	1%	9%	0%	7%	16%	25%	23%	6%
pga Recurrence	5%	9%	0%	5%	2%	1%	0%	6%	1%	8%	0%	12%	0%	6%	8%	2%	1%	1%
Fragility, Seismic	6%	5%	0%	5%	6%	2%	1%	9%	2%	8%	1%	7%	0%	6%	8%	6%	2%	2%
Population	2%	2%	0%	2%	2%	1%	1%	2%	17%	2%	1%	2%	0%	2%	2%	2%	44%	1%
Mortality	2%	2%	0%	2%	2%	2%	1%	2%	2%	2%	1%	2%	0%	2%	3%	2%	1%	1%
Warning and Evacuation	33%	47%	0%	41%	31%	31%	29%	43%	34%	50%	17%	59%	0%	43%	47%	39%	24%	21%
	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%

	128	129	130	131	132	133	135	138	139	140	142	144	145	146	147	151	152	153
DLIS EAF Uncertainty Summary	NETHERLANDS	NEW HOPE TRACT	PALM-ORWOOD	PARADISE JUNCTION	PEARSON DISTRICT	PESCADERO DISTRICT	PICO-NAGLEE	RANDALL ISLAND	RECLAMATION DISTRICT 17	RINDGE TRACT	RIVER JUNCTION	RYER ISLAND	NORTH STOCKTON	SHERMAN ISLAND	SHIMA TRACT	STARK TRACT	STATEN ISLAND	STEWART TRACT
Population	917	1490	66	3808	696	751	859	66	27617	55	358	320	50570	186	18	11	26	17
Mean EAF	0.054	0.056	0.005	0.132	0.069	0.001	0.001	0.002	0.618	0.012	0.000	0.051	1.622	0.035	0.001	0.000	0.011	0.000

Uncertainty Source																		
Total Delta Inflow (discharge) + 1 Std Dev	0.069	0.114	0.006	0.208	0.075	0.001	0.002	0.002	0.689	0.013	0.000	0.054	0.077	0.036	0.001	0.000	0.012	0.000
Total Delta Inflow (discharge) - 1 Std Dev	0.044	0.028	0.004	0.093	0.063	0.001	0.001	0.002	0.563	0.011	0.000	0.048	0.038	0.035	0.001	0.000	0.010	0.000
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.062	0.096	0.005	0.141	0.074	0.001	0.001	0.002	0.649	0.013	0.000	0.054	0.065	0.037	0.001	0.000	0.012	0.000
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.046	0.032	0.004	0.124	0.063	0.001	0.001	0.002	0.588	0.011	0.000	0.048	0.045	0.033	0.001	0.000	0.010	0.000
Tide +1 Std Dev	0.059	0.063	0.006	0.163	0.070	0.001	0.001	0.002	0.708	0.014	0.000	0.054	0.069	0.039	0.001	0.000	0.012	0.000
Tide -1 Std Dev	0.049	0.049	0.004	0.107	0.067	0.001	0.001	0.002	0.543	0.011	0.000	0.049	0.043	0.039	0.001	0.000	0.010	0.000
Fragility, H&H + 1 Std Dev	0.063	0.059	0.005	0.147	0.083	0.001	0.001	0.002	0.711	0.013	0.000	0.061	2.626	0.037	0.001	0.000	0.012	0.000
Fragility, H&H - 1 Std Dev	0.044	0.053	0.004	0.117	0.054	0.001	0.002	0.002	0.521	0.010	0.000	0.042	1.877	0.039	0.001	0.000	0.010	0.000
pga Recurrence + 1 Std Dev	0.057	0.057	0.005	0.139	0.073	0.001	0.001	0.002	0.680	0.013	0.000	0.056	1.708	0.040	0.001	0.000	0.012	0.000
pga Recurrence -1 Std Dev	0.051	0.054	0.004	0.126	0.065	0.001	0.001	0.002	0.566	0.011	0.000	0.048	1.550	0.031	0.001	0.000	0.010	0.000
Fragility, Seismic + 1 Std Dev	0.062	0.058	0.006	0.141	0.079	0.001	0.001	0.002	0.705	0.013	0.000	0.061	1.774	0.042	0.001	0.000	0.012	0.000
Fragility, Seismic - 1 Std Dev	0.051	0.053	0.004	0.125	0.065	0.001	0.001	0.002	0.587	0.011	0.000	0.049	1.541	0.033	0.001	0.000	0.010	0.000
Population +1 Std Dev	0.048	0.050	0.004	0.117	0.061	0.001	0.001	0.002	0.543	0.010	0.000	0.046	0.175	0.031	0.001	0.049	0.112	0.000
Population -1 Std Dev	0.054	0.056	0.005	0.132	0.069	0.001	0.001	0.002	0.618	0.012	0.000	0.051	1.622	0.035	0.001	0.000	0.011	0.000
Mortality +1 Std Dev	0.048	0.049	0.004	0.116	0.061	0.001	0.001	0.002	0.539	0.010	0.000	0.046	1.413	0.031	0.001	0.000	0.010	0.000
Mortality -1 Std Dev	0.060	0.063	0.005	0.150	0.077	0.001	0.001	0.002	0.707	0.013	0.000	0.057	1.859	0.039	0.001	0.000	0.012	0.000
Warning and Evacuation +1 Std Dev	0.040	0.041	0.003	0.098	0.051	0.001	0.001	0.001	0.460	0.009	0.000	0.038	1.204	0.026	0.001	0.000	0.008	0.000
Warning and Evacuation -1 Std Dev	0.067	0.070	0.006	0.165	0.086	0.001	0.001	0.002	0.773	0.015	0.000	0.064	2.032	0.044	0.002	0.000	0.014	0.000
Standard Deviation of EAF	0.024	0.056	0.002	0.076	0.026	0.000	0.001	0.001	0.234	0.004	0.000	0.019	0.931	0.011	0.000	0.024	0.051	0.000
Coefficient of Variation	45%	100%	42%	58%	38%	53%	46%	42%	38%	37%	59%	36%	57%	33%	39%	70188%	463%	71%
Fatality %	0.01%	0.00%	0.01%	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.02%	0.00%	0.02%	0.00%	0.02%	0.01%	0.00%	0.04%	0.00%

Percent Variation by Source																		
Total Delta Inflow (discharge)	27%	58%	13%	58%	5%	62%	34%	13%	7%	9%	13%	2%	0%	0%	10%	0%	0%	30%
Stage-Discharge (regr. & interp.)	11%	33%	5%	1%	5%	5%	0%	12%	2%	7%	1%	2%	0%	2%	9%	0%	0%	1%
Tide	5%	1%	19%	14%	0%	4%	15%	0%	12%	14%	23%	2%	0%	0%	13%	0%	0%	10%
Fragility, H&H	16%	0%	6%	4%	31%	8%	16%	26%	16%	9%	11%	24%	16%	0%	10%	0%	0%	5%
pga Recurrence	2%	0%	7%	1%	3%	14%	23%	2%	6%	6%	4%	5%	1%	17%	5%	0%	0%	1%
Fragility, Seismic	5%	0%	9%	1%	7%	3%	6%	4%	6%	6%	42%	11%	2%	14%	5%	0%	0%	1%
Population	2%	0%	2%	1%	2%	2%	3%	2%	3%	2%	2%	2%	60%	3%	3%	100%	99%	39%
Mortality	2%	0%	2%	1%	2%	2%	2%	2%	3%	2%	2%	2%	1%	3%	2%	0%	0%	1%
Warning and Evacuation	32%	6%	37%	20%	45%	1%	1%	38%	45%	46%	1%	49%	20%	61%	42%	0%	0%	13%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

DLIS EAF Uncertainty Summary	155	156	157	158	159	160	161	162	164	165	167	168	171	172	175	176	177
	SUTTER ISLAND	TERMINOUS TRACT	TWITCHELL ISLAND	TYLER ISLAND	UNION ISLAND EAST	UNION ISLAND WEST	UPPER ANDRUS ISLAND	JONES TRACT (Lower and Upper)	VEALE TRACT	VENICE ISLAND	WALNUT GROVE	WALTHALL	WEST SACRAMENTO	WETHERBEE LAKE	WRIGHT-ELMWOOD TRACT	YOLANO	MAINTENANCE AREA 9 SOUTH
Population	111	461	30	103	181	218	185	82	55	1	502	38	35855	201	18	174	1495
Mean EAF	0.010	0.084	0.008	0.029	0.008	0.012	0.025	0.009	0.003	0.000	0.041	0.002	0.363	0.014	0.002	0.000	0.0210

Uncertainty Source																	
Total Delta Inflow (discharge) + 1 Std Dev	0.010	0.125	0.009	0.032	0.008	0.013	0.027	0.012	0.004	0.000	0.046	0.002	0.132	0.020	0.002	0.000	0.0000
Total Delta Inflow (discharge) - 1 Std Dev	0.009	0.060	0.007	0.026	0.007	0.011	0.023	0.008	0.003	0.000	0.036	0.001	0.028	0.010	0.002	0.000	0.0000
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.010	0.120	0.009	0.032	0.008	0.012	0.027	0.011	0.003	0.000	0.046	0.002	0.060	0.014	0.002	0.000	0.0000
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.009	0.059	0.007	0.026	0.007	0.011	0.023	0.008	0.003	0.000	0.035	0.002	0.044	0.013	0.002	0.000	0.0000
Tide +1 Std Dev	0.010	0.104	0.009	0.032	0.009	0.014	0.026	0.013	0.004	0.000	0.043	0.002	0.066	0.017	0.002	0.000	0.0000
Tide -1 Std Dev	0.009	0.068	0.007	0.026	0.007	0.011	0.023	0.008	0.003	0.000	0.039	0.001	0.051	0.011	0.002	0.000	0.0000
Fragility, H&H + 1 Std Dev	0.011	0.092	0.009	0.032	0.008	0.013	0.028	0.011	0.003	0.000	0.046	0.002	0.365	0.015	0.002	0.000	0.6275
Fragility, H&H - 1 Std Dev	0.008	0.076	0.007	0.025	0.007	0.011	0.021	0.008	0.003	0.000	0.035	0.001	0.361	0.012	0.002	0.000	0.6275
pga Recurrence + 1 Std Dev	0.010	0.086	0.009	0.031	0.009	0.013	0.027	0.010	0.003	0.000	0.044	0.002	0.364	0.014	0.002	0.000	0.0154
pga Recurrence -1 Std Dev	0.009	0.082	0.007	0.027	0.007	0.010	0.023	0.009	0.003	0.000	0.037	0.002	0.361	0.013	0.002	0.000	0.0154
Fragility, Seismic + 1 Std Dev	0.011	0.088	0.009	0.031	0.009	0.014	0.027	0.011	0.004	0.000	0.046	0.002	0.364	0.014	0.002	0.000	0.0228
Fragility, Seismic - 1 Std Dev	0.009	0.080	0.008	0.027	0.007	0.011	0.023	0.009	0.003	0.000	0.039	0.002	0.345	0.013	0.002	0.000	0.0199
Population +1 Std Dev	0.010	0.000	0.008	0.074	0.007	0.026	0.007	0.010	0.022	0.008	0.006	0.003	0.000	0.036	0.001	0.001	0.0517
Population -1 Std Dev	0.010	0.084	0.008	0.029	0.008	0.012	0.025	0.009	0.003	0.000	0.041	0.002	0.363	0.014	0.002	0.000	0.0210
Mortality +1 Std Dev	0.008	0.075	0.007	0.026	0.007	0.010	0.022	0.008	0.003	0.000	0.036	0.001	0.317	0.012	0.002	0.000	0.0185
Mortality -1 Std Dev	0.011	0.094	0.009	0.032	0.009	0.013	0.028	0.011	0.003	0.000	0.046	0.002	0.416	0.015	0.002	0.000	0.0238
Warning and Evacuation +1 Std Dev	0.007	0.062	0.006	0.021	0.006	0.009	0.018	0.007	0.002	0.000	0.030	0.001	0.270	0.010	0.001	0.000	0.0156
Warning and Evacuation -1 Std Dev	0.012	0.105	0.010	0.036	0.010	0.015	0.031	0.012	0.004	0.000	0.051	0.002	0.454	0.017	0.002	0.000	0.0262
Standard Deviation of EAF	0.004	0.068	0.003	0.025	0.003	0.008	0.012	0.005	0.009	0.004	0.023	0.001	0.212	0.013	0.001	0.000	0.0164
Coefficient of Variation	38%	81%	36%	88%	37%	69%	50%	50%	310%	1196%	57%	62%	58%	98%	36%	141%	78%
Fatality %	0.01%	0.02%	0.03%	0.03%	0.00%	0.01%	0.01%	0.01%	0.01%	0.03%	0.01%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%

Percent Variation by Source																	
Total Delta Inflow (discharge)	6%	23%	4%	2%	6%	2%	3%	19%	0%	0%	5%	33%	6%	15%	5%	49%	0%
Stage-Discharge (regr. & interp.)	5%	20%	6%	2%	2%	1%	2%	6%	0%	0%	6%	1%	0%	0%	3%	1%	0%
Tide	1%	7%	13%	1%	17%	3%	1%	34%	1%	0%	1%	14%	0%	5%	6%	0%	0%
Fragility, H&H	27%	1%	8%	2%	6%	2%	9%	7%	0%	0%	6%	5%	0%	2%	9%	0%	0%
pga Recurrence	3%	0%	9%	1%	10%	3%	3%	2%	0%	0%	2%	0%	0%	0%	9%	1%	0%
Fragility, Seismic	8%	0%	7%	1%	9%	2%	3%	4%	0%	0%	2%	1%	0%	0%	8%	3%	1%
Population	0%	38%	1%	83%	1%	73%	53%	1%	98%	100%	58%	28%	73%	71%	8%	46%	88%
Mortality	2%	0%	2%	0%	3%	1%	1%	1%	0%	0%	1%	1%	1%	0%	2%	0%	1%
Warning and Evacuation	46%	10%	50%	8%	46%	13%	26%	26%	1%	0%	20%	17%	19%	7%	49%	0%	11%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	1	2	3	5	6	8	9	10	11	13
DLIS Annual Probability of Failure Uncertainty Summary	ATLAS TRACT	BACON ISLAND	BETHEL ISLAND	BISHOP TRACT	BIXLER TRACT	BOULDIN ISLAND	BRACK TRACT	BRADFORD ISLAND	BRANNAN- ANDRUS	BYRON TRACT
	\$5,665,496	\$14,406,608	\$141,982,575	\$284,605,903	\$5,099,879	\$22,390,678	\$34,885,971	\$25,821,853	\$638,102,252	\$4,590,500
Mean EAD	0.0168	0.0331	0.0307	0.0262	0.0262	0.0323	0.0452	0.0400	0.0345	0.0318

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.0175	0.0365	0.0320	0.0272	0.0275	0.0387	0.0603	0.0437	0.0361	0.0335
Total Delta Inflow (discharge) - 1 Std Dev	0.0162	0.0312	0.0299	0.0256	0.0257	0.0283	0.0362	0.0378	0.0333	0.0307
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0179	0.0358	0.0322	0.0276	0.0264	0.0381	0.0590	0.0439	0.0363	0.0324
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0158	0.0309	0.0292	0.0251	0.0260	0.0279	0.0357	0.0369	0.0330	0.0310
Tide +1 Std Dev	0.0180	0.0384	0.0340	0.0276	0.0268	0.0410	0.0504	0.0478	0.0366	0.0332
Tide -1 Std Dev	0.0157	0.0291	0.0279	0.0250	0.0258	0.0265	0.0407	0.0350	0.0327	0.0304
Fragility, H&H + 1 Std Dev	0.0205	0.0361	0.0338	0.0298	0.0263	0.0381	0.0490	0.0446	0.0391	0.0308
Fragility, H&H - 1 Std Dev	0.0130	0.0301	0.0277	0.0227	0.0261	0.0265	0.0413	0.0353	0.0300	0.0276
pga Recurrence + 1 Std Dev	0.0178	0.0371	0.0345	0.0290	0.0308	0.0336	0.0480	0.0441	0.0381	0.0361
pga Recurrence -1 Std Dev	0.0159	0.0297	0.0275	0.0239	0.0222	0.0312	0.0427	0.0365	0.0316	0.0281
Fragility, Seismic + 1 Std Dev	0.0360	0.0446	0.0419	0.0346	0.0190	0.0536	0.0536	0.0515	0.0448	0.0442
Fragility, Seismic + 1 Std Dev	0.0274	0.0331	0.0307	0.0262	0.0108	0.0441	0.0452	0.0400	0.0345	0.0318
Standard Deviation of EAD	0.0060	0.0095	0.0081	0.0063	0.0060	0.0128	0.0186	0.0115	0.0081	0.0079
Coefficient of Variation	36%	29%	26%	24%	23%	40%	41%	29%	24%	25%

Percent Variation by Source										
Total Delta Inflow (discharge)	1%	8%	2%	2%	2%	17%	42%	7%	3%	3%
Stage-Discharge (regr. & interp.)	3%	7%	3%	4%	0%	16%	39%	9%	4%	1%
Tide	4%	24%	14%	4%	1%	32%	7%	31%	6%	3%
Fragility, H&H	39%	10%	14%	31%	0%	21%	4%	17%	32%	4%
pga Recurrence	3%	15%	19%	16%	51%	1%	2%	11%	16%	26%
Fragility, Seismic	51%	37%	48%	43%	46%	14%	5%	25%	40%	63%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	14	15	16	18	19	20	22	27	28
DLIS Annual Probability of Failure Uncertainty Summary	CACHE HAAS AREA	CANAL RANCH TRACT	CHIPPS ISLAND	Clifton Court Forebay	CONEY ISLAND	DEAD HORSE ISLAND	DLIS-01 (PITTSBUR G AREA)	DLIS-06 (OAKLEY AREA)	DLIS-07 (KNIGHTSE N AREA)
	\$66,561,102	\$13,768,652	\$1,726,613	\$20,290,726	\$16,719,134	\$1,473,792	\$1,052,022,510	\$248,074,194	\$15,630,438
Mean EAD	0.0248	0.0343	0.0447	0.0173	0.0312	0.0492	0.0302	0.0094	0.0098

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	0.0281	0.0452	0.0462	0.0217	0.0339	0.0589	0.0306	0.0095	0.0104
Total Delta Inflow (discharge) - 1 Std Dev	0.0230	0.0282	0.0437	0.0152	0.0298	0.0428	0.0301	0.0094	0.0097
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0263	0.0436	0.0468	0.0182	0.0321	0.0584	0.0305	0.0094	0.0099
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0235	0.0280	0.0432	0.0167	0.0305	0.0425	0.0301	0.0094	0.0098
Tide +1 Std Dev	0.0254	0.0373	0.0501	0.0183	0.0328	0.0524	0.0311	0.0095	0.0101
Tide -1 Std Dev	0.0241	0.0318	0.0408	0.0166	0.0300	0.0464	0.0300	0.0094	0.0097
Fragility, H&H + 1 Std Dev	0.0267	0.0374	0.0493	0.0181	0.0332	0.0548	0.0304	0.0094	0.0098
Fragility, H&H - 1 Std Dev	0.0228	0.0312	0.0400	0.0166	0.0293	0.0437	0.0301	0.0094	0.0098
pga Recurrence + 1 Std Dev	0.0279	0.0369	0.0501	0.0200	0.0357	0.0518	0.0358	0.0113	0.0118
pga Recurrence -1 Std Dev	0.0221	0.0321	0.0401	0.0152	0.0275	0.0470	0.0256	0.0078	0.0082
Fragility, Seismic + 1 Std Dev	0.0339	0.0422	0.0380	0.0508	0.0443	0.0572	0.0236	0.0170	0.0177
Fragility, Seismic + 1 Std Dev	0.0248	0.0343	0.0285	0.0376	0.0312	0.0492	0.0138	0.0094	0.0098
Standard Deviation of EAD	0.0065	0.0131	0.0098	0.0079	0.0083	0.0138	0.0071	0.0042	0.0043
Coefficient of Variation	26%	38%	22%	45%	27%	28%	24%	45%	44%

Percent Variation by Source									
Total Delta Inflow (discharge)	16%	42%	2%	17%	6%	34%	0%	0%	1%
Stage-Discharge (regr. & interp.)	5%	35%	3%	1%	1%	33%	0%	0%	0%
Tide	1%	4%	22%	1%	3%	5%	1%	0%	0%
Fragility, H&H	9%	5%	23%	1%	5%	16%	0%	0%	0%
pga Recurrence	20%	3%	26%	9%	24%	3%	52%	17%	17%
Fragility, Seismic	50%	9%	24%	71%	61%	8%	47%	82%	82%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	29	31	34	35	36	38	39	40	43
DLIS Annual Probability of Failure Uncertainty Summary	DLIS-08 (DISCOVER Y BAY AREA)	DLIS-10	DLIS-13 (STOCKTON N)	DLIS-14 (CENTRAL STOCKTON)	DLIS-15	DLIS-17	DLIS-18	DLIS-19 (GRIZZLY SLOUGH AREA)	DLIS-22 (RIO VISTA)
	\$1,062,266,567	\$14,176,608	\$1,976,282,574	\$846,005,281	\$65,950,789	\$11,641,632	\$169,542,723	\$36,710,324	\$18,787,306
Mean EAD	0.0095	0.0128	0.0134	0.0647	0.0147	0.0074	0.0091	0.0069	0.0079

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	0.0100	0.0154	0.0051	0.0070	0.0185	0.0114	0.0150	0.0108	0.0083
Total Delta Inflow (discharge) - 1 Std Dev	0.0093	0.0117	0.0049	0.0053	0.0126	0.0057	0.0064	0.0054	0.0077
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0095	0.0132	0.0050	0.0061	0.0182	0.0095	0.0124	0.0088	0.0083
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0094	0.0124	0.0049	0.0055	0.0120	0.0061	0.0071	0.0058	0.0077
Tide +1 Std Dev	0.0096	0.0132	0.0050	0.0060	0.0169	0.0084	0.0098	0.0070	0.0082
Tide -1 Std Dev	0.0094	0.0124	0.0049	0.0055	0.0129	0.0066	0.0084	0.0068	0.0077
Fragility, H&H + 1 Std Dev	0.0095	0.0131	0.0076	0.0630	0.0173	0.0076	0.0092	0.0069	0.0081
Fragility, H&H - 1 Std Dev	0.0094	0.0125	0.0075	0.0560	0.0122	0.0072	0.0089	0.0069	0.0078
pga Recurrence + 1 Std Dev	0.0114	0.0150	0.0144	0.0657	0.0157	0.0083	0.0100	0.0078	0.0094
pga Recurrence -1 Std Dev	0.0079	0.0110	0.0127	0.0640	0.0139	0.0066	0.0083	0.0062	0.0067
Fragility, Seismic + 1 Std Dev	0.0171	0.0214	0.0182	0.0694	0.0196	0.0119	0.0138	0.0116	0.0142
Fragility, Seismic + 1 Std Dev	0.0095	0.0128	0.0134	0.0647	0.0147	0.0074	0.0091	0.0069	0.0079
Standard Deviation of EAD	0.0042	0.0052	0.0025	0.0044	0.0060	0.0042	0.0057	0.0040	0.0035
Coefficient of Variation	44%	40%	19%	7%	41%	57%	63%	57%	43%

Percent Variation by Source									
Total Delta Inflow (discharge)	1%	13%	0%	4%	25%	46%	57%	47%	1%
Stage-Discharge (regr. & interp.)	0%	1%	0%	1%	27%	16%	22%	14%	1%
Tide	0%	1%	0%	0%	11%	4%	1%	0%	1%
Fragility, H&H	0%	0%	0%	64%	18%	0%	0%	0%	0%
pga Recurrence	17%	15%	11%	4%	2%	4%	2%	4%	16%
Fragility, Seismic	82%	70%	89%	28%	17%	30%	17%	35%	82%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	46	47	48	49	50	52	53	54	55	56
DLIS Annual Probability of Failure Uncertainty Summary	DLIS-25	DLIS-26 (MORROW ISLAND)	DLIS-27	DLIS-28	DLIS-29	DLIS-31 (GARABALD I UNIT)	DLIS-32	DLIS-33	DLIS-34	DLIS-35
	\$2,160,225	\$7,959,320	\$11,081,462	\$12,445,233	\$19,085,298	\$3,607,664	\$1,255,433	\$236,356	\$4,038,609	\$3,962,322
Mean EAD	0.0256	0.0289	0.0182	0.0294	0.0335	0.0227	0.0271	0.0502	0.0637	0.0747

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.0261	0.0297	0.0190	0.0301	0.0343	0.0232	0.0277	0.0547	0.0690	0.0816
Total Delta Inflow (discharge) - 1 Std Dev	0.0252	0.0283	0.0177	0.0288	0.0328	0.0223	0.0267	0.0472	0.0599	0.0696
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0267	0.0305	0.0199	0.0310	0.0355	0.0243	0.0288	0.0592	0.0766	0.0942
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0245	0.0274	0.0169	0.0278	0.0315	0.0210	0.0255	0.0437	0.0540	0.0611
Tide +1 Std Dev	0.0287	0.0334	0.0227	0.0338	0.0389	0.0265	0.0312	0.0764	0.0989	0.1241
Tide -1 Std Dev	0.0227	0.0251	0.0153	0.0259	0.0293	0.0192	0.0238	0.0381	0.0464	0.0516
Fragility, H&H + 1 Std Dev	0.0292	0.0335	0.0197	0.0344	0.0394	0.0259	0.0318	0.0574	0.0709	0.0815
Fragility, H&H - 1 Std Dev	0.0219	0.0242	0.0167	0.0243	0.0275	0.0194	0.0224	0.0430	0.0565	0.0679
pga Recurrence + 1 Std Dev	0.0287	0.0320	0.0212	0.0323	0.0366	0.0254	0.0298	0.0530	0.0664	0.0771
pga Recurrence -1 Std Dev	0.0231	0.0263	0.0159	0.0270	0.0309	0.0205	0.0249	0.0479	0.0615	0.0728
Fragility, Seismic + 1 Std Dev	0.0359	0.0390	0.0280	0.0392	0.0436	0.0319	0.0363	0.0595	0.0727	0.0828
Fragility, Seismic + 1 Std Dev	0.0256	0.0289	0.0182	0.0294	0.0335	0.0227	0.0271	0.0502	0.0637	0.0747
Standard Deviation of EAD	0.0076	0.0087	0.0070	0.0087	0.0099		0.0081	0.0228	0.0303	0.0411
Coefficient of Variation	30%	30%	39%	30%	29%		30%	45%	48%	55%

Percent Variation by Source										
Total Delta Inflow (discharge)	0%	1%	1%	1%	1%		0%	3%	2%	2%
Stage-Discharge (regr. & interp.)	2%	3%	4%	3%	4%		4%	12%	14%	16%
Tide	15%	23%	28%	21%	24%		20%	70%	75%	78%
Fragility, H&H	23%	29%	5%	34%	37%		34%	10%	6%	3%
pga Recurrence	14%	10%	14%	9%	8%		9%	1%	1%	0%
Fragility, Seismic	46%	34%	48%	32%	26%		32%	4%	2%	1%
	100%	100%	100%	100%	100%		100%	100%	100%	100%

	57	58	60	61	62	65	67	68	69	70	71
DLIS Annual Probability of Failure Uncertainty Summary	DLIS-36	DLIS-37 (CHADBOU RNE AREA)	DLIS-39	DLIS-40	DLIS-41 (JOICE ISLAND AREA)	DLIS-44 (HILL SLOUGH UNIT)	DLIS-46	DLIS-47	DLIS-48	DLIS-49	DLIS-50
	\$11,825,681	\$11,989,199	\$11,364,582	\$6,862,839	\$9,075,245	\$2,402,317	\$1,843,120	\$4,155,399	\$11,566,441	\$229,048	\$113,729
Mean EAD	0.0443	0.1177	0.0325	0.0485	0.0609	0.0598	0.3573	0.2824	0.0205	0.0224	0.0256

Uncertainty Source											
Total Delta Inflow (discharge) + 1 Std Dev	0.0485	0.1299	0.0340	0.0508	0.0616	0.0607	0.3801	0.2982	0.0209	0.0227	0.0260
Total Delta Inflow (discharge) - 1 Std Dev	0.0416	0.1081	0.0314	0.0468	0.0603	0.0592	0.3382	0.2702	0.0202	0.0221	0.0253
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0531	0.1552	0.0367	0.0548	0.0633	0.0629	0.4137	0.3182	0.0214	0.0231	0.0263
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0385	0.0913	0.0295	0.0437	0.0585	0.0569	0.3114	0.2505	0.0197	0.0218	0.0250
Tide +1 Std Dev	0.0698	0.2078	0.0431	0.0640	0.0662	0.0664	0.4800	0.3598	0.0221	0.0236	0.0268
Tide -1 Std Dev	0.0343	0.0722	0.0275	0.0401	0.0560	0.0546	0.2754	0.2251	0.0190	0.0212	0.0245
Fragility, H&H + 1 Std Dev	0.0516	0.1252	0.0385	0.0565	0.0693	0.0674	0.3645	0.2900	0.0235	0.0262	0.0308
Fragility, H&H - 1 Std Dev	0.0370	0.1101	0.0264	0.0404	0.0525	0.0522	0.3500	0.2748	0.0175	0.0186	0.0204
pga Recurrence + 1 Std Dev	0.0474	0.1201	0.0347	0.0514	0.0637	0.0622	0.3590	0.2842	0.0229	0.0247	0.0276
pga Recurrence -1 Std Dev	0.0417	0.1156	0.0306	0.0460	0.0586	0.0578	0.3560	0.2809	0.0186	0.0205	0.0239
Fragility, Seismic + 1 Std Dev	0.0542	0.1262	0.0405	0.0582	0.0704	0.0683	0.3633	0.2888	0.0291	0.0306	0.0331
Fragility, Seismic + 1 Std Dev	0.0443	0.1177	0.0325	0.0485	0.0609	0.0598	0.3573	0.2824	0.0205	0.0224	0.0256
Standard Deviation of EAD	0.0216	0.0763	0.0115	0.0166	0.0115	0.0112	0.1165	0.0771	0.0060	0.0061	0.0068
Coefficient of Variation	49%	65%	36%	34%	19%	19%	33%	27%	29%	27%	27%

Percent Variation by Source											
Total Delta Inflow (discharge)	3%	2%	1%	1%	0%	0%	3%	3%	0%	0%	0%
Stage-Discharge (regr. & interp.)	12%	18%	10%	11%	4%	7%	19%	19%	2%	1%	1%
Tide	68%	79%	46%	52%	20%	28%	77%	76%	7%	4%	3%
Fragility, H&H	11%	1%	28%	24%	54%	47%	0%	1%	25%	39%	58%
pga Recurrence	2%	0%	3%	3%	5%	4%	0%	0%	13%	11%	7%
Fragility, Seismic	5%	0%	12%	9%	17%	14%	0%	0%	52%	45%	30%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	74	75	76	77	78	80	83	84	85	86	87
DLIS Annual Probability of Failure Uncertainty Summary	DLIS-53	DLIS-54	DLIS-55	DLIS-56	DLIS-57	DLIS-59	DLIS-62	DLIS-63 (GRIZZLY ISLAND AREA)	DREXLER POCKET	DREXLER TRACT	DUTCH SLOUGH
	\$589,276	\$2,816,700	\$4,363,738	\$407,578	\$1,574,965	\$5,709,355	\$14,748,523	\$152,178,674	\$2,578,061	\$35,140,390	\$6,077,326
Mean EAD	0.0097	0.0263	0.0313	0.0282	0.0226	0.0278	0.0304	0.1314	0.0228	0.0325	0.0313

Uncertainty Source											
Total Delta Inflow (discharge) + 1 Std Dev	0.0099	0.0268	0.0318	0.0287	0.0230	0.0280	0.0307	0.1541	0.0287	0.0426	0.0330
Total Delta Inflow (discharge) - 1 Std Dev	0.0096	0.0259	0.0309	0.0278	0.0223	0.0276	0.0303	0.1127	0.0196	0.0267	0.0303
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0099	0.0270	0.0321	0.0289	0.0233	0.0283	0.0310	0.1806	0.0248	0.0367	0.0329
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0096	0.0256	0.0306	0.0275	0.0220	0.0272	0.0300	0.0961	0.0208	0.0283	0.0296
Tide +1 Std Dev	0.0100	0.0275	0.0327	0.0294	0.0237	0.0287	0.0313	0.2846	0.0282	0.0450	0.0350
Tide -1 Std Dev	0.0095	0.0252	0.0301	0.0272	0.0216	0.0269	0.0297	0.0632	0.0186	0.0239	0.0281
Fragility, H&H + 1 Std Dev	0.0098	0.0317	0.0377	0.0340	0.0267	0.0333	0.0365	0.1391	0.0265	0.0369	0.0341
Fragility, H&H - 1 Std Dev	0.0096	0.0209	0.0249	0.0224	0.0185	0.0222	0.0244	0.1237	0.0190	0.0280	0.0284
pga Recurrence + 1 Std Dev	0.0116	0.0284	0.0337	0.0303	0.0248	0.0300	0.0330	0.1340	0.0241	0.0342	0.0353
pga Recurrence -1 Std Dev	0.0081	0.0246	0.0293	0.0264	0.0209	0.0259	0.0283	0.1292	0.0216	0.0311	0.0279
Fragility, Seismic + 1 Std Dev	0.0170	0.0339	0.0399	0.0359	0.0304	0.0360	0.0393	0.1402	0.0290	0.0590	0.0251
Fragility, Seismic + 1 Std Dev	0.0097	0.0263	0.0313	0.0282	0.0226	0.0278	0.0304	0.1314	0.0228	0.0472	0.0180
Standard Deviation of EAD	0.0041	0.0070	0.0082	0.0074	0.0061	0.0073	0.0079	0.1206	0.0085	0.0158	0.0071
Coefficient of Variation	42%	27%	26%	26%	27%	26%	26%	92%	37%	49%	23%

Percent Variation by Source											
Total Delta Inflow (discharge)	0%	0%	0%	0%	0%	0%	0%	3%	28%	25%	4%
Stage-Discharge (regr. & interp.)	0%	1%	1%	1%	1%	1%	0%	12%	6%	7%	5%
Tide	0%	3%	3%	2%	3%	2%	1%	84%	32%	45%	23%
Fragility, H&H	0%	60%	61%	62%	46%	58%	58%	0%	19%	8%	16%
pga Recurrence	19%	7%	7%	7%	10%	8%	9%	0%	2%	1%	27%
Fragility, Seismic	80%	29%	28%	27%	40%	32%	32%	0%	13%	14%	25%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	88	89	90	91	92	94	95	96	97	98
DLIS Annual Probability of Failure Uncertainty Summary	EGBERT TRACT	EHRHEARD T CLUB	EMPIRE TRACT	FABIAN TRACT	FAY ISLAND	GLANVILLE	GLIDE DISTRICT	GRAND ISLAND	HASTINGS TRACT	HOLLAND TRACT
	\$250,440,401	\$20,054,541	\$16,514,693	\$841,291,449	\$195,146	\$402,122,596	\$4,805,816	\$270,291,329	\$88,621,732	\$109,806,595
Mean EAD	0.0160	0.0399	0.0482	0.0389	0.0413	0.0520	0.0188	0.0325	0.0183	0.0311

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.0169	0.0482	0.0636	0.0398	0.0495	0.0767	0.0209	0.0336	0.0209	0.0335
Total Delta Inflow (discharge) - 1 Std Dev	0.0153	0.0343	0.0384	0.0383	0.0367	0.0356	0.0175	0.0313	0.0168	0.0297
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0170	0.0474	0.0628	0.0395	0.0456	0.0766	0.0198	0.0336	0.0198	0.0332
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0151	0.0344	0.0378	0.0385	0.0376	0.0349	0.0178	0.0315	0.0171	0.0292
Tide +1 Std Dev	0.0166	0.0411	0.0691	0.0401	0.0505	0.0553	0.0193	0.0331	0.0191	0.0353
Tide -1 Std Dev	0.0155	0.0387	0.0347	0.0378	0.0349	0.0486	0.0183	0.0319	0.0177	0.0277
Fragility, H&H + 1 Std Dev	0.0189	0.0444	0.0543	0.0416	0.0450	0.0550	0.0206	0.0401	0.0203	0.0342
Fragility, H&H - 1 Std Dev	0.0132	0.0354	0.0420	0.0363	0.0375	0.0489	0.0169	0.0249	0.0163	0.0280
pga Recurrence + 1 Std Dev	0.0175	0.0423	0.0495	0.0445	0.0453	0.0530	0.0210	0.0343	0.0206	0.0348
pga Recurrence -1 Std Dev	0.0148	0.0378	0.0471	0.0343	0.0379	0.0511	0.0169	0.0309	0.0164	0.0279
Fragility, Seismic + 1 Std Dev	0.0374	0.0353	0.0698	0.0510	0.0349	0.0700	0.0146	0.0456	0.0390	0.0420
Fragility, Seismic + 1 Std Dev	0.0274	0.0308	0.0603	0.0389	0.0277	0.0621	0.0105	0.0352	0.0283	0.0311
Standard Deviation of EAD	0.0061	0.0110	0.0260	0.0084	0.0126	0.0299	0.0040	0.0095	0.0066	0.0086
Coefficient of Variation	38%	28%	54%	22%	30%	58%	21%	29%	36%	28%

Percent Variation by Source										
Total Delta Inflow (discharge)	2%	39%	24%	1%	26%	47%	18%	1%	10%	5%
Stage-Discharge (regr. & interp.)	2%	34%	23%	0%	10%	49%	6%	1%	4%	6%
Tide	1%	1%	44%	2%	39%	1%	2%	0%	1%	20%
Fragility, H&H	22%	17%	6%	10%	9%	1%	22%	64%	9%	13%
pga Recurrence	5%	4%	0%	37%	9%	0%	26%	3%	10%	16%
Fragility, Seismic	68%	4%	3%	51%	8%	2%	26%	30%	65%	41%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	99	101	102	104	105	106	108	110	111	116
DLIS Annual Probability of Failure Uncertainty Summary	HOLT STATION	HONKER LAKE TRACT	HOTCHKISS TRACT	JERSEY ISLAND	KASSON DISTRICT	KING ISLAND	LIBBY MCNEIL	LISBON DISTRICT	LITTLE EGBERT TRACT	LOWER ROBERTS ISLAND
	\$14,857,836	\$88,763,386	\$163,341,470	\$86,100,394	\$44,307,149	\$45,105,010	\$8,852,277	\$65,018,995	\$17,421,881	\$449,079,256
Mean EAD	0.1867	0.0235	0.0173	0.0185	0.0138	0.0230	0.0236	0.0153	0.0897	0.0248

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.2254	0.0246	0.0187	0.0198	0.0138	0.0275	0.0250	0.0170	0.1086	0.0260
Total Delta Inflow (discharge) - 1 Std Dev	0.1530	0.0229	0.0164	0.0177	0.0138	0.0205	0.0225	0.0141	0.0749	0.0240
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.2178	0.0242	0.0189	0.0199	0.0138	0.0269	0.0251	0.0165	0.1124	0.0259
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.1584	0.0229	0.0158	0.0168	0.0138	0.0199	0.0223	0.0142	0.0723	0.0239
Tide +1 Std Dev	0.2632	0.0250	0.0204	0.0220	0.0138	0.0275	0.0240	0.0156	0.1130	0.0268
Tide -1 Std Dev	0.1307	0.0222	0.0145	0.0152	0.0138	0.0195	0.0232	0.0151	0.0719	0.0229
Fragility, H&H + 1 Std Dev	0.1928	0.0288	0.0201	0.0216	0.0138	0.0274	0.0266	0.0184	0.0965	0.0270
Fragility, H&H - 1 Std Dev	0.1806	0.0182	0.0145	0.0154	0.0138	0.0186	0.0206	0.0122	0.0829	0.0226
pga Recurrence + 1 Std Dev	0.1894	0.0249	0.0190	0.0203	0.0163	0.0242	0.0261	0.0164	0.0911	0.0280
pga Recurrence -1 Std Dev	0.1844	0.0224	0.0159	0.0170	0.0117	0.0220	0.0215	0.0144	0.0885	0.0221
Fragility, Seismic + 1 Std Dev	0.1818	0.0301	0.0243	0.0305	0.0163	0.0410	0.0231	0.0181	0.1100	0.0189
Fragility, Seismic + 1 Std Dev	0.1769	0.0235	0.0173	0.0228	0.0094	0.0326	0.0160	0.0139	0.1008	0.0131
Standard Deviation of EAD	0.0815	0.0066	0.0059	0.0065		0.0089	0.0055	0.0043	0.0343	0.0053
Coefficient of Variation	44%	28%	34%	35%		39%	23%	28%	38%	21%

Percent Variation by Source										
Total Delta Inflow (discharge)	20%	2%	4%	3%		16%	5%	12%	24%	4%
Stage-Discharge (regr. & interp.)	13%	1%	7%	6%		16%	6%	7%	34%	4%
Tide	66%	5%	25%	27%		20%	1%	0%	36%	13%
Fragility, H&H	1%	64%	22%	22%		25%	29%	52%	4%	18%
pga Recurrence	0%	4%	7%	6%		1%	18%	5%	0%	31%
Fragility, Seismic	0%	25%	35%	36%		22%	41%	24%	2%	30%
	100%	100%	100%	100%		100%	100%	100%	100%	100%

	117	118	119	120	121	122	123	124	125	127
DLIS Annual Probability of Failure Uncertainty Summary	MAINTENA NCE AREA 9 NORTH	MANDEVILL E ISLAND	MCCORMA CK- WILLIAMSO N TRACT	MCDONALD ISLAND	MCMULLIN RANCH	MEDFORD ISLAND	MEIN'S LANDING	MERRITT ISLAND	MIDDLE & UPPER ROBERTS ISLAND	MOSSDALE ISLAND
	\$2,718,073,646	\$15,075,927	\$9,081,945	\$465,783,237	\$53,315,739	\$475,327	\$4,421,335	\$66,874,759	\$163,527,538	\$23,352,518
Mean EAD	0.0187	0.0193	0.0535	0.0346	0.0000	0.0235	0.0416	0.0164	0.0358	0.0195

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.0188	0.0223	0.0694	0.0361	0.0000	0.0278	0.0418	0.0177	0.0247	0.0234
Total Delta Inflow (discharge) - 1 Std Dev	0.0155	0.0177	0.0435	0.0336	0.0000	0.0211	0.0413	0.0152	0.0223	0.0174
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0186	0.0220	0.0688	0.0365	0.0000	0.0271	0.0423	0.0176	0.0243	0.0200
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0156	0.0170	0.0431	0.0328	0.0000	0.0206	0.0407	0.0153	0.0221	0.0190
Tide +1 Std Dev	0.0171	0.0248	0.0567	0.0382	0.0000	0.0309	0.0429	0.0165	0.0253	0.0214
Tide -1 Std Dev	0.0170	0.0153	0.0507	0.0313	0.0000	0.0184	0.0401	0.0163	0.0213	0.0178
Fragility, H&H + 1 Std Dev	0.0245	0.0229	0.0588	0.0384	0.0000	0.0275	0.0461	0.0202	0.0538	0.0230
Fragility, H&H - 1 Std Dev	0.0160	0.0157	0.0482	0.0307	0.0000	0.0194	0.0370	0.0125	0.0348	0.0160
pga Recurrence + 1 Std Dev	0.0196	0.0206	0.0562	0.0386	0.0000	0.0251	0.0467	0.0172	0.0382	0.0208
pga Recurrence -1 Std Dev	0.0179	0.0182	0.0513	0.0312	0.0000	0.0221	0.0373	0.0157	0.0337	0.0184
Fragility, Seismic + 1 Std Dev	0.0233	0.0406	0.0613	0.0446	0.0000	0.0449	0.0351	0.0240	0.0414	0.0258
Fragility, Seismic + 1 Std Dev	0.0187	0.0308	0.0535	0.0346	0.0000	0.0347	0.0261	0.0178	0.0330	0.0195
Standard Deviation of EAD	0.0054	0.0085	0.0198	0.0084		0.0103	0.0081	0.0053	0.0110	0.0060
Coefficient of Variation	29%	44%	37%	24%		44%	20%	32%	31%	31%

Percent Variation by Source										
Total Delta Inflow (discharge)	9%	7%	43%	2%		11%	0%	6%	1%	25%
Stage-Discharge (regr. & interp.)	8%	9%	42%	5%		10%	1%	5%	1%	1%
Tide	0%	31%	2%	17%		37%	3%	0%	3%	9%
Fragility, H&H	62%	18%	7%	21%		15%	32%	53%	75%	33%
pga Recurrence	2%	2%	2%	19%		2%	34%	2%	4%	4%
Fragility, Seismic	18%	33%	4%	36%		25%	31%	34%	15%	28%
	100%	100%	100%	100%		100%	100%	100%	100%	100%

	128	129	130	131	132	133	134	135	136
DLIS Annual Probability of Failure Uncertainty Summary	NETHERLANDS	NEW HOPE TRACT	PALM-ORWOOD	PARADISE JUNCTION	PEARSON DISTRICT	PESCADERO DISTRICT	PETERS POCKET	PICO-NAGLEE	PROSPECT ISLAND
	\$260,416,494	\$171,360,928	\$305,778,099	\$207,856,578	\$149,462,488	\$366,226,887	\$21,731,427	\$389,111,813	\$5,533,470
Mean EAD	0.0166	0.0164	0.0276	0.0242	0.0239	0.0101	0.0195	0.0035	0.0460

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	0.0188	0.0245	0.0297	0.0302	0.0249	0.0104	0.0271	0.0037	0.0613
Total Delta Inflow (discharge) - 1 Std Dev	0.0151	0.0122	0.0264	0.0210	0.0228	0.0100	0.0155	0.0033	0.0361
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0179	0.0227	0.0288	0.0250	0.0248	0.0101	0.0228	0.0036	0.0575
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0154	0.0126	0.0266	0.0235	0.0230	0.0101	0.0169	0.0034	0.0374
Tide +1 Std Dev	0.0174	0.0175	0.0302	0.0269	0.0241	0.0102	0.0210	0.0037	0.0556
Tide -1 Std Dev	0.0158	0.0154	0.0258	0.0218	0.0236	0.0100	0.0182	0.0034	0.0384
Fragility, H&H + 1 Std Dev	0.0202	0.0177	0.0292	0.0282	0.0296	0.0102	0.0217	0.0036	0.0510
Fragility, H&H - 1 Std Dev	0.0130	0.0151	0.0260	0.0202	0.0181	0.0100	0.0174	0.0034	0.0410
pga Recurrence + 1 Std Dev	0.0175	0.0177	0.0316	0.0257	0.0251	0.0121	0.0211	0.0042	0.0477
pga Recurrence -1 Std Dev	0.0159	0.0153	0.0242	0.0230	0.0228	0.0085	0.0183	0.0029	0.0446
Fragility, Seismic + 1 Std Dev	0.0246	0.0321	0.0212	0.0314	0.0330	0.0147	0.0180	0.0179	0.0512
Fragility, Seismic + 1 Std Dev	0.0181	0.0243	0.0141	0.0252	0.0251	0.0086	0.0143	0.0107	0.0450
Standard Deviation of EAD	0.0055	0.0091	0.0061	0.0075	0.0072	0.0036	0.0074	0.0037	0.0193
Coefficient of Variation	33%	56%	22%	31%	30%	35%	38%	105%	42%

Percent Variation by Source									
Total Delta Inflow (discharge)	12%	46%	8%	38%	2%	0%	62%	0%	42%
Stage-Discharge (regr. & interp.)	5%	31%	3%	1%	2%	0%	16%	0%	27%
Tide	2%	1%	13%	12%	0%	0%	4%	0%	20%
Fragility, H&H	43%	2%	7%	28%	63%	0%	9%	0%	7%
pga Recurrence	2%	2%	36%	3%	3%	25%	4%	3%	1%
Fragility, Seismic	35%	18%	34%	18%	30%	75%	6%	96%	3%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	137	138	139	140	141	142	143	144	145
DLIS Annual Probability of Failure Uncertainty Summary	QUIMBY ISLAND	RANDALL ISLAND	RECLAMATI ON DISTRICT 17	RINDGE TRACT	RIO BLANCO TRACT	RIVER JUNCTION	ROUGH AND READY ISLAND	RYER ISLAND	NORTH STOCKTON
	\$5,333,067	\$15,034,388	\$2,213,651,549	\$32,608,649	\$1,446,547	\$50,223,262	\$78,428,017	\$111,475,504	\$3,427,598,233
Mean EAD	0.0150	0.0238	0.0148	0.0228	0.0487	0.0227	0.0124	0.0428	0.0312

Uncertainty Source									
Total Delta Inflow (discharge) + 1 Std Dev	0.0160	0.0248	0.0154	0.0270	0.0598	0.0228	0.0132	0.0437	0.0116
Total Delta Inflow (discharge) - 1 Std Dev	0.0142	0.0229	0.0143	0.0205	0.0419	0.0226	0.0118	0.0419	0.0108
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0165	0.0247	0.0151	0.0259	0.0589	0.0227	0.0132	0.0437	0.0114
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0136	0.0230	0.0145	0.0204	0.0414	0.0227	0.0117	0.0420	0.0109
Tide +1 Std Dev	0.0178	0.0240	0.0157	0.0279	0.0561	0.0230	0.0135	0.0437	0.0115
Tide -1 Std Dev	0.0123	0.0237	0.0138	0.0188	0.0431	0.0225	0.0114	0.0420	0.0109
Fragility, H&H + 1 Std Dev	0.0174	0.0268	0.0175	0.0271	0.0543	0.0228	0.0146	0.0488	0.0521
Fragility, H&H - 1 Std Dev	0.0125	0.0208	0.0121	0.0185	0.0430	0.0226	0.0101	0.0369	0.0349
pga Recurrence + 1 Std Dev	0.0164	0.0265	0.0161	0.0241	0.0514	0.0267	0.0135	0.0473	0.0332
pga Recurrence -1 Std Dev	0.0138	0.0216	0.0137	0.0217	0.0464	0.0193	0.0115	0.0391	0.0296
Fragility, Seismic + 1 Std Dev	0.0376	0.0191	0.0213	0.0425	0.0570	0.0151	0.0320	0.0409	0.0357
Fragility, Seismic + 1 Std Dev	0.0271	0.0143	0.0156	0.0334	0.0487	0.0078	0.0232	0.0303	0.0288
Standard Deviation of EAD	0.0068	0.0047	0.0042	0.0089	0.0160	0.0052	0.0053	0.0091	0.0095
Coefficient of Variation	45%	20%	29%	39%	33%	23%	43%	21%	30%

Percent Variation by Source									
Total Delta Inflow (discharge)	2%	4%	2%	13%	32%	0%	2%	1%	0%
Stage-Discharge (regr. & interp.)	5%	3%	1%	9%	30%	0%	2%	1%	0%
Tide	16%	0%	5%	26%	17%	0%	4%	1%	0%
Fragility, H&H	13%	40%	40%	23%	12%	0%	18%	43%	83%
pga Recurrence	4%	26%	8%	2%	2%	51%	4%	20%	4%
Fragility, Seismic	60%	26%	45%	26%	7%	49%	71%	34%	13%
	100%	100%	100%	100%	100%	100%	100%	100%	100%

	146	147	148	151	152	153	154	155	156	157
DLIS Annual Probability of Failure Uncertainty Summary	SHERMAN ISLAND	SHIMA TRACT	SHIN KEE TRACT	STARK TRACT	STATEN ISLAND	STEWART TRACT	SUNRISE CLUB	SUTTER ISLAND	TERMINOU S TRACT	TWITCHELL ISLAND
	\$135,565,721	\$21,298,838	\$3,077,519	\$6,255,466	\$37,904,020	\$18,462,846	\$458,402	\$41,755,943	\$250,309,479	\$199,842,702
Mean EAD	0.0162	0.0311	0.0642	0.0237	0.0482	0.0256	0.0250	0.0240	0.0438	0.0245

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.0167	0.0339	0.0827	0.0243	0.0549	0.0275	0.0253	0.0251	0.0595	0.0274
Total Delta Inflow (discharge) - 1 Std Dev	0.0158	0.0296	0.0523	0.0233	0.0435	0.0245	0.0248	0.0229	0.0343	0.0227
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0172	0.0335	0.0826	0.0239	0.0544	0.0260	0.0259	0.0250	0.0586	0.0277
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0150	0.0291	0.0512	0.0236	0.0433	0.0253	0.0242	0.0230	0.0335	0.0220
Tide +1 Std Dev	0.0183	0.0340	0.0758	0.0242	0.0541	0.0269	0.0268	0.0243	0.0520	0.0293
Tide -1 Std Dev	0.0139	0.0288	0.0551	0.0233	0.0435	0.0244	0.0233	0.0237	0.0372	0.0210
Fragility, H&H + 1 Std Dev	0.0185	0.0355	0.0700	0.0242	0.0571	0.0278	0.0286	0.0296	0.0490	0.0290
Fragility, H&H - 1 Std Dev	0.0139	0.0268	0.0585	0.0232	0.0394	0.0234	0.0215	0.0183	0.0387	0.0200
pga Recurrence + 1 Std Dev	0.0181	0.0340	0.0672	0.0277	0.0502	0.0289	0.0280	0.0253	0.0457	0.0263
pga Recurrence -1 Std Dev	0.0146	0.0287	0.0618	0.0203	0.0466	0.0228	0.0226	0.0229	0.0423	0.0230
Fragility, Seismic + 1 Std Dev	0.0415	0.0397	0.0729	0.0172	0.0715	0.0197	0.0321	0.0348	0.0477	0.0495
Fragility, Seismic + 1 Std Dev	0.0296	0.0311	0.0642	0.0106	0.0627	0.0143	0.0231	0.0262	0.0415	0.0382
Standard Deviation of EAD	0.0071	0.0078	0.0254	0.0050	0.0138	0.0050	0.0067	0.0073	0.0202	0.0093
Coefficient of Variation	44%	25%	39%	21%	29%	20%	27%	31%	46%	38%

Percent Variation by Source										
Total Delta Inflow (discharge)	0%	8%	36%	1%	17%	9%	0%	2%	39%	7%
Stage-Discharge (regr. & interp.)	2%	8%	38%	0%	16%	1%	2%	2%	38%	9%
Tide	10%	11%	17%	1%	15%	6%	7%	0%	13%	20%
Fragility, H&H	11%	32%	5%	1%	41%	19%	29%	59%	6%	24%
pga Recurrence	6%	11%	1%	54%	2%	36%	16%	3%	1%	3%
Fragility, Seismic	71%	30%	3%	43%	10%	29%	46%	34%	2%	37%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	158	159	160	161	162	164	165	166	167	168
DLIS Annual Probability of Failure Uncertainty Summary	TYLER ISLAND	UNION ISLAND EAST	UNION ISLAND WEST	UPPER ANDRUS ISLAND	JONES TRACT (Lower and Upper)	VEALE TRACT	VENICE ISLAND	VICTORIA ISLAND	WALNUT GROVE	WALTHALL
	\$144,186,822	\$113,871,081	\$103,239,034	\$56,802,534	\$32,149,041	\$25,880,816	\$5,864,701	\$53,878,331	\$35,896,342	\$11,986,540
Mean EAD	0.0445	0.0271	0.0356	0.0255	0.0349	0.0182	0.0410	0.0283	0.0221	0.0370

Uncertainty Source										
Total Delta Inflow (discharge) + 1 Std Dev	0.0494	0.0276	0.0365	0.0270	0.0401	0.0211	0.0466	0.0302	0.0237	0.0426
Total Delta Inflow (discharge) - 1 Std Dev	0.0411	0.0266	0.0349	0.0242	0.0320	0.0166	0.0378	0.0272	0.0207	0.0339
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0492	0.0274	0.0362	0.0269	0.0377	0.0201	0.0459	0.0290	0.0237	0.0377
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0409	0.0267	0.0351	0.0243	0.0323	0.0164	0.0372	0.0276	0.0207	0.0363
Tide +1 Std Dev	0.0486	0.0281	0.0372	0.0264	0.0422	0.0223	0.0501	0.0300	0.0227	0.0404
Tide -1 Std Dev	0.0413	0.0260	0.0343	0.0247	0.0297	0.0150	0.0351	0.0270	0.0215	0.0342
Fragility, H&H + 1 Std Dev	0.0503	0.0296	0.0375	0.0313	0.0383	0.0209	0.0461	0.0298	0.0266	0.0416
Fragility, H&H - 1 Std Dev	0.0388	0.0246	0.0338	0.0198	0.0315	0.0155	0.0359	0.0268	0.0176	0.0323
pga Recurrence + 1 Std Dev	0.0475	0.0305	0.0410	0.0268	0.0386	0.0199	0.0446	0.0325	0.0235	0.0401
pga Recurrence -1 Std Dev	0.0420	0.0241	0.0311	0.0245	0.0317	0.0167	0.0379	0.0248	0.0209	0.0343
Fragility, Seismic + 1 Std Dev	0.0535	0.0375	0.0261	0.0435	0.0283	0.0433	0.0513	0.0280	0.0384	0.0312
Fragility, Seismic + 1 Std Dev	0.0445	0.0271	0.0184	0.0351	0.0217	0.0316	0.0410	0.0169	0.0302	0.0260
Standard Deviation of EAD	0.0104	0.0067	0.0068	0.0075	0.0099	0.0081	0.0126	0.0073	0.0066	0.0081
Coefficient of Variation	23%	25%	19%	29%	28%	45%	31%	26%	30%	22%

Percent Variation by Source										
Total Delta Inflow (discharge)	16%	1%	1%	3%	17%	8%	12%	4%	5%	29%
Stage-Discharge (regr. & interp.)	16%	0%	1%	3%	8%	5%	12%	1%	5%	1%
Tide	12%	2%	4%	1%	40%	20%	35%	4%	1%	15%
Fragility, H&H	30%	14%	7%	59%	12%	11%	17%	4%	46%	33%
pga Recurrence	7%	23%	54%	2%	12%	4%	7%	28%	4%	13%
Fragility, Seismic	19%	60%	32%	31%	11%	52%	17%	58%	39%	11%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

	169	171	172	173	174	175	176	177
DLIS Annual Probability of Failure Uncertainty Summary	WEBB TRACT	WEST SACRAMEN TO	WETHERBE E LAKE	WINTER ISLAND	WOODWAR D ISLAND	WRIGHT- ELMWOOD TRACT	YOLANO	MAINTENA NCE AREA 9 SOUTH
	\$22,065,222	\$3,181,461,757	\$105,978,664	\$26,502	\$147,675,889	\$26,328,480	\$121,945,411	\$165,045,570
Mean EAD	0.0270	0.0302	0.0289	0.0598	0.0145	0.0271	0.0164	0.0121

Uncertainty Source								
Total Delta Inflow (discharge) + 1 Std Dev	0.0310	0.0245	0.0365	0.0745	0.0169	0.0289	0.0171	0.0061
Total Delta Inflow (discharge) - 1 Std Dev	0.0247	0.0214	0.0246	0.0499	0.0132	0.0261	0.0162	0.0061
Stage-Discharge (regr. & interp.) + 1 Std Dev	0.0310	0.0229	0.0298	0.0761	0.0158	0.0286	0.0165	0.0061
Stage-Discharge (regr. & interp.) - 1 Std Dev	0.0239	0.0218	0.0280	0.0504	0.0133	0.0258	0.0163	0.0061
Tide +1 Std Dev	0.0343	0.0226	0.0330	0.1112	0.0175	0.0292	0.0164	0.0061
Tide -1 Std Dev	0.0221	0.0219	0.0256	0.0369	0.0122	0.0252	0.0164	0.0061
Fragility, H&H + 1 Std Dev	0.0317	0.0304	0.0338	0.0660	0.0166	0.0303	0.0164	0.5199
Fragility, H&H - 1 Std Dev	0.0224	0.0300	0.0239	0.0536	0.0125	0.0239	0.0164	0.5199
pga Recurrence + 1 Std Dev	0.0290	0.0338	0.0300	0.0624	0.0160	0.0301	0.0193	0.0060
pga Recurrence -1 Std Dev	0.0254	0.0271	0.0279	0.0577	0.0133	0.0246	0.0139	0.0060
Fragility, Seismic + 1 Std Dev	0.0508	0.0227	0.0345	0.0689	0.0381	0.0361	0.0115	0.0177
Fragility, Seismic + 1 Std Dev	0.0395	0.0164	0.0289	0.0598	0.0272	0.0271	0.0062	0.0121
Standard Deviation of EAD	0.0108	0.0049	0.0092	0.0420	0.0069	0.0068	0.0038	0.0028
Coefficient of Variation	40%	16%	32%	70%	48%	25%	23%	23%

Percent Variation by Source								
Total Delta Inflow (discharge)	8%	10%	43%	9%	7%	4%	1%	0%
Stage-Discharge (regr. & interp.)	11%	1%	1%	9%	3%	4%	0%	0%
Tide	32%	0%	16%	78%	15%	9%	0%	0%
Fragility, H&H	19%	0%	29%	2%	9%	22%	0%	0%
pga Recurrence	3%	47%	1%	0%	4%	17%	50%	0%
Fragility, Seismic	27%	41%	9%	1%	62%	44%	48%	100%
	100%	100%	100%	100%	100%	100%	100%	100%

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