Delta Stewardship Council

Resolution 2024-01

RESOLUTION OF THE DELTA STEWARSHIP COUNCIL TO ADOPT REVISED DELTA PLAN CHAPTER 7 "REDUCE RISK TO PEOPLE, PROPERTY AND STATE INTERESTS IN THE DELTA" (INCLUDING RR P1), APPENDIX P, AND DELTA PLAN EXECUTIVE SUMMARY

WHEREAS, the Sacramento-San Joaquin Delta Reform Act of 2009 (Wat. Code, § 85000 et seq) ("Delta Reform Act") created the Delta Stewardship Council ("Council") and directs the Council to develop an enforceable, comprehensive, long-term management plan for the Sacramento-San Joaquin Delta and the Suisun Marsh (collectively, "the Delta") referred to as the Delta Plan; and

WHEREAS, the Delta Reform Act requires the Delta Plan to "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" (Wat. Code, § 85305, subd. (a)); and

WHEREAS, the Delta Reform Act requires the Council, in consultation with the Central Valley Flood Protection Board, to "recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and nonproject levees"
(Wat. Code, § 85306); and

WHEREAS, the Council has the power to "adopt regulations or guidelines as needed to carry out the powers and duties identified in [the Delta Reform Act]" (Wat. Code, § 85210, subd. (i)); and

WHEREAS, Water Code section 85082 directs the Council to adopt and implement the Delta Plan and Water Code section 85300(c) directs the Council to review the Delta Plan at least every five years and revise it as the Council deems appropriate; and

WHEREAS, on May 16, 2013, the Council, as lead agency under the California Environmental Quality Act (Pub. Resources Code, § 21000) ("CEQA"), certified the Final Delta Plan Program Environmental Impact Report as State Clearinghouse No. 2010122028 and approved the Delta Plan; and

WHEREAS, on April 26, 2018, at a duly noticed public meeting, the Council adopted Resolution 2018-1 adopting amendments to the Delta Plan ("2018 Delta Plan Amendments"), which included revisions to Delta Plan Chapter 7 "Reduce Risk to People, Property, and State Interests in the Delta", and proposed revisions to Delta Plan Policy RR P1 to implement the Delta Levees Investment Strategy ("DLIS"); and

WHEREAS, by adopting Resolution 2018-1, the Council, as lead agency under CEQA, (1) certified the Final Delta Plan Amendments Program Environmental Impact Report as State Clearinghouse No. 2017032048 ("PEIR") for the 2018 Delta Plan Amendments, (2) adopted Findings and a Statement of Overriding Considerations, (3) adopted and incorporated the new mitigation measures identified in the PEIR and in the Findings, and (4) adopted the Mitigation Monitoring and Reporting Program for the Delta Plan Amendments, and

WHEREAS, on June 10, 2019, the California Department of Water Resources had published new Light Detection and Ranging (or LiDAR) elevation imaging ("2017 LiDAR imaging") of the Delta and Suisun Marsh for 2017, which provided updated information about the height of levees and island floors; and

WHEREAS, the 2017 LiDAR imaging presented new information that needed to be further evaluated to inform whether the priorities identified in the 2018 DLIS should be modified because of changed levee or island conditions; and
WHEREAS, on March 26, 2020, the Council adopted Resolution 2020-01, to direct staff to evaluate the new 2017 LiDAR imaging information to determine if further modifications to Chapter 7 or the DLIS priorities and modified preliminary language to amend the interim Delta Plan Policy RR P1 (Modified Preliminary Language for RR P1) were needed and report back to the Council at a future date; And

WHEREAS, on March 26, 2020, the Council amended Delta Plan, Chapter 7, to, among other things, delete part of pages 26-30 and 41-45 describing priorities for state investment in levees and the 2018 DLIS; and

WHEREAS, following stakeholder input, on May 21, 2021, Council staff reported the results of the evaluation of the 2017 LiDAR imaging and presented proposed revisions to the DLIS priorities and Modified Preliminary Regulatory Language for RR P1 to the Council and committed to return to the Council at a future date for authorization to reinitiate rulemaking; and

WHEREAS, staff presented proposed revisions to the DLIS priorities and Modified Preliminary Regulatory Language for RR P1 to the Council at the regularly scheduled Council meeting on August 26, 2021; and

WHEREAS, at the August 26, 2021, meeting, the Council adopted Resolution 2021-02 that, among other things, approved a CEQA Addendum to the 2018 Delta Plan Amendments Program Environmental Impact Report ("PEIR Addendum") for the staff-recommended DLIS prioritization and approved the staff-recommended DLIS Modified Preliminary Draft Regulatory Language for purposes of a rulemaking to amend Delta Plan Policy RR P1, and directed staff to initiate a rulemaking to amend Delta Plan Policy RR P1, as set forth in California Code of Regulations, title 23, section 5012 and the related definitions in regulation in California Code of Regulations, title 23, section 5001; and

WHEREAS, the Council filed a Notice of Determination for the PEIR Addendum with the Governor's Office of Planning and Research State Clearinghouse on August 27, 2021, and the 30-day statute of limitations expired without challenge; and

WHEREAS, at the June 23, 2022, regularly scheduled public meeting, the Council adopted Resolution 2022-05 adopting amendments to the Delta Plan ("Ecosystem Amendment"), which included revisions to Delta Plan Chapter 4, and

WHEREAS, by adopting Resolution 2022-05, the Council, as lead agency under CEQA, (1) certified the Final Program Environmental Impact Report as State Clearinghouse No. 2020050219 ("Ecosystem Amendment PEIR") for the Ecosystem Amendment, (2) adopted Findings and a Statement of Overriding Considerations, (3) adopted and incorporated the new mitigation measures identified in the PEIR and in the Findings, and (4) adopted the Mitigation Monitoring and Reporting Program for the Ecosystem Amendment, and

WHEREAS, the Council adopted at its July 27, 2023, regularly scheduled public meeting amendments to California Code of Regulations, title 23, sections 5001 and 5012 in Resolution 2023-05 to implement DLIS, which became effective on January 1, 2024; and

WHEREAS, Council staff recommend the Council adopt conforming revisions to 1) the Delta Plan, Chapter 7, and Delta Plan, Appendix P, to reflect the regulatory amendments adopted in Resolution 2023-05 and effective January 1, 2024, as detailed in Attachments 1 and 2, and 2) the Delta Plan, Executive Summary, to incorporate

previous Council actions concerning the Ecosystem Amendment as adopted in Resolution 2022-05, as detailed in Attachment 3;

NOW, THEREFORE, BE IT RESOLVED by the Delta Stewardship Council as follows:

Section 1. The Council adopts the staff-recommended revisions and directs the Executive Officer, or their designee, to revise the Delta Plan, Chapter 7 "Reduce Risk to People, Property and State Interests in the Delta", in substantially the same form as presented in Attachment 1 and Delta Plan, Appendix P, in substantially the same form as presented in Attachment 2.

Section 2. The Council adopts the staff-recommended revisions and directs the Executive Officer, or their designee, to revise the Delta Plan, Executive Summary, in substantially the same form as presented in Attachment 3.

Section 3. The Executive Officer, or their designee, is authorized to make any technical, nonsubstantive changes that they deem necessary or advisable to effectuate the purposes of this resolution.

Section 4. This resolution takes effect immediately upon approval.

Attachments:
Attachment1: Revised Chapter 7
Attachment 2: Appendix P Maps of Delta Levee Investment Priorities
Attachment 3: Revised Executive Summary

CERTIFICATION On a motion by Councilmember _____, seconded by Councilmember _____, and a vote of the Council, the foregoing resolution was passed and adopted by the Delta Stewardship Council by the following vote at a regular meeting of the Delta Stewardship Council on December 14, 2023.

Burgis _____

Damrell _____

Hueso _____

Lee _____

Madueño _____

Mehranian _____

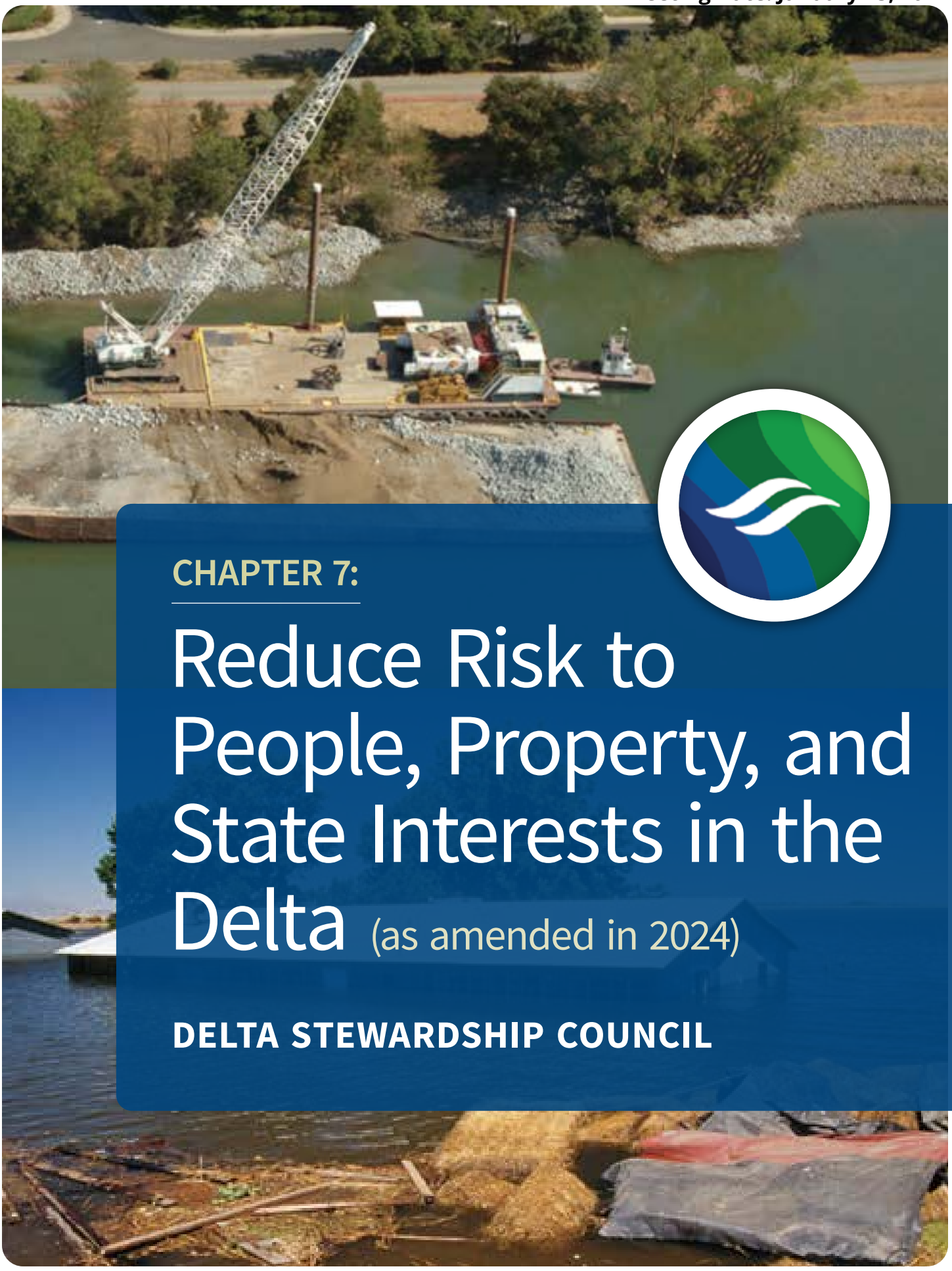
Zingale _____

Dated: January 25, 2023

_____

Emma Askea

Clerk of the Board of the Delta Stewardship Council



CHAPTER 7:

Reduce Risk to People, Property, and State Interests in the Delta (as amended in 2024)

DELTA STEWARDSHIP COUNCIL

ABOUT THIS CHAPTER

This chapter provides an overview of flood risk in the Sacramento-San Joaquin Delta (Delta), current flood management efforts, and the most pertinent agencies and regulations. It details the Delta Stewardship Council's (Council) core strategies to reduce risk to people, property, and State interests in the Delta.

These core strategies form the basis of the four policies and fifteen recommendations found at the end of the chapter:

- Continue to prepare for Delta flood emergencies
- Modernize levee information management
- Prioritize investment in Delta flood management
- Update funding strategies
- Manage rural floodplains to avoid increased flood risk
- Protect and expand floodways, floodplains, and bypasses
- Renew assurances of federal assistance for post-disaster levee reconstruction
- Limit State liability

Reducing flood risks in the Delta also relies on locating urban development in the cities where levees are stronger (as proposed in Chapter 5) and retaining rural lands for agriculture, so that development in the most floodprone areas is minimized.

RELEVANT LEGISLATION

Water Code sections 85305, 85306, 85307, and 85309 require the Delta Plan to include or otherwise consider specific components to attempt to reduce risk.

85305(a) 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.

(b) The council may incorporate into the Delta Plan the emergency preparedness and response strategies for the Delta developed by the California Emergency Management Agency pursuant to Section 12994.5.

85306 The council, in consultation with the Central Valley Flood Protection Board, shall recommend in the Delta Plan priorities for state investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and non-project levees.

85307(a) The Delta Plan may identify actions to be taken outside of the Delta, if those actions are determined to significantly reduce flood risks in the Delta.

(b) The Delta Plan may include local plans of flood protection.

(c) The council, in consultation with the Department of Transportation, may address in the Delta Plan the effects of climate change and sea level rise on the three state highways that cross the Delta.

(d) The council, in consultation with the State Energy Resources Conservation and Development Commission and the Public Utilities Commission, may incorporate into the Delta Plan additional actions to address the needs of Delta energy development, energy storage, and energy transmission and distribution.

85309 The department, in consultation with the United States Army Corps of Engineers and the Central Valley Flood Protection Board, shall consider a proposal to coordinate flood and water supply operations of the State Water Project and the federal Central Valley Project, and submit the proposal to the council for consideration for incorporation into the Delta Plan. In drafting the proposal, the department shall consider all related actions set forth in the Strategic Plan.

CHAPTER 7:

Reduce Risk to People, Property, and State Interests in the Delta (as amended in 2024)

Reducing flood risks to people, property, and State interests is critical to achieving the Delta Reform Act's coequal goals and protecting the Delta as a place. The Legislature has found that the Delta is "inherently floodprone," and that further improvements and continuing maintenance of the levee system will not resolve all flood risks (Public Resources Code section 29704). Living with risk, whether from floods, earthquakes, fires, coastal storms, or other hazards, is often part of life in California. The Delta's hazards, however, are exceptional because they affect so many State interests, including the reliability of its water supplies, the health of the Delta's ecosystem, and the qualities that make the Delta an attractive place to live, work, and recreate.

To reduce these risks to people, property, and State interests in the Delta, the Delta Reform Act requires that the Delta Plan promote effective emergency response and preparedness, appropriate land use, and strategic investments in levees (Water Code section 85305). The Delta Reform Act also directs the Council, in consultation with the Central Valley Flood Protection Board (CVFPB), to recommend priorities for State investments in levee operation, maintenance, and improvements in the Delta, including both levees that are a part of the State Plan of Flood Control and non-project levees (Water Code section 85306).

The Council envisions a future in which risks of flooding in the Delta are reduced, despite an increase in sea levels and altered runoff patterns. The Council sees a future where Delta residents, local governments, and businesses are better prepared to respond when floods threaten. The Council envisions a future where bypasses are expanded; channels are improved; and strong, well-maintained levees protect local communities—but also protect State interests in a more reliable water supply for California

and a protected and restored Delta ecosystem. These improvements will include new or expanded floodways and bypasses, maintaining and improving levees, and floodproofing new development. The Council envisions that rural areas and the Delta's legacy communities will also be protected from flood risks by careful land use planning that discourages urban development in flood-threatened areas. The Council envisions that flood management will draw on a variety of funding tools, including greater payments by those who benefit from the Delta's levees. State funds for desired projects will be focused on State interests in the Delta, but some of that activity will protect local interests as well. Federal, State, and local agencies will respond cooperatively to flood disasters, working together to recover vital infrastructure, mitigate economic damage, restore the ecosystem, and encourage long-term resiliency.

Eliminating flood risks will be impossible, but prudent planning, reasonable land development, and improved flood management will significantly reduce risk, and serve the coequal goals of a more reliable water supply, and a protected and restored Delta ecosystem.

Delta Hazards Threaten Both Coequal Goals and the Delta as a Place

The threats that flooding, earthquakes, and other hazards pose to the Delta imperil California's water supplies and the health of the Delta ecosystem. The channels that convey water through the Delta to users in the Bay Area, San Joaquin Valley, or Southern California, and the islands that prevent saltwater intrusion into Delta water supplies depend upon levees for their preservation. Should the levees that protect these channels fail, the impacts on water supplies could be felt statewide. Improving these Delta levees is an investment in water supply reliability. Another way to reduce these risks is for areas that use Delta water to develop plans for possible interruption of these supplies in a catastrophic event, as recommended in Chapter 3. Integrating water supply and flood control efforts is also important to optimize the management of the multipurpose reservoirs that store water for the Central Valley Project (CVP), State Water Project (SWP), and other water users. For example, a potential benefit of wide flood bypasses leading to the Delta may be greater flexibility in these reservoirs' operations, creating new opportunities to manage water supplies or generate hydroelectric power, while also contributing to ecosystem restoration as described below.

The Delta levees also affect the health of the ecosystem. Many birds, such as waterfowl or sandhill cranes, thrive in areas that depend on levees for their management. In some locations, careful removal or breaching of levees may create new habitats that benefit fish, wildlife, and the ecosystem. Fish and wildlife habitats can be improved by thoughtful design of levee margins bordering sloughs and river channels. Setting levees back deliberately, when feasible, can create both more capacity for flood flows and more habitat for fish and wildlife. But unplanned levee failures often create weed-infested depths that harbor nonnative species rather than refuges for smelt, salmon, or other preferred species. Changes in the area protected by levees also alter water circulation through the Delta, changing the benefit of flows released to protect its ecosystem.

The Delta's residents, farms, and businesses also depend on its levees. They shape the Delta landscape, protecting its farms and communities from destruction. The levee system is the foundation on which the entire Delta economy is built, the Delta Protection Commission's (DPC's) Economic Sustainability Plan reports (DPC 2012). Delta residents built the levee system over generations, and they are keenly interested in its maintenance and improvement. (See sidebar, Delta Disaster Recalled, for an example of the consequences of levee failure.)

DELTA DISASTER RECALLED

On a moonlit Wednesday night in June 1972, the San Joaquin River flowed slowly after one of the driest winters on record. It gnawed at the Andrus Island levee 6 miles south of Isleton between Bruno's Yacht Harbor and Spindrift Resort, opening a small hole that grew rapidly. By the time sheriff's deputies arrived on scene shortly after 1 a.m., the river had carved a 100-foot break. By 3 a.m., water covered Highway 12. Shortly after sunrise, the breach had grown to 300 feet, and volunteers were hard at work on a 1.5 mile-long bow levee to protect Isleton.

The battle to save Isleton continued throughout the day, but a rising tide and waves created by 30- to 45-mile-per-hour Delta winds hampered efforts. Within a few hours, officials ordered the evacuation of 1,400 Isleton residents and an additional 1,500 residents of Andrus and Brannan Islands. At 9:45 p.m. Thursday, the bow levee breached, and a wall of water rushed into the low-lying residential area of Isleton. Although the city's business district was spared, almost all of Andrus Island and portions of Brannan Island were flooded, in some places up to 20 feet deep.

Then-Governor Ronald Reagan declared the islands a disaster area and asked President Richard Nixon to do the same. Over the next 6 months, the levee was repaired, the 12,000-acre lake that had been Brannan and Andrus Islands was drained, and life began returning to normal. A full year after the levee break, however, more than one-third of the residents had neither moved back into their homes nor begun to rebuild.

Officials estimated that damages were $21.8 million, slightly more than half of that from crop loss and saltwater damage to farmland. The cost for levee repairs was put at $800,000, and $500,000 went to pump the 20 square miles of flooded land dry. More than $1.5 million in federal disaster relief was made available. No definitive cause was ever determined for the levee breach, and a subsequent court case absolved the State of liability (DWR 1973, Sacramento River Delta Historical Society 1996).

Flood Risk in the Delta

The Delta is an inherently floodprone area. This section provides an overview of the causes and consequences of floods in the Delta. The Sacramento and San Joaquin rivers collectively drain approximately 42,500 square miles of land. Before the Delta was modified by levees and other human structures, these rivers' natural flows overflowed the Delta's low-lying islands and floodplains for long periods each spring. The biggest floods occurred when warm Pacific storms swept in from the west and southwest, picking up moisture over the ocean and causing torrential rains when intercepted by the mountains surrounding the Central Valley. The risks of flooding were increased when large amounts of sediment were discharged to Central Valley rivers during the Gold Rush, choking their channels and raising their beds above their natural levels and surrounding lands.

Today, flooding of the Delta's complex labyrinth of islands and waterways is prevented by its levees. This system of flood control is supplemented by the flood facilities of the Sacramento River and San Joaquin River flood control projects and multipurpose reservoirs such as Shasta, Folsom, and Millerton lakes and Lake Oroville on the Sacramento and San Joaquin rivers and their tributaries, which hold back floodwater and provide water supplies and other benefits described in Chapter 3.

Many Delta levees were initially constructed more than a century ago. Levee-building materials and equipment that were state-of-the-art then seem primitive today. History has shown that structural failures of the levee system occur as a result of extraordinary events, imperfect knowledge, and imperfect materials. Delta levees face potential threats such as large runoff events, extreme high tides, wind-generated waves, earthquakes, subsidence, and sea level rise. Individually, each of these threats is enough to cause serious concern; together, they represent the potential for catastrophic disruption of the Delta and its economic and ecological services.

A mass or even partial failure of the levee system would have real life-and-death impacts and property losses that could total billions of dollars. Delta flooding could interrupt the conveyance of water through the Delta for the SWP, the CVP, in-Delta users, the Contra Costa Water District, the cities of Antioch and Stockton, and others who depend on the Delta for reliable water supplies (see Chapter 3 for a discussion of water supply reliability). Levee failures could also damage key features of the Delta ecosystem, including managed wetlands in Suisun Marsh and habitats of wintering greater sandhill cranes at Staten Island and nearby tracts. Unplanned levee failure could also degrade water quality in the Delta, because tidewaters would flood into the bowl created by subsidence of Delta islands. These failures would draw saltwater from San Francisco Bay and pollute Delta water with flood debris, farm chemicals, and other pollutants.

Levee failures also could flood homes, farms, and businesses, including historic structures in the legacy communities, and interrupt recreation and tourism.

As noted in Chapter 5, about 116,000 residential structures are located in the 100 year floodplain of the Delta, mostly near Sacramento, West Sacramento, and Stockton. Also, 8,000 residences are below mean higher high water (DWR 2008b). Serious consequences also could result from flood-related damage to critical infrastructure in the Delta, including radio, cellular telephone, and television transmission towers; electrical transmission lines, including Pacific Gas and Electric Company, Sacramento Municipal Utility District, and Western Area Power Administration lines; natural gas pipelines serving local gas fields and regional transmission systems; petroleum pipelines; the East Bay Municipal Utility District aqueduct; several railroads; three state highways; and three interstate highways (DWR 2011a; Arcadis 2016b).

In simplistic terms, the concept of flood risk can be described as the likelihood of a flood event occurring multiplied by the consequences of that event. To many, flood risk simply means the chance a storm event will overwhelm the flood control system to some extent. Figure 7-1 illustrates the variables, namely the probability of flooding and the financial consequences. However, there are many other causes of flood risk, and the consequences can be far more complicated than the immediate damage to property.

UNDERSTANDING DELTA FLOOD RISK

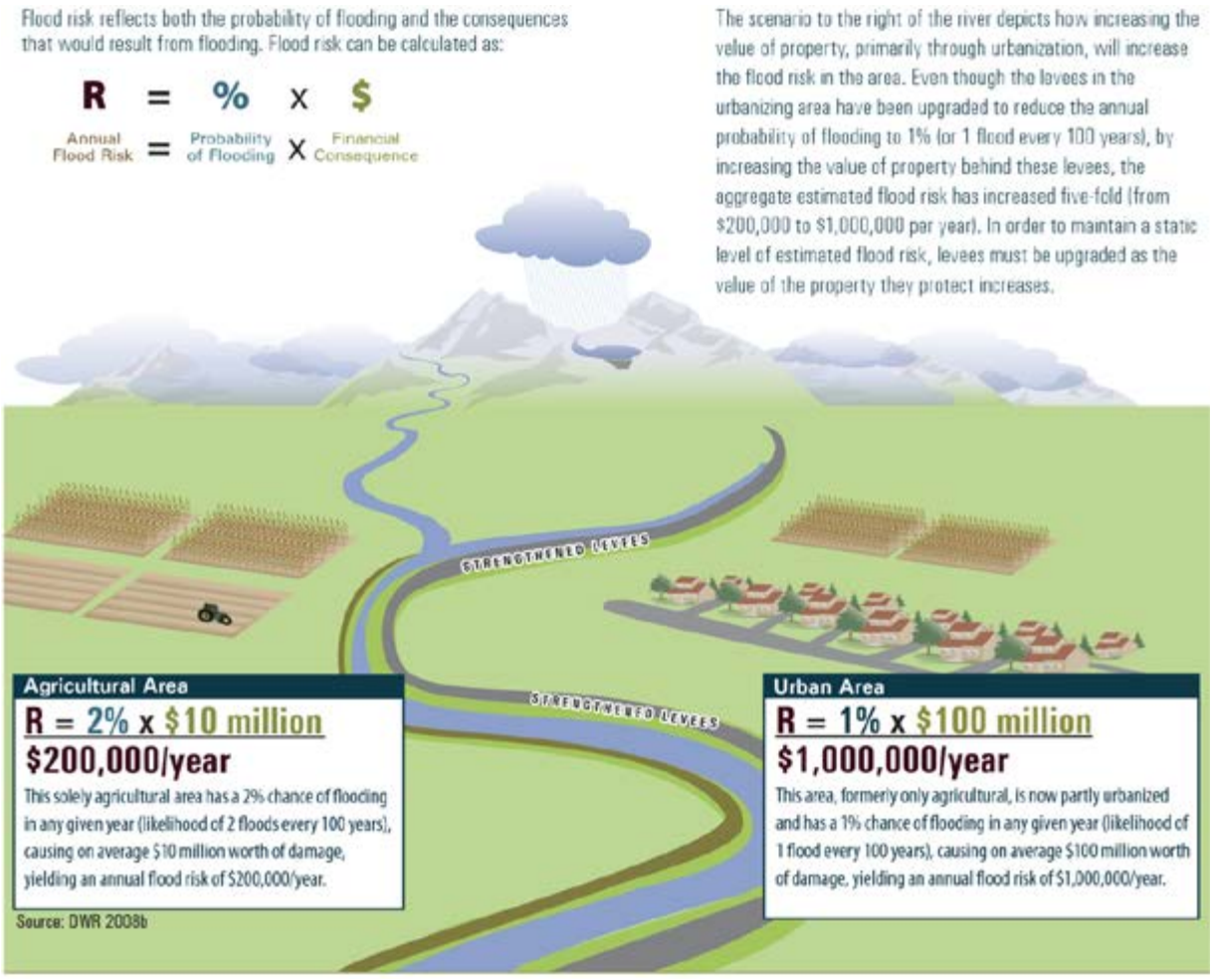


Figure 7-1 | Calculating flood risk involves the possibility of flooding and the consequences that would result from flooding.

FLOODS

Flooding during winter storms that result in high water surface elevations and high winds has been a common cause of levee failures in the Delta. For example, the Sacramento River at Rio Vista may flow in excess of 300,000 cubic feet per second (cfs) during winter and early spring floods, 30 times typical late-summer flows of 10,000 cfs. Peak discharges place high stress on Delta levees and can create flood conditions, especially when coupled with high tides.

The likelihood of levee failures caused by high water is substantial, based on the historical performance of these levees over the last century. During the last century, there have been more than 140 levee failures and island inundations, most of which occurred during flood seasons (DWR 2005). High water in the Delta can overtop levees, as well as increase the hydrostatic pressure on levees and their foundations, causing instability and increasing the risk of failure due to through-levee and/or under-levee seepage. Most levee failures in the Delta have occurred during winter storms and related high-water conditions, often in conjunction with high tides and strong winds.

EARTHQUAKES

The Delta's levees are also threatened by the active seismic zones west of the Delta, including the San Andreas and Hayward faults. Less active faults underlie the Delta. A strong earthquake could damage Delta levees because of the potential for deformation or cracking of levees or liquefaction of levee embankments and foundations during strong ground shaking. Saturated levees composed of dredged materials in other parts of the country and the world have performed poorly during moderate to strong earthquake shaking (DWR 2009; Delta Stewardship Council Staff 2010a). Moderate earthquakes between 1979 and 1984 damaged nearby Delta levees, and many Delta islands' levees failed during floods within a year after the 1906 San Francisco earthquake (Deverel 2016). If a levee failed on an island subsided below sea level or during high flows or if a flood were to occur soon after an earthquake, the protected area could be inundated. The risks of earthquakes causing levee breaches and island inundations in the Delta have long been recognized. A California Department of Water Resources (DWR) report begins:

> *There is a long history of levee failures in the Delta that have resulted in extensive economic damage, but no failures of Delta levees are known to be directly attributable to earthquakes. Even so, two factors indicate a possible bleak picture for the future of many Delta levees. First, no serious causative quakes have occurred on the nearby major faults since the San Francisco earthquake of 1906. Second, the Delta levees of today are vastly different than those in the 1906 Delta, which had limited size and extent (DWR 1980).*

The DWR Delta Risk Management Strategy Phase 1 study evaluated the performance of Delta levees under various seismic threat scenarios, and analyzed potential consequences for water supply, water quality, ecosystem values, and public health and safety. The study concluded that a major earthquake of magnitude 6.7 or greater in the vicinity of the Delta Region has a 62 percent probability of occurring sometime between 2003 and 2032 (DWR 2009). More recent investigations suggest earthquake-induced ground shaking affecting Delta levees may be less serious, but still worrisome (Delta Independent Science Board 2016; Deverel 2016).

Figure 7-2 illustrates a potential flood scenario in which a 6.5 magnitude earthquake causes a 20-island failure. Although the probabilistic nature of earthquake prediction makes it difficult to quantify the timing and magnitude of seismic threats, it is important to address the threats posed by earthquakes to the Delta levee system because of the potential adverse effects of such events.

HIGH TIDES AND SUNNY-DAY HAZARDS

Even without an earthquake or flood, Delta levees can fail during high tides or even on sunny days. Generally, these failures may be the result of a combination of high tide and pre-existing internal levee and foundation weaknesses caused by burrowing animals, internal erosion of the levee and foundation through time, and human interventions such as dredging or excavation at the toe of the levee (DWR 2008b). Examples of sunny-day failures include the Brannon Andrus Tract in 1972 and Upper Jones Tract in 2004. It is estimated that, based on current conditions, a sunny-day failure would occur once every 9 years on average (DWR and DFG 2008).

SIMULATION OF DELTA SALINITY AFTER A 20-ISLAND FAILURE CAUSED BY A MAGNITUDE 6.5 EARTHQUAKE

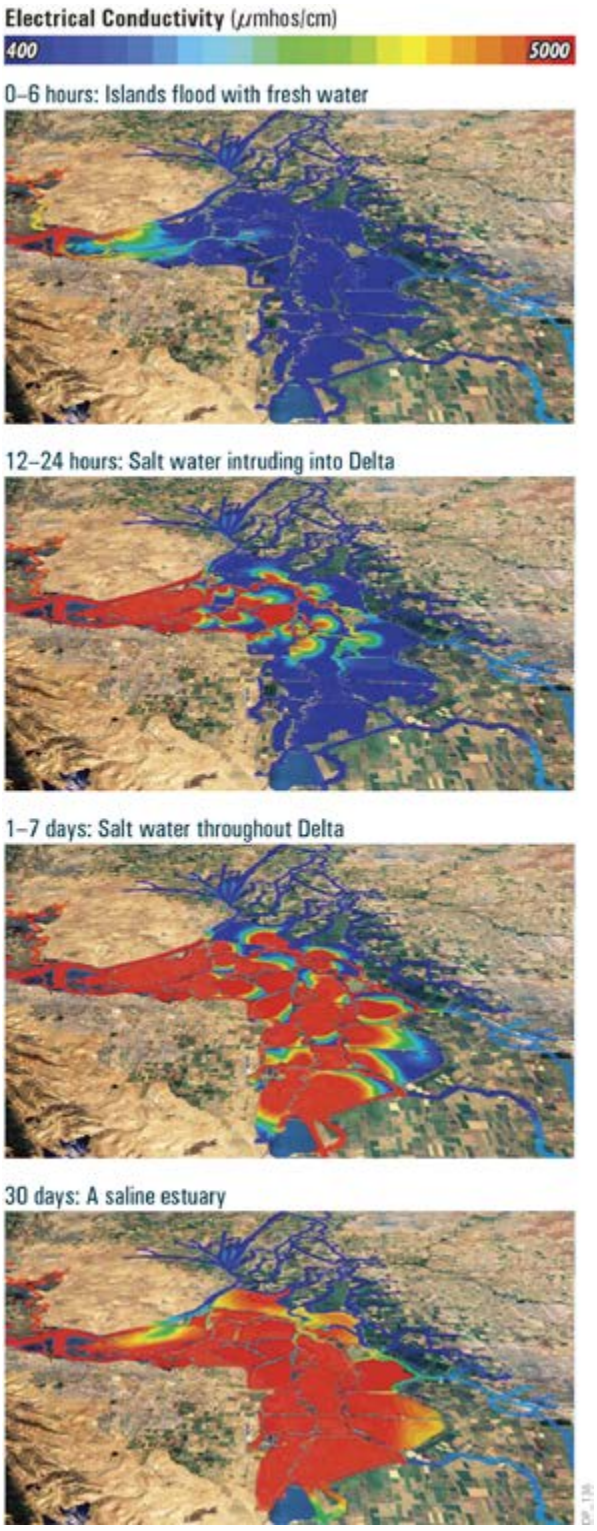


Figure 7-2 | Figure depicts a potential flood scenario in which a 6.5 magnitude earthquake causes a 20-island failure.

Source: MWD 2010

One-third of the failures at peaty Delta islands since 1960 have been sunny-day failures (Delta Independent Science Board 2016).

Other hazards that affect the performance of Delta levees include encroachments, penetrations, and burrowing animals. Encroachments such as structures or farming practices on or close to the levee; penetrations of the levee, such as culverts or pipelines; and burrows created by rodents, especially beavers, muskrats, and squirrels, can weaken the structural integrity of levees. Because of unregulated historical construction, levees also contain many hidden hazards. Active programs of inspection, oversight, and maintenance are essential to minimize these hazards.

LAND SUBSIDENCE

Because of the land subsidence described in Chapter 5, much of the central Delta is below sea level. Some islands are 12 to 15 feet below sea level, requiring levees 20 to 25 feet in height that act as dikes, holding back water continually rather than only during seasonal floods or extreme tides. As subsidence progresses, accommodation space increases, and levees must be continually maintained, strengthened, and periodically raised to support the increasing hydraulic stresses (Miller 2008; Mount and Twiss 2005). The hydraulic stress also can drive seepage through and under levees, and place levee foundations under more stress. The thinning of the peat soil layer also leads to shallow or artesian groundwater conditions. More seepage onto islands will increase the drainage costs associated with additional pumping and decrease levee stability (Deverel and Leighton 2010; Deverel, Lucero, and Bachand 2015).

One approach to addressing subsidence can be the acquisition of conservation easements that provide for fallowing land adjoining levees on islands with deep peat. Acquisition of such easements is authorized through the Delta Levees Maintenance and Special Projects (Water Code section 12987(b) and 12316(e)), enabling use of this complement to levee improvement where appropriate.

CLIMATE CHANGE AND FLOOD RISK

Climate change has major implications for the Delta, and especially for flood risk management. It is estimated that by the year 2100, sea levels at the Golden Gate may rise 17 to 66 inches (National Research Council, 2012; Natural Resources Agency 2014). Recent research

suggests melting glacial ice may cause even higher rises in sea levels (Dennis, B. and Mooney, C. 2016). This chapter of the Delta Plan uses the higher end of the range of sea level rise forecast by the National Research Council (Arcadis 2015), consistent with advice from the Natural Resources Agency. The scenario anticipates sea level rising by 2050 by approximately two feet at the Golden Gate and the western end of Sherman Island, 20 inches at Mandeville or Venice Islands near the San Joaquin River's confluence with Middle and Old Rivers and six to eight inches at Walnut Grove. These higher water levels will put additional stress on levees, increasing their risk of failure. By 2050, rising sea levels will more than double the probability of flooding if levees are not just well-maintained but also improved (Arcadis 2016b; Arcadis 2017). Drainage of Delta islands will also be more difficult, impairing agriculture on which the finances of many reclamation districts rely.

Climate change will also increase hydrologic variability and uncertainty, which is likely to result in more severe flooding over time (DWR 2016).

Additionally, scientific understanding of large-scale precipitation events is growing, as demonstrated by the ARkStorm scenarios being investigated by the U.S. Geological Survey, which indicate that massive storms and subsequent flooding have occurred in the past and are likely to occur again (USGS 2011). Failure of significant parts of the Delta's flood management system may be unavoidable.

ADEQUACY OF FLOOD RISK DATA

The threats to Delta levees described above have been acknowledged for many years, but disagreements remain about the significance of the risks they pose. This update of the Delta Plan is based on the best, most up-to-date data available, compiled from more than 50 data sources and provided for public review and correction. Nevertheless, some Delta residents, reclamation district engineers, and scientists object that other reports or their firsthand knowledge provide contradictory information. In part, this reflects continually changing conditions in the Delta, including land use, levee improvement and maintenance, subsidence, and other factors. In addition, the information about levee conditions and threats that is kept by the almost 100 agencies involved in maintaining the Delta levee network is not easily shared, but rather is often retained only in paper reports held by individual agencies or firms. This means that California does not have the clearest possible understanding of risks in the Delta or of how they can be most effectively reduced.

Informed decision-making can be improved by gathering and widely sharing information about the Delta levee network using contemporary data management technology. Sharing this information has been urged for many years (DWR 1983; Central Valley Flood Protection Board 2016) and is required for project levees (Water Code section 9140). More transparency about the benefits gained through State-funded levee improvements can complement information about levee conditions, facilitating more comprehensive and timely assessment and reporting about the Delta levee network.

THE DELTA'S LEVEES

This section summarizes the current state of flood management planning for the Delta. To reduce the risk of flooding, Delta landowners, local governments, and State and federal agencies have planned and built an extensive levee system in the Delta, and significant flood control works upstream of the Delta. Other government flood control programs plan for emergency response in the event of floods, or help manage flood risks through land use planning, building standards, and flood insurance. The Delta Reform Act refers to these government-sponsored flood control programs in its provisions regarding covered actions (Water Code section 85057.5(a) (4)). The sidebar, What Is a Government-sponsored Flood Control Program?, highlights those programs referenced in statute; and proposed actions in the Delta that will have a significant impact on the implementation of one of these programs may be considered covered actions. Chapter 2 provides details about covered actions.

There are about 1,330 miles of project, non-project, and other levees in the Delta and Suisun Marsh. These levees reduce flood risk for approximately 740,000 acres of land in the Delta. They define the Delta's physical characteristics; influence the reliability of its water supplies and its ecosystem health; and are critical to the Delta's residents, farms, businesses, cities, and legacy communities. Because many Delta levees protect land below sea level, they hold back water all day, year-round, rather than only during floods, and so are called "the hardest working levees" in America.

Differences in how levees are classified can influence reports about their length and condition. Approximately 65 percent of the levees in the Delta and all levees in the Suisun Marsh are owned or maintained by local agencies or private owners and are not part of the flood control projects on the Sacramento or San Joaquin rivers. Most of these are non-project levees maintained by local reclamation districts created and funded by landowners, initially for the purpose of draining ("reclaiming") Delta islands and tracts. The reclamation districts continue to maintain levees and other water control facilities today. These non-project levees are defined in Water Code section 12980(e).

The State-federal flood control projects on the Sacramento and San Joaquin rivers include approximately one-third, or about 380 miles, of the Delta's levees. Known as "project levees," they begin on the left bank of the Sacramento River at Sherman Island, and line most of the riverbanks, as well as the Sacramento River Deep Water Ship Channel and some connecting waterways, north to Sacramento and beyond. The Delta Cross Channel's control gates are an important feature of this levee system, closing during high flows to keep the Sacramento River's floodwaters out of the central Delta. The flood control project also includes the Yolo Bypass, the broad, managed floodplain in Yolo County west of West Sacramento. The wide bypass, which is confined by project levees, draws floodwater through weirs above Sacramento to lower flood heights on the Sacramento River and its tributaries, discharging back to the Delta above Rio Vista. The Yolo Bypass floods about once every 3 years, between December and February. On the San Joaquin River, project levees line the riverbanks from Old River to Stockton. Figure 7-3 shows the locations of project and non-project levees in the Delta.

Recent evaluations show that some of the flood control project facilities on the Sacramento and San Joaquin rivers are not adequate. Because the system was intended partly to flush Gold Rush-era sediment from rivers and channels, the project levees were often built close to the riverbanks, and are prone to erosion. Many of the system's channels have inadequate capacity to carry the flows for which they were designed, and many levees do not meet contemporary design standards (DWR 2011c).

The CVFPB, as part of its responsibility to oversee the flood control projects on the Sacramento and San Joaquin rivers, has adopted regulations to control encroachments on the project and some of the streams that flow into it. It also regulates encroachments within designated floodways, which are the channels of a river or other watercourse and the adjacent land areas that convey floodwaters (California Code of Regulations) CCR), Title 23, Division 1, Chapter 1, Article 2, Section 4). In the Delta, designated floodways include the Cosumnes River's floodplain and the confluence of the San Joaquin River and the Stanislaus River upstream from Paradise Cut.

Some levees are neither project levees nor non-project levees. These "unattributed levees" include hundreds of miles of levees in Suisun Marsh and the Delta, and are not part of any State-financed flood control program. They also include some levees that are no longer maintained along the perimeter of permanently flooded islands and no longer serve flood control or drainage purposes.

Other facilities throughout the Delta drain rainfall runoff from land into Delta channels. Local cities and districts own and maintain urban storm drains in developed areas. Stockton, Sacramento, West Sacramento, Lathrop, Manteca, and Tracy are Delta cities with storm drainage facilities. Most Delta islands have a network of agricultural drains and pumps to convey runoff to the Delta channels. Some Delta channels have been dredged to increase their capacity to carry floodwater and to obtain material for levee construction and maintenance.

Multipurpose reservoirs in the Sacramento and San Joaquin river watersheds that play a role in California's water supply also serve critically important roles in managing floods that affect the Delta. The CVP's Shasta, Folsom, and Millerton lakes and New Melones Reservoir; the SWP's Lake Oroville; and other reservoirs are operated in accordance with flood control rules established by U.S. Army Corps of Engineers (USACE), reserving space to capture flood flows that can be released downstream gradually so that channels are not overwhelmed.

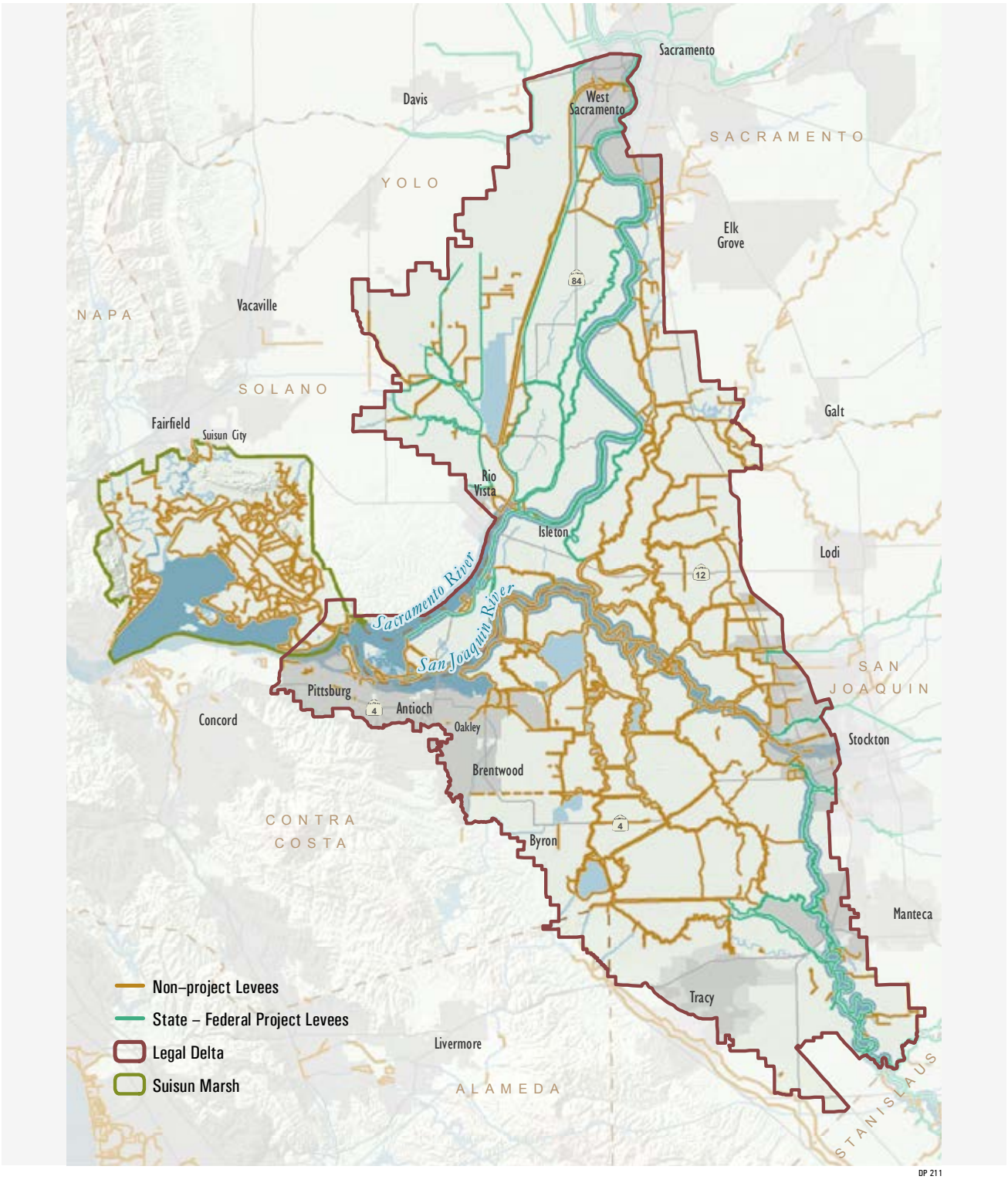


Figure 7-3 | Map showing State and Federal Project levees and non-project levees in the Legal Delta and Suisun Marsh.

Source: Adapted From Delta Vision Blue Ribbon Task Force 2008 and DWR 2011b

PLANNING FOR FLOOD MANAGEMENT

Many planning efforts addressing flood management and emergency preparedness, response, and mitigation are under way, including the following:

- **Central Valley Flood Protection Plan (CVFPP).** This strategic plan for improving the flood control projects on the Sacramento and San Joaquin rivers recommends approaches for reducing flood risk and improving the flood control project, including expansion of the Yolo Bypass and setting back levees along Paradise Cut (DWR 2016b) (see sidebar, Central Valley Flood Protection Plan).
- **DWR's FloodSAFE Initiative.** In 2006, DWR launched FloodSAFE California—a multifaceted initiative to improve public safety through integrated flood management.
- **Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force Report.** This report responds to Water Code section 12994.5, which called for the task force to make recommendations to the Governor about Delta multi-hazard emergency response and recovery issues.
- **CVP and SWP Reoperation Studies.** DWR's Forecast-coordinated Operations Program and Systems Reoperation Program address reservoir operational criteria, as noted in Chapter 3.

The U.S. Army Corps of Engineers (USACE) has completed recent studies (2015) recommending improvement to the Delta's project levees protecting Sacramento's Pocket neighborhood and West Sacramento. Congress authorized federal participation in these projects in 2016. USACE studies are underway of potential improvements to Delta levees protecting metropolitan Stockton and at the Yolo Bypass. Another USACE study (2014) concluded there is no federal interest in the Delta's non-project levees' improvement.

The Council considered the findings of these studies and incorporated them into the update of this Delta Plan chapter. The CVFPP and FloodSAFE include many concepts relevant to flood protection in the Delta.

The CVFPB, DWR, and USACE each play unique and critical roles in Delta flood-risk management. Because of this, the Council's role in facilitation, coordination, and integration of various agencies and other parties is of particular importance. Frequent, ongoing collaboration with other State, federal, and local agencies to improve communication and coordination is essential to meeting the Delta Plan's flood management objectives.

Existing Levee Standards and Guidance

It is more important than ever that the Delta's levees are designed, constructed, and maintained to provide a level of flood risk reduction commensurate with the coequal goals and protection of the Delta's unique values as a place. Over the last few decades, State and federal agencies have developed guidelines and standards for levees. These standards and guidelines generally establish minimum criteria for levee design and maintenance. The standards include (1) the level of flood protection California has prescribed for the Central Valley's urban areas, (2) whether sufficient protection is provided by the levees to exempt development financed with federally backed mortgages from requirements to obtain flood insurance, and (3) whether property and infrastructure protected by the levees (including the levees themselves) may be eligible for assistance in the event of a catastrophic emergency, including aid from USACE to rehabilitate levees damaged in an emergency.

Five levee standards and guidelines applicable to the Delta are discussed below (and shown on Figure 7-4); they are ordered from highest to lowest level of flood protection:

- **DWR 200-year Urban Levee Protection.** (DWR 200 Year): This standard goes beyond criteria for DWR levee height and geometric design to include requirements for freeboard, slope stability, seepage/underseepage, erosion, settlement, and seismic stability (DWR 2011b). It is intended to protect against a flood that has a 0.5 percent chance of being equaled or exceeded in any given year (a 200-year level of flood protection). This urban levee standard is the only levee standard that specifically links land uses to levee criteria. State law requires that by 2025, floodprone urban areas with over 10,000 residents must meet this 200-year flood protection standard (Government Code section 65865.5(a)(3)). Compliance likely will be achieved by upgrading levees to meet DWR's 200

year design standard. Sacramento and Stockton are planning levee improvements to attain this level of protection.

Very few levees in the Delta meet this standard, because most Delta levees do not protect urban areas. Under existing law, rural levees are not required to meet this standard.

- **FEMA 100-year (Base Flood) Protection (FEMA – 100 Year):** This "insurance" standard, often called the "1 percent annual chance flood" level of protection, provides criteria that levees must meet to protect against the flooding that is the basis for FEMA's flood insurance rate maps (44 Code of Federal Regulations 65.10). It is often used with established USACE criteria to prescribe requirements for levee freeboard, slope stability, seepage/underseepage, erosion, and settlement. The standard generally does not address seismic stability. In communities where levees provide this level of flood protection, new developments are not required to meet federal floodproofing standards and can obtain federally guaranteed mortgages without purchasing flood insurance. Few Delta levees outside of cities meet this standard, and some urban levees need improvement to meet it.
- **Bulletin 192-82:** The plan for Delta levee improvement proposed by DWR when State funding for Delta levees began, Bulletin 192 (DWR 1975), proposed two levels of improvement: 100-year protection roughly equivalent to the FEMA 100-year standard for levees protecting areas with legacy communities, other unincorporated Delta towns, and other islands with more residents—Brannan, Andrus, and Bethel Islands and Hotchkiss, Shima, Wright-Elmwood, Walnut Grove, and Sargent Barnhart Tracts. Levee improvements on other islands used primarily for agriculture were to provide 50 year protection, with 1.5 feet of freeboard above the expected 300-year flood elevation. The plan anticipated that on a few islands, levee improvements would be uneconomical, a conclusion with which the Legislature concurred (Water Code section 128981(b)). Bulletin 192 is endorsed as a conceptual plan to guide the formulation of projects to preserve the Delta levee system (Water Code section 12225). Bulletin 192-82, its update, provides guidance for the Delta Levees Maintenance Subventions Program (Water Code section 12987).
- **Public Law 84-99 (PL 84-99):** The PL 84-99 guideline is a minimum requirement established by USACE for levees that participate in its Rehabilitation and Inspection Program (33 United States Code 701n) (69 Stat. 186). The standard for levee geometry implies a minimum levee height and a slope stability factor of safety, but is not associated with a level of protection (such as a 100-year flood) and does not address seismic stability. Delta islands or tracts that meet the PL 84-99 criteria may be eligible for USACE funding for levee rehabilitation, island restoration after flooding, and emergency assistance, provided that the reclamation district is accepted into the USACE's program and passes a rigorous initial inspection and periodic follow up inspections. Eligibility for PL 84-99 was formerly based primarily on levee geometry with minimum freeboard and maximum steepness of slopes. USACE's periodic inspection program incorporates other elements into eligibility, including presence of structure encroachments, vegetation, rodent control programs, and more. The PL 84-99 cross section is roughly equivalent to that proposed in Bulletin 192-82.

  The CALFED Record of Decision set a goal of improving Delta levees to meet the PL 84-99 criteria, as does the DPC Economic Sustainability Plan, but funding has been inadequate to attain this objective. Five Delta reclamation districts, protecting about 3 percent of the legal Delta's land behind about 41 miles of levees, meet or exceed the Delta-specific PL 84-99 criteria, and 24 more districts are more than half way to improving levees to this standard (Arcadis 2016a; Arcadis 2016b).[1]
- **Suisun Marsh:** Guidelines for levees in Suisun Marsh are established in the 1980 Suisun Marsh Local Plan of Protection, and are approved by the San Francisco Bay Conservation and Development Commission. The crowns of exterior levees are to be 2 feet above expected high water levels. Where wave action is expected, the freeboard must be at least 3 feet. The more recent Suisun Marsh Plan (U.S. Bureau of Reclamation 2012) also proposes habitat levees—low, wide, gently sloping vegetated levees, which may be overtopped during storm surges with nominal eroding or destabilizing. Habitat levees would include

benches or berms that provide wind- and wave-action protection as well as opportunities for high marsh/upland transition habitat.

From 1987 until 2014, levee upgrades often sought improvement to meet the Federal Emergency Management Program's Delta hazard mitigation plan (HMP), as a step towards the PL 84-99 or Bulletin 192-82 standards. Good progress was made, with more than half of Delta reclamation districts meeting the HMP criteria (CALFED Bay-Delta Program 2000; Delta Stewardship Council 2013).

No State standards currently address design criteria for flood protection of the state highways and interstate highways that traverse the Delta. Federal standards require that interstate highways must be protected from 50-year flood events to qualify for Federal Highway Administration funds (23 Code of Federal Regulations 650.115). The levee investment priorities of this chapter applied this Federal Highway Administration standard to identify acceptable risks of flooding to the Delta's interstates and State highways 160, 4, and 12. Because most roads in the Delta were constructed before these standards were developed, they do not meet the standards. For example, sections of State Route 12 are 10 feet or more below sea level. A flood on the islands this highway traverses could interrupt transportation and trade, and put motorists at risk.

WHAT IS A GOVERNMENT-SPONSORED FLOOD CONTROL PROGRAM?

Any State or federal strategy, project, approval, funding, or other effort that is intended to reduce the likelihood and/or consequence of flooding of real property and/or improvements, including risks to people, property, and State interests in the Delta, that is carried out pursuant to applicable law, including, but not limited to, the following code:

- State Water Resources Law of 1945 (Water Code section 12570 et seq.)
- Sacramento-San Joaquin River Flood Control Projects (Flood Control Act of 1941, Public Law 77–228)
- Local Plans of Flood Protection (Water Code section 8201)
- Central Valley Flood Protection Plan (Water Code section 9600 et seq.)
- Delta Levees Special Flood Control Projects Program (Water Code section 12300 et seq.)
- Delta Levees Maintenance Subventions Program (Water Code section 12980 et seq.)
- Central Valley Flood Protection Board Authority (California Code of Regulations, Title 23, Division 1)
- National Flood Insurance Program (National Flood Insurance Act Of 1968, 42 United States Code 4001 et Seq., Public Law 90-448)

CENTRAL VALLEY FLOOD PROTECTION PLAN

The Central Valley Flood Protection Act of 2008 directed DWR to prepare the CVFPP. The CVFPP is a flood management planning effort that addresses flood risks and ecosystem restoration opportunities in an integrated manner. It specifically proposes a system-wide approach to flood management for the areas currently protected by facilities of the State Plan of Flood Control (SPFC). The CVFPP was adopted by the CVFPB in June 2012. It was thereafter updated in 2017 and 2022 and is expected to be updated every 5 years thereafter.

The CVFPP proposes a system-wide approach to address the following issues:

- Physical improvements in the Sacramento and San Joaquin river basins
- Urban flood protection
- Small community flood protection
- Rural/Agricultural area flood protection
- System improvements
- Non-SPFC levees
- Ecosystem restoration opportunities
- Climate change considerations

The geographic scope of the CVFPP includes the portions of the Delta covered by the SPFC, including about 65 miles of urban, non-project levees at Stockton; approximately two-thirds of Delta levees are not addressed in the CVFPP. The effects of system-wide improvements directed by the CVFPP and the potential of redirected impacts to areas within the Delta will be monitored by the Council to ensure alignment with the coequal goals and the Delta Reform Act. Additionally, the Council may, at its discretion, incorporate those portions of the CVFPP into Delta Plan to the extent that those portions promote the coequal goals (Water Code section 85350).

1. The 2013 Delta Plan reported that 25 reclamation districts had levees improved to the PL 84-99 criteria according to a report by DWR. That report was based only on the PL 84-99 criteria for freeboard above the base flood elevation, but did not account for the backslope required by the Delta-specific PL 84-99 criteria.

LEVEE GUIDANCE

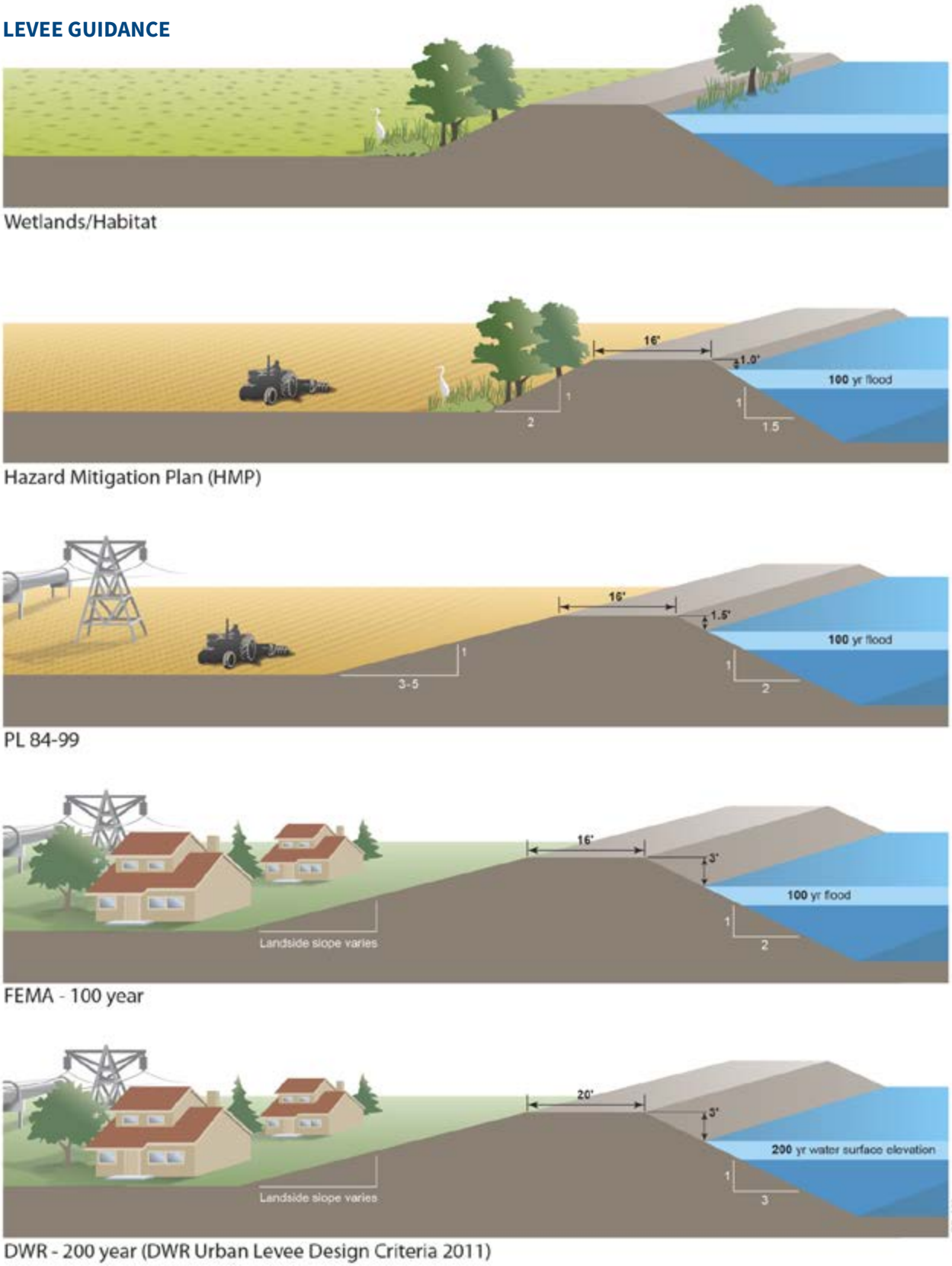


Figure 7-4 | Schematic showing the 5 levee standards in the Legal Delta and Suisun Marsh.

Levees and Ecosystem Function

Historically, most discussion of levees has emphasized reducing flood risks to life and property.

Discussion has also occurred on how to more effectively accommodate ecosystem function with the current levee system, highlighting the following issues (Healey and Mount 2007):

- Current levees tend to be narrow, with steep waterside slopes that provide little upland habitat value.
- Setback levees may provide habitat value and increased levee integrity.
- Levees can be used to promote specific habitat types (such as waterfowl habitat) by ensuring that some areas of freshwater marsh are sustained.
- Where lands are not heavily subsided, levees can allow for multiple land uses including habitat management and wildlife-friendly agriculture.
- Allowing levees to fail on deeply subsided islands would not generate any obvious ecological benefits.
- Subsidence reversal on deeply subsided islands would rely on levees to appropriately manage water levels during tule growth.

Habitat and ecosystem values and functions can provide multiple benefits, and must be considered in flood management planning and actions. For example, the CVFPP includes a conservation framework that outlines how environmental elements can be integrated into flood management (DWR 2016a). Setting levees back from the riverbank can expand flood conveyance capacity and reduce flood risk while providing ecosystem restoration and recreational opportunities (USACE 2002). Setback levees also allow opportunities for construction of an improved levee foundation and section using modern design and construction practices, thereby reducing risk of failure. Integrating fish-and wildlife-friendly channel margin treatments into levee improvements can also help (Davenport, Austin, Duryea, Huang, and Livsey 2016).

As management efforts in the Delta proceed, it will be important to consider ecosystem functions and their interactions with the levee system, as discussed in Chapter 4. An example where these interactions are already being debated is the USACE's current policy requiring removal of vegetation from levees. Scientific support for and against this policy is mixed. Concerns with maintaining woody vegetation on levees include difficulties with inspection and flood fighting, potential for root holes, and trees toppling from erosion. Other evidence, however, suggests that woody shrubs and small trees on levees enhance levee structural integrity while providing environmental benefits. A study on a channel levee along the Sacramento River concluded that roots reinforced the levee soil and increased shear resistance by providing increased stability against slope failures (Shields and Gray 1992). In either case, the widespread removal of vegetation from Delta levees could have significant adverse environmental impacts that are not well understood.

Recreation

The Delta's levees line its greatest recreation asset—the rivers and sloughs that attract boaters, anglers, nature lovers, and other visitors. In appropriate locations, publicly owned levees and their crown roads can provide access for bank fishing, walking, or bicycling. Private waterside resorts also provide recreation on sites adjoining Delta levees. Where levees adjoin busy highways or farmland or on private levees, and where no entity is responsible for managing recreational use, access may create conflicts that cannot be effectively mitigated. The Delta Plan's chapter 5 calls for considering recreation and access opportunities when levee investment decisions are made.

FLOODPLAINS AND CHANNELS

Floodplains and channels that provide the capacity to carry and store flood flows are critical for managing flood risks, and for overall Delta water management and ecosystem integrity. Projects planned for Yolo Bypass and Paradise Cut are examples of improvements that could add capacity to convey flood flows and help manage flood risks. The CVFPB and FEMA both play roles in designating floodways and floodplains to accommodate flood flows.

The CVFPB regulates encroachment in floodplains by designating floodways in the Sacramento River and San Joaquin River drainages, including the Delta (Water Code section 8609). A "designated floodway" is the channel of the stream and that portion of the adjoining floodplain, as shown in Figure 7-5, reasonably required to provide for the passage of a specified flood. It may also be the floodway between existing levees as determined by the CVFPB.

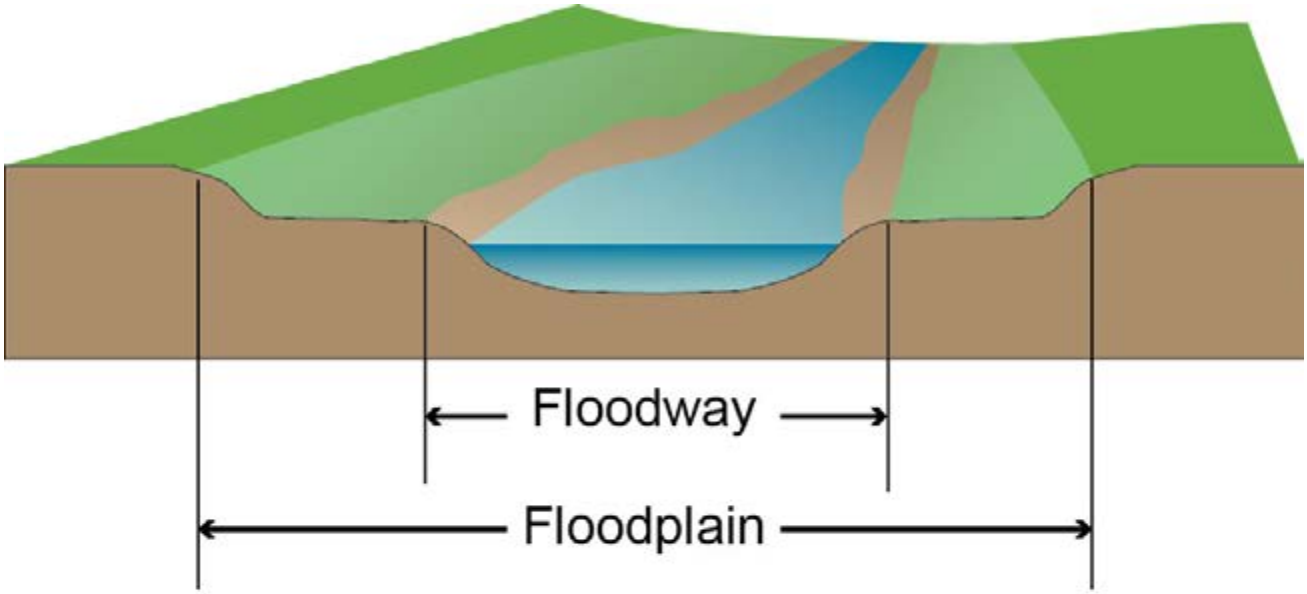
The CVFPB regulates encroachments within designated floodways and regulated streams through its permitting authority. The encroachment permit process applies to all projects, existing and proposed (including habitat restoration projects), within State/federal flood control project levees, designated floodways, bypasses, and regulated streams (CCR, Title 23, Division 1). The CVFPB should be consulted prior to the consideration of any projects that may be in a designated floodway in the Delta. Appendix L includes a map of the CVFPB's jurisdictional areas in the Delta.

Additionally, under the National Flood Insurance Program, FEMA maps floodplains that have a 1 percent chance of flooding in any year (a 100-year flood). FEMA works with participating communities to regulate development within these floodplains according to federal regulations. No new construction, substantial improvements, or other development (including fill) may be permitted within specified flood zones on the community's Flood Insurance Rate Map unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than 1 foot at any point within the community.

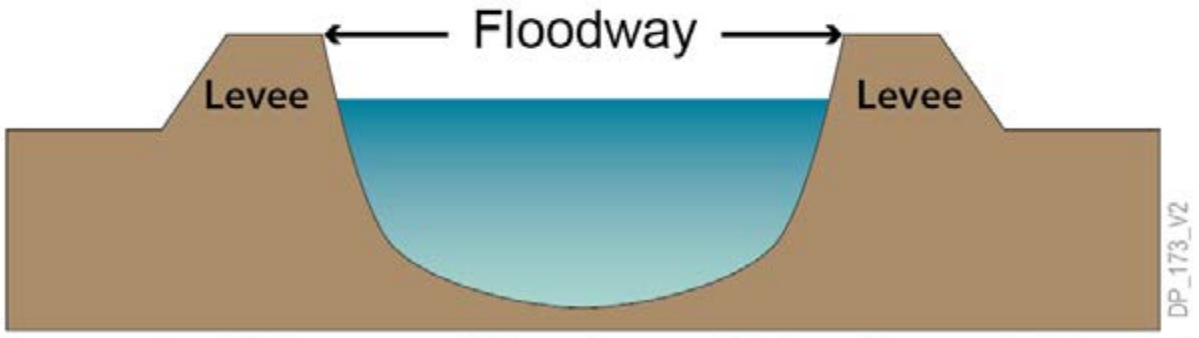
In some flood channels and bypasses, dredging may have benefits because it increases channel capacity and also provides material that can be used for levee maintenance and other flood risk management activities. Because some portions of the Delta are within a tidal pool and other areas are riverine, the efficacy of dredging must be addressed on a site-specific basis and cannot simply be considered useful on a Delta-wide basis.

The benefits and impacts of dredging Delta channels are being investigated by a consortium of federal and State agencies, including U.S. Environmental Protection Agency, USACE, DWR, and the Regional Water Quality Control Boards, under the Delta Dredged Sediment Long-Term Management Strategy (LTMS) Program. The LTMS is designed to improve operational efficiency and coordination of the collective and individual agency decision-making responsibilities resulting in approved dredging and dredged material management actions in the Delta. Approved dredging and dredged material management actions will take place in a manner that protects and enhances Delta water quality, identifies appropriate opportunities for the beneficial reuse of Delta sediments for levee rehabilitation and ecosystem restoration, and establishes safe disposal for materials that cannot be reused (USACE 2007).

CONCEPTUAL DIAGRAMS OF FLOODWAYS



Conceptual Diagram of a Floodway within a Floodplain



Conceptual Diagram of Floodway within a Leveed Channel

Figure 7-5 | The floodway is the channel of the stream and that portion of the adjoining floodplain reasonably required to provide for the passage of a specified flood; it is also the floodway between existing levees as determined by the CVFPB or the Legislature.

Source: FEMA 2006

DELTA FLOOD MANAGEMENT FACILITIES

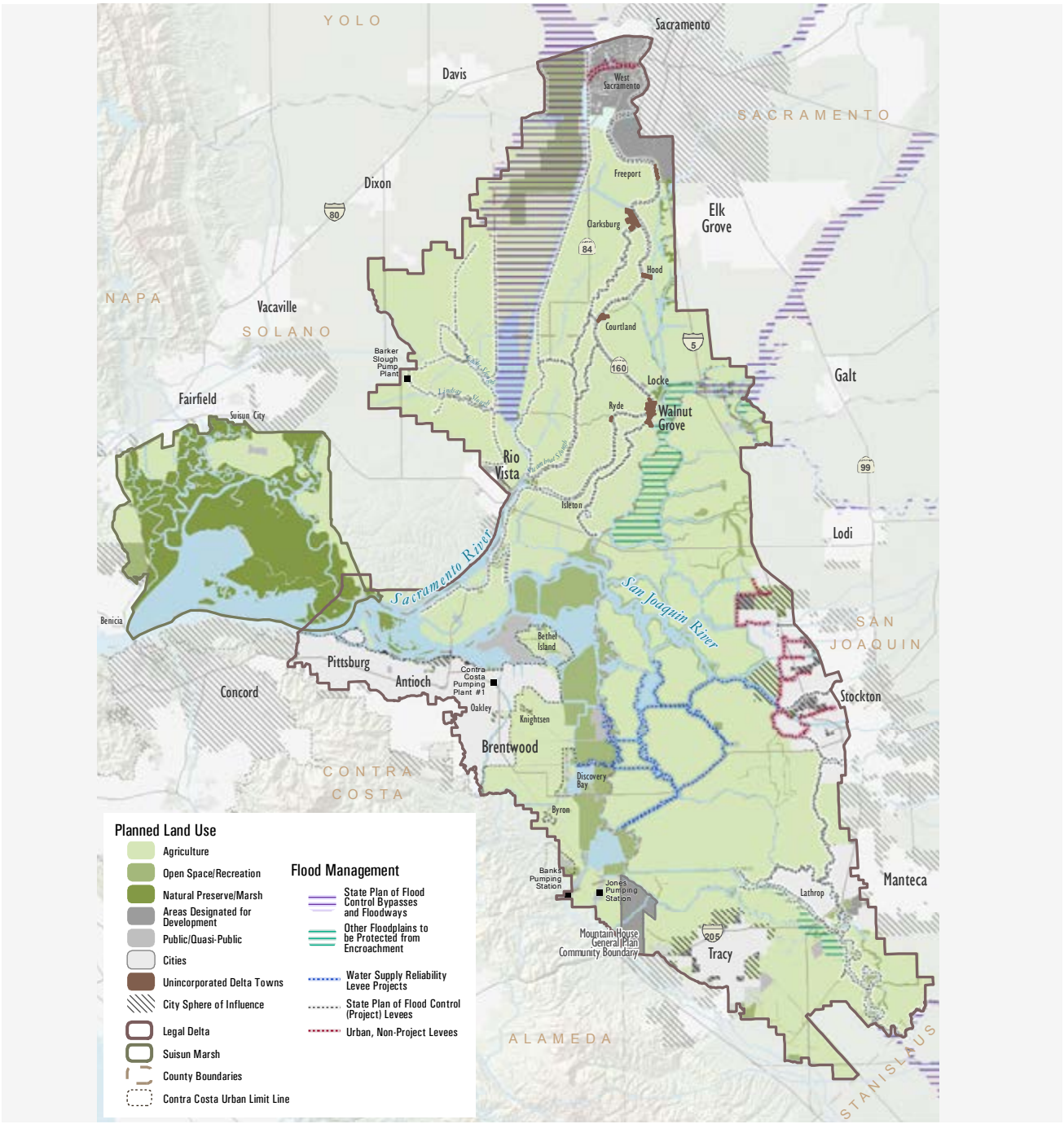


Figure 7-6 | The map shows land uses designated by city and county general plans. Within cities' spheres of influences, the map shows land use designations proposed in city general plans, where available. In cases where cities have not proposed land uses within their spheres of influence, the map shows land uses designated by county general plans.

Sources: City of Benicia 2003, Contra Costa County 2008, Contra Costa County 2010, DWR 2011b, DWR 2011c, DWR 2011d, City of Fairfield 2008, Jones & Stokes 2007, City of Lathrop 2012, City of Manteca 2012, Mountain House Community Services District 2008, City of Rio Vista 2001, SACOG 2009, City of Sacramento 2008, Sacramento County 2011, Sacramento County 2012, Sacramento County 2013, San Joaquin County 2008a, San Joaquin County 2008b, Solano County 2008a, Solano County 2008b, South Delta Levee Protection and Channel Maintenance Authority 2011, City of Stockton 2011a, City of Stockton 2011b, City of Suisun City 2011, City of Tracy 2011a, City of Tracy 2011b, City of West Sacramento 2010, Yolo County 2010a, Yolo County 2010b

INVESTMENT IN REDUCING RISK

Maintaining the Delta's levees and improving them to reduce risk to desired levels will cost billions of dollars. State-subsidized expenditures to maintain rural Delta levees, including local matching funds, averaged $11.6 million annually between FY 2010 to FY 2014. More is spent by State and local agencies to maintain project levees. Costs to improve Delta levees towards desired criteria total about $3 billion: $1.77 billion for urban levees, according to estimates from the Central Valley Flood Protection Plan regional flood management plans, and $1.26 billion, adjusted for inflation, for rural levees (URS Corporation/Jack R. Benjamin & Associates 2011).

Because the Delta's levees reduce risk to residents; agricultural land; water supplies; and energy, communications, and transportation facilities, the State has invested considerable funding to maintain and improve them over several decades through various legislative actions. For rural non-project levees, two State programs provide matching funds to maintain and improve Delta levees. The principal State programs are:

- DWR's Delta Levees Maintenance Subventions Program provides technical and financial assistance to local levee maintaining agencies in the Delta for the maintenance and rehabilitation of Delta levees. It pays up to 75 percent of levee maintenance and improvement costs after a minimum cost threshold has been paid by that district. In practice most recent funding is used to subsidize maintenance, with only modest amounts disbursed for major levee rehabilitation. While the Subventions Program is primarily for non-project levees, project levees qualify if more than 50 percent of the island acreage is within the Delta primary zone. Funding assistance provided by the subventions program is governed by guidelines developed by DWR and adopted by the CVFPB. The subventions program does not fund levee maintenance or improvement in Suisun Marsh.
- DWR's Delta Levees Special Flood Control Projects Program provides financial assistance to local levee maintaining agencies to improve or rehabilitate levees in the Delta, portions of Suisun Marsh (approximately 12 miles of levees on islands bordering Suisun Bay from Van Sickle Island westerly to Montezuma Slough) as well as the town of Thornton (Water Code section 12311). It can fund up to 100 percent of project costs.

An estimated $530 million of State taxpayer money has been spent by DWR on Delta levee maintenance and improvements through the subventions and special projects programs since the 1970s. No federal funds are available for these non-project levees.

Outside of the primary zone, almost all Delta levees are maintained by local levee maintaining agencies without State assistance.

Because the Delta's project levees are authorized as part of the federal flood control project, they are eligible for federal funding for improvements and significant repairs. The CVFPB serves as the non-federal partner to USACE for the Delta's project levees. The federal government pays between 50 and 75 percent of the total costs of flood control projects authorized by Congress, with the non-federal costs typically shared by State (70 percent) and local entities (30 percent) (Water Code 44 section 12310–12318). The cost sharing ratio varies with the kind of benefits provided. For example, federal cost-share for ecosystem restoration projects can be as much as 65 percent in urban flood risk reduction projects. Water supply, recreation, and other benefits included in flood risk reduction projects can further modify federal cost sharing. The State share of non-federal costs also depends on the mix of benefits. State funds are distributed through several DWR programs, including its Early Implementation Program, Local Levee Assistance Program, Urban Flood Risk Reduction (UFRR) Program, and Small Communities Flood Risk Reduction Program. $613.3 million has been committed through DWR's Early Implementation Program to improve levees that protect urban and urbanizing areas in the Delta.

The State programs that support Delta levee maintenance and improvement have grown and adjusted incrementally over the years, reflecting new needs and institutions. DWR plays the prominent role. The CVFPB approves guidelines for the Delta Levees Maintenance Subventions Program (Water Code sections 12984 and 12991). The California Water Commission is authorized to approve lists of projects that are priorities for the Special Projects Program (Water Code section 12313(b)). The Department of Fish and Wildlife guides mitigation impacts to fish and wildlife and improvement of their habitats (Water Code sections 12314 and 12987(c)). The

Natural Resources Agency maintains a recreation plan to be considered in maintenance and improvement plans funded under subventions program (Water Code section 12987(e) and is responsible for supervising implementation of the special projects program (Water Code section 12306.5). Simplifying these responsibilities in fewer agencies could both improve oversight and reduce the complexity of interagency coordination.

PRIORITIZING STATE INVESTMENT IN LEVEES

The Delta Reform Act requires that the Delta Plan attempt to reduce risk to people, property and State interests in the Delta by promoting strategic levee investments and recommending priorities for State investments in the Delta's project and non-project levees (Water Code sections 85305(a) and 85306). Priorities are needed because the funds needed to complete desired levee improvements significantly exceed the funds currently available. History provides little reason to expect that all the funds needed will soon be provided. Even if more funds were provided, projects providing greater benefits ought to proceed before those with fewer benefits. Given the uncertainty over the amount and availability of future Delta levee program funding, the most prudent approach is to prioritize those that reduce the most significant risks, provide the most benefits and avoid the costliest consequences. Prioritizing investment ensures that limited public funds are expended first for improvements that are most critical to protecting lives, property, and State interests. These priorities, in combination with the Delta Reform Act directive that State agencies act consistently with the Delta Plan and the requirement that reimbursements for major rehabilitation of levees through the Delta Levees Maintenance Subventions Program conform to the Delta Plan (Water Code section 12986), will ensure that State spending on Delta levees reflects these priorities in the future. The Delta Reform Act provides that activities of the Council in determining priorities for State levee investments in Delta levees do not increase the State's liability for flood protection in the Delta or its watershed (Water Code section 85032(j)).

This 2013 Delta Plan envisioned that State funds for flood management would be focused on State interests but that some of that activity would protect local interests as well. The Plan outlined a process to prioritize State investments in levee operation, maintenance, and improvements in the Delta. The Council, following a workshop with flood risk management experts and extensive agency and public comment, adopted a set of principles to provide further guidance for priority setting (Delta Stewardship Council 2015). Principles relevant to prioritization of levee investments include:

1. The goals of State law and the Delta Plan—and, therefore, the Delta Levee Investment Strategy—are to better protect life, property, and the State's coequal goals for the Delta.
2. State funding should not assist further urbanization of floodprone Delta land.
3. Expenditures should reduce risk. Reducing the probability of flood damage, for example, by improving levees or creating floodways, and lowering the consequences of flooding with actions like evacuation planning or floodproofing are both important.
4. State flood management investment to protect urban areas is the first priority.
5. Water conveyance and diversion infrastructure is a high priority.
6. State funds must enhance the ecosystem even if projects cost more to the State and to reclamation districts. A programmatic approach that locates ecosystem enhancements where they provide high benefits is preferable.
7. Consider systemwide needs. Specific recommendations of the Delta Plan and the State Plan of Flood Control should be considered. These include the proposed Paradise Cut Bypass recommended in the Delta Plan, and other specified non-project levees.
8. Impacts to the Delta's unique values should be taken into account. These include the Delta's farmlands, historic communities, and natural and cultural resources.
9. State investments in the Delta's flood management system must consider post-flood recovery responses by local, state, and federal agencies and the efficacy and likelihood of financial assistance after flood damage.
10. Owners of non-project levees seeking State funding have the burden to prove that they protect many people and/or assets or help achieve the coequal goals.

This guidance was applied, following an independent science review (Mitchell, Asselman, Bolte, Cutter, McCann, Michelsen, and Rose 2015), to develop a method for assessing potential levee investment priorities in this plan amendment (Arcadis 2016b). The fragility of the Delta's levees to threats from flooding, earthquakes, and sea level rise was carefully evaluated, and the population and property the levees protect were inventoried, using census data, land use maps, assessment information, and other sources. Metrics were developed to weigh the State interests that the Council determined investments should safeguard: water conveyance and diversion infrastructure and the Delta ecosystem. Information about transportation and utility infrastructure and the Delta's unique values including farmland and legacy communities was also gathered, so that risks to these assets could be considered. This information, totaling 1.5 million data points, was assembled into a database that is analyzed by a computer-assisted decision support tool to aid in evaluating alternative priorities. Islands and tracts where levee improvements further multiple objectives, such as protecting both water supply and the Delta ecosystem, were preferred to projects that advance only a single interest. Also considered in setting priorities were information about system-wide needs, including recommendations of the Delta Plan, the Central Valley Flood Protection Plan and other proposals for the State Plan of Flood Control, and the California EcoRestore initiative. Advice from the Central Valley Flood Protection Board, DWR, other flood agencies, and Delta stakeholders was also considered.

Gathering and evaluating the information used to recommend investment priorities has been a considerable and controversial effort. Despite the limitations of the data available, the effort has been more thorough, comprehensive, and transparent than prior studies. As data is updated and levee conditions change with improvements, the Council intends to maintain and improve its database and decision support tool, both to track the performance of State levee investments and to support periodic reviews of the Delta Plan.

CONTINUE AND IMPROVE THE DELTA LEVEES MAINTENANCE SUBVENTIONS PROGRAM

Confirmation that continued maintenance of Delta's levees remains important is one result of this evaluation. This maintenance, including ongoing State financial support through the Delta Levees Maintenance

Subventions Program, should continue. It reduces risks to lives, property and State interests and contributes to preservation of the Delta's unique agricultural, natural, and cultural resources. This maintenance of the Delta levee network also reduces the risk that failure of one island's levees could expose adjoining islands to increased wind waves or seepage.

THE DELTA LEVEES INVESTMENT STRATEGY

Investments that improve Delta levees towards applicable standards and guidelines are critical to protecting lives, property, and State interests. Priorities for these improvements are established in Figure 7-8 and Table 7-1. The very highest priorities are improvements to levees protecting urban and urbanizing areas where the most lives and property are at risk. Another very high priority is improving levees where the quality of water supplies, restored marshes, transportation routes, small communities, and farmland are at risk. Priority is also given to areas that are retiring outmoded levees by restoring the sites to marsh, contributing to the net improvement of aquatic habitats required by the Delta Levees Special Flood Control Projects Program (Water Code section 12311).

An island or tract may be a high priority island where water supplies or ecosystems are at risk but benefits to multiple interests are not significant. Improvements on other high priority islands and tracts may reduce risks to multiple values, but benefits, or risks are lower than on very high priority areas. Levees protecting interstates and State highways 160, 4, and 12 are also identified as high priorities to indicate their improvement will be important when feasibility studies or CalTrans' climate change vulnerability studies indicate upgrades are the best alternative.

Stockpiling material for emergency repairs of levees on the water export corridors along Middle and Old Rivers toward the State Water Project and Central Valley Project pumps or at sites serving local reclamation districts can complement these levee improvements. No foreseeable amount of improvement will make the Delta's levees invulnerable to failures in large floods or earthquakes. Placing levee repair materials where they are readily available to repair damage is prudent preparation for disasters that may come. In the unfortunate event that a levee failure occurs, the coequal goals of providing a more reliable water supply and protecting, restoring, and enhancing the Delta ecosystem should be fundamental to the post-disaster response process.

Every levee is important to those whose safety or property is protected. The islands and tracts that are identified as "other priorities" are not unimportant. State funds for improving these levees should be considered after projects on very high priority and high priority islands are funded. Some of these islands and tracts hold valuable property or have important water supply or ecosystem values, but face lower risks of failure, often because of previous State-funded levee improvements. Others may have levees with a high probability of failure, but have few residents, less valuable property, or lower water supply or ecosystem values. Suisun Marsh levees, except for those bordering Suisun Bay from Van Sickle Island westerly to Montezuma Slough, are ineligible for State funds for levee improvement (Water Code section 12311), a restriction that should be maintained.

In awarding State funds to improve these levees, DWR may vary from these priorities when necessary to protect lives, property, or the State's interests in water supply reliability, the Delta ecosystem, considering the Delta's unique agricultural, natural, cultural, or recreational values. The reasons for any such variations must be explained.

Update Funding Strategies

"Who pays what" is a key to financing all public works. The Delta Plan endorses the principles that "beneficiaries pay" and "stressors pay." The Council's levees investment strategy principles include:

1. The Delta Levees Investment Strategy should be based on the Delta Plan principle that beneficiaries pay. The State share of levee improvements should reflect the State interests at stake. Levee maintenance is primarily the responsibility of local reclamation districts and their property owners, not the State. The State should also take into account the ability of local agencies to pay.
2. The State should create a Delta Flood Risk Management Assessment District with the authority to charge all beneficiaries.

In practice, almost all funds for most Delta levees' maintenance and improvement have come from two sources—landowners through assessments on lands or other property protected by the levee network, and the State's general fund, both through direct appropriation and through the repayment of general obligation bonds. Annual funding for levee improvements and maintenance is constrained currently by annual appropriations of State funds, statewide bond measures, and by affordability and budgeting at the local level, where jurisdictions, whether urbanized or rural, face budgetary constraints and competition for tax dollars from a multitude of public needs.

Although the State contributes the majority of funds for maintaining and improving non-project Delta levees, the concept of shared responsibility with local landowners is key to the Delta's levees long term viability. The continued participation and financial support of local reclamation districts is essential. As noted in the Delta Reform Act's Section 85003(b), "Delta property ownership developed pursuant to the federal Swamp Land Act of 1850, and State legislation enacted in 1861, and as a result of the construction of levees to keep previously seasonal wetlands dry throughout the year. That property ownership, and the exercise of associated rights, continue to depend on the landowners' maintenance of those non-project levees and do not include any right to state funding of levee maintenance or repair." Local cost shares are paid from property assessments. In the rural Delta, assessments, which also cover reclamation districts' drainage expenses, often average $10 to $40 per acre annually, with higher assessments in districts that are matching significant State funds for levee improvement (Delta Stewardship Council 2015). Local agencies have varying ability to pay, influenced by the value of land that can be assessed and the desires of their voters, who are usually property owners (see Figure 7-7). In the rural Delta, where the productivity and use of agricultural land strongly influences land values, districts' ability to pay varies widely (Arcadis 2017).

Most recent State funds have come from general obligation bonds, such as those, authorized by Proposition 1E for flood risk reduction. The reliance on State bonds to fund 75 to 100 percent of levee improvement and maintenance costs not only limits the amount of annual funding available but is an uncertain

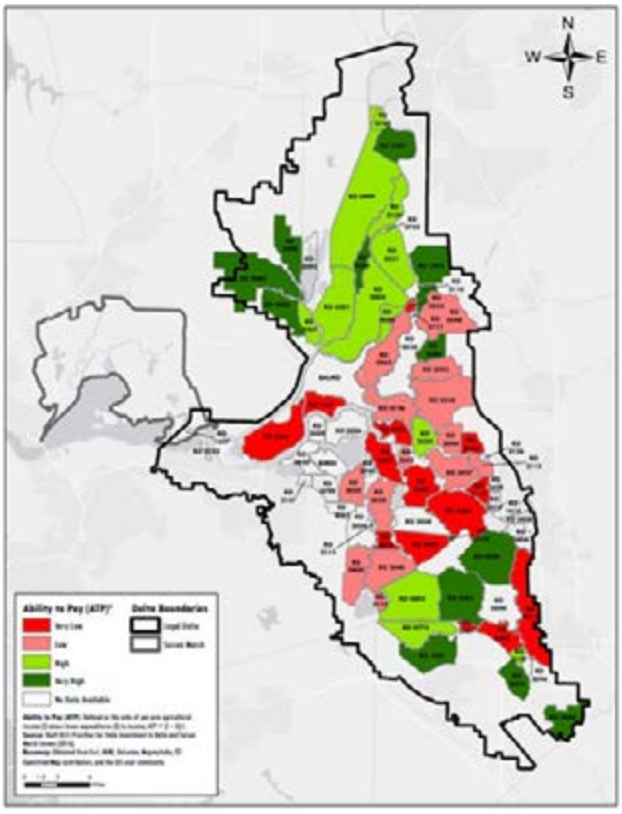


Figure 7-7 | Map depicting the ability to pay by tract or island.

source of future funding for these very costly long-term capital and maintenance needs. Another drawback of relying primarily on statewide bond measures to fund Delta levee improvements and maintenance is that the Delta's needs must compete with other regions, increasing the uncertainty of bond-funded appropriations.

Prior to the availability of bond funds, the subventions program was supported with modest levels of general funds. The reliance on general fund reflects in part a proper allocation to the State of costs to protect broad-based public benefits such as protecting public safety, enhancing fish and wildlife habitat or safeguarding water quality. Without another way to collect funds from water users, highway and railroad users, or utility customers, the general fund may also approximate these broad-based classes of beneficiaries.

The State's cost share for levee maintenance and improvement varies among programs. The Delta Levees Maintenance Subventions Program pays up to 75 percent of local costs, above $1,000 per levee mile,

to maintain and rehabilitate non-project and some project levees. The $1,000 per levee mile deductible, last updated in 1981, is an approach to State-local cost sharing. This deductible equates to approximately $3 per acre for reclamation districts within the Delta. If the deductible were updated for inflation since 1981, it would be $2,250 to $2,500 per mile, depending on the index used to measure rising costs or crop prices. At the upper limit of $2,500 per mile, this would equate to approximately $7 per acre for Delta reclamation districts studies of a local agencies' ability to pay are supposed to inform cost-sharing between local districts and the State, but in practice are seldom completed or applied.

Most project levees are maintained without State support by local agencies or State-imposed maintenance areas funded by local landowners.

Improvement of non-project levees is usually funded through the Delta Levee Special Projects Flood Control Program, although occasionally the Delta Levees Maintenance Subventions Program funds rehabilitation projects that improve levees. The Special Flood Control Projects Program may pay up to 100 percent of improvement costs, subject to cost-sharing agreements it may enter into with the beneficiaries or owners of infrastructure, such as utilities or highways that benefit from the improvement. The USACE's conclusion that there is no federal interest in improving non-project Delta levees removes the CALFED Bay-Delta Program's expectation that the federal government might pay up to half the cost of these levees' improvement. Improvements to project levees usually include at least a 50 percent federal cost share, with greater federal support when improvements provide ecosystem restoration or other benefits.

To widen other levee beneficiaries' participation in funding levee maintenance and improvement, the 2013 Delta Plan and the DPC's Economic Sustainability Plan proposed creating a regional agency with fee assessment authority to assist with the financing, planning, and implementation of Delta flood risk reduction activities. It was hoped that this alternative funding mechanism could provide a more stable, long-term approach to funding in which local participation by all beneficiaries of flood risk management is more broadly incorporated. Phase 1 of the DPC efforts, however, suggests that such a district is infeasible because it cannot capture revenue from all beneficiaries of Delta levees and the significant legal and political hurdles of creating an assessment district crossing so many jurisdictional boundaries. Instead, the DPC is exploring other approaches to involving beneficiaries in paying for levee improvements (M. Cubed 2016). Phase 1 of the DPC effort suggests that the most feasible portfolio of finance mechanisms is one that could generate revenue to pay for levee maintenance, repair, rehabilitation and improvements, including new fees that would bring in revenue from beneficiaries that do not currently pay for Delta levees in proportion to the benefits they receive. Candidates include contributions from the State Water Project or Central Valley Project for improvements protecting the conveyance of water through the Delta for export, a water use fee linked to improvement of levees protecting water quality, fees on energy or telecommunication utilities with infrastructure protected by levees, contributions from CalTrans as it implements strategies to reduce its highways' vulnerability, reactivation of the Sacramento-San Joaquin Drainage District as proposed in the draft Central Valley Flood Protection Plan, or regional assessments to respond to sea level rise. This potential portfolio of finance mechanisms may help move toward a levee funding system based on the "beneficiary pays" principle, increasing the funds available to pay for levee maintenance or priority levee improvements. These approaches should be further investigated by the DPC in the next phase of work and pursued, if viable, along with action by the Public Utilities Commission recommended in the Delta Plan to promote cost-sharing of levee improvements by investor owned utilities.

PLANNING FOR FLOODPLAIN LAND USE

The most important step in reducing risk to people in the Delta is to stop putting more people at risk behind levees that do not meet minimum modern standards for flood protection. Actions that increase the demand for higher public spending on flood risk reduction and exacerbate flood risk (for example, urbanizing floodprone areas) should be discouraged (Galloway, et. al. 2007).

The DPC Land Use and Resource Management Plan for the Primary Zone of the Delta also includes important policies to limit development in floodprone areas of the Primary Zone:

> *Local governments shall carefully and prudently carry out their responsibilities to regulate new construction within flood hazard areas to protect public health, safety, and welfare. These responsibilities shall be carried out consistent with applicable regulations concerning the Delta, as well as the statutory language contained in the Delta Protection Act of 1992. Increased flood protection shall not result in residential designations or densities beyond those allowed under zoning and general plan designations in place on January 1, 1992, for lands in the Primary Zone. (DPC 2010)*

As noted in Chapter 5, the legacy community of Bethel Island warrants a special note because of its flood hazards. About 2,100 people reside on the island in about 1,300 residences concentrated on the south central shoreline and four mobilehome parks. The island, which is below sea level, is surrounded by approximately 15 miles of levees, limiting the drainage of floodwaters in the event of a levee breach. A single road, Bethel Island Road, links the island to the mainland at the city of Oakley, complicating emergency response or evacuation in the event of flooding. Because developments on Bethel Island are proposed to be served by the Bethel Island Municipal Improvement District or other adjacent public services, the entire island is within the urban limit line adopted by Contra Costa voters in 2006. The high-flood risks on the island and the restricted evacuation opportunities, however, indicate the island has greater hazards to lives and property than the Delta's other areas designated for development. For this reason, it is not excluded from the Delta Plan policy prohibiting new subdivisions unless adequate flood protection is provided. This is consistent with provisions of the Contra Costa County General Plan, which require that development other than a single home on existing parcels await resolution of several issues, including improvement of the community's public services, levees, and emergency evacuation routes.

EXAMPLES OF FLOODPROOFING

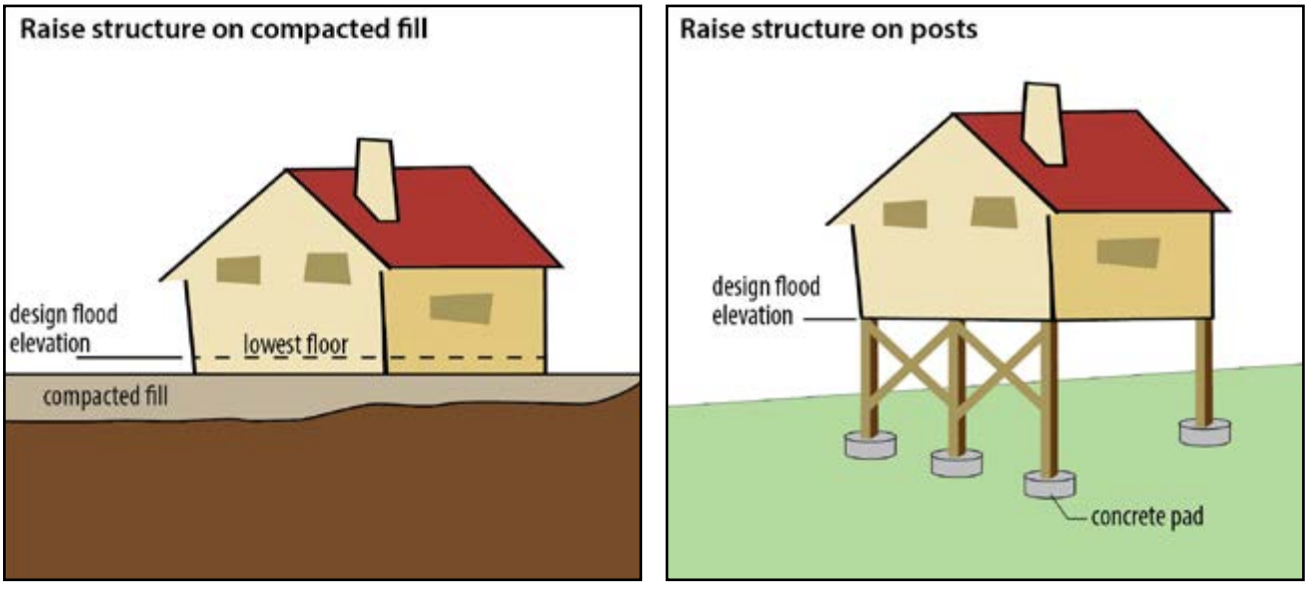


Figure 7-8 | Floodproofing in accordance with the National Flood Insurance Program can be achieved through several methods. The illustration on the left shows an example of floodproofing by constructing the lowest floor within a structure above the design flood elevation. The illustration on the right shows floodproofing by raising the bottom of the structure above the design flood elevation.

Source: FEMA 1994; FEMA 2001

As described in Chapter 5, urban residential, commercial, and industrial uses should be located in cities, other urban areas, and their spheres of influence, where strong levees can be provided, rather than in rural lands protected only by non-project levees. Outside of these urban and urbanizing areas and the legacy communities, the Delta Plan prohibits major subdivisions of five or more parcels where 200-year flood protection is not available. In rural areas, any new rural residential subdivisions should anticipate rising sea levels by going beyond FEMA standards to designate home sites that will be above the sea level anticipated in 2100. Recognizing legacy community needs for incidental growth to maintain their unique cultural values, development within community boundaries should continue consistent with existing general plans, and federal and local flood protection laws. Appendix B provides maps of Delta community boundaries. Maintaining most of the Delta in rural, agricultural land use, as described in Chapter 5, complements policies that reduce the number of properties and the population exposed to high flood risks.

Finally, the participation of Delta counties and cities in the National Flood Insurance Program brings with it a requirement that all residential, commercial, agricultural, and industrial buildings comply with FEMA floodproofing standards, including elevating structure ground floors above the 100-year flood elevation. Examples of floodproofing are shown on Figure 7-8.

FUNDING FOR NON-STRUCTURAL RISK REDUCTION

Flood risks to lives and property can be reduced by investing in emergency evacuation routes, floodproofing, or other actions in addition to levees. In the Delta's unincorporated towns or rural developments, these non-structural risk reduction activities may be preferred when improving levees is not affordable or cost effective. Pursuing these alternatives can be difficult, however, because State funds are primarily available for levee improvements, rather than the full range of risk reduction activities. As the State makes additional funds available for flood risk reduction, providing funds for non-structural risk reduction as well as levee improvement can give Delta residents more choices about how to reduce flood risks.

EMERGENCY PREPAREDNESS AND RESPONSE

Even with the best-engineered levees, channels, and floodways, a residual risk from flooding will always remain; flood risk can never be eliminated. Although investment in flood protection infrastructure can considerably reduce the likelihood of a catastrophic levee failure, failures are inevitable and will require well-coordinated and carefully developed emergency response efforts. A 200-year flood or earthquake could badly damage levees at up to 10 to as many as 40 islands (Arcadis 2016b). To reduce response time and optimize effectiveness of response efforts after such a

disaster, emergency plans need to leverage the unique capabilities of each agency with a mission in the Delta. This section provides an overview of the agencies and planning involved in emergency preparedness and response in the Delta.

Responsibilities for preparing for, declaring, and responding to flood emergencies are distributed among local, State, and federal agencies. Federal agencies with authority include USACE and FEMA. In California, State and local responsibilities fall to county offices of emergency services, local reclamation districts, Cal EMA, and DWR. In a Delta flood emergency, the response efforts by local and State emergency management professionals are guided by California's Standardized Emergency Management System (SEMS). SEMS was established by Government Code section 8607(a), and provides for effective management of multiagency and multijurisdictional emergencies in California, including flood emergencies. This system consists of five organizational levels, which are activated as necessary: (1) field response, (2) local government, (3) operational area, (4) regional, and (5) State. These levels are activated stepwise as the events warrant additional response and resources, meaning that each level of emergency responder contacts the next level above them should they deem the emergency beyond their capabilities to control. Federal resources are called upon if State resources are exhausted or additional assistance is needed. SEMS incorporates the functions and principles of the Incident Command System, the Master Mutual Aid Agreement, existing mutual aid systems, the operational area concept, and multiagency or interagency coordination. A detailed discussion of SEMS can be found in Cal EMA SEMS Guidelines (Cal EMA 2009). Local governments must use SEMS to be eligible for funding of their response-related personnel costs under State disaster assistance programs.

At the State level, Cal EMA's California Emergency Plan is the current guiding plan for all State emergencies. The California Emergency Plan incorporates and complies with the principles and requirements found in federal and State laws, regulations, and guidelines. Cal EMA typically defers to DWR for emergency management during floods. DWR emergency flood management actions are guided by its 2007 Interim Flood Emergency Operations Plan. DWR is in the process of developing its Delta Flood Emergency Preparedness Response and Recovery Program (EPRRP), which will be the overall guiding flood emergency management program for DWR activities for project and non-project levees in the Delta. The Delta Flood EPRRP consists of three components: (1) the plan for flood emergency preparedness, response, and recovery actions in the Delta; (2) multiagency plan coordination, which coordinates DWR's plan with the plans of other Delta flood response agencies; and (3) response facilities implementation, which includes the development of flood emergency response facilities in the Delta.

At the federal level, USACE has a standing All-Hazards Emergency Response Plan and standing contracts for emergency response work in the Delta region, and is ready to assist the State, as requested through PL 84-99. These existing plans and procedures are considered in DWR's flood emergency operations plans and are a critical part of the Delta Flood EPRRP Plan. FEMA is responsible for coordinating the response of several federal agencies to a large natural disaster that overwhelms the resources of State and local authorities. The primary duty of FEMA is to ensure services to disaster victims through operational planning and integrated preparedness measures. To further address emergency preparedness and response issues in the Delta, Water Code section 12994.5 calls for developing and implementing multi-hazard preparedness and response strategies for the Delta. This legislation requires the Office of Emergency Services (CalOES) to establish the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force. Led by CalOES, the task force consists of representatives from the DPC, DWR, and the five Delta counties. The task force was directed to do the following:

- Make recommendations to CalOES about creating an interagency unified command system organizational framework, in accordance with the guidelines of the National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS);
- Coordinate development of a draft emergency preparedness and response strategy for the Delta; and
- Develop and conduct all-hazard emergency response exercises and training in the Delta that would test or facilitate implementation of regional coordination protocols.

The recommendations prepared by the task force include identifying potential threats and consequences affecting the Delta, developing a Delta catastrophic flood incident plan to guide integrated emergency response in the Delta, and preparing a regional mass evacuation plan.

RENEWING FEDERAL ASSURANCES OF ASSISTANCE IN RECOVERING FROM FLOOD DISASTERS

Following a flood disaster, various federal programs can provide disaster assistance. The federal agencies have repeatedly helped fund post-disaster repairs of Delta levees and other public infrastructure, providing aid after floods in 1980, 1982, 1983, 1986, 1997, 2004, and 2006. FEMA's Hazard Mitigation Plan (HMP) criteria must be met to be eligible for its assistance (Delta Stewardship Council Staff 2010b). USACE has specific criteria concerning eligibility for assistance to repair levees under PL 84-99. The Delta HMP agreed to between California agencies and FEMA was intended to reduce risks to the property that Delta levees protect, so that federal aid would be needed less often. The State's investment in Delta levee maintenance and improvement has in part been in fulfillment of its responsibilities under the HMP.

California cannot rely exclusively on federal assistance to rebuild Delta levees damaged in floods. Following Hurricane Katrina and other expensive disasters, eligibility requirements for FEMA and USACE post-disaster assistance for levee repairs have been tightened and more rigorously enforced. Most rural Delta project levees were either removed from the Corps' PL 84-99 program or are expected to become ineligible soon. In 2014, the Delta HMP was not renewed, despite the considerable State investment in its implementation. The agreement's termination partly reflected FEMA's concern that sufficient progress had not been made toward its long-term goal of bringing levees up to the USACE Delta specific PL 84-99 standard and growing realization of the costs that flood disasters nationwide are imposing on the federal government.

Planning for levee improvement and maintenance is difficult without more certainty about the reliability of federal post-disaster recovery programs, including the criteria that could be imposed on reclamation districts seeking whatever federal levee repair assistance may be available. Revising assistance criteria to reflect the Delta's unique setting and its water supply and ecosystem values is an important aspect of seeking renewed federal commitments. Without federal assistance, post-disaster recovery would be difficult and expensive. Landowners alone would be unlikely to repair levees damaged in a disaster on 18 to 23 Delta islands where the cost of repairs is likely to exceed the value of the islands' property (Suddeth, et. al. 2010). Federal assistance in rebuilding these levees could significantly lower landowners' repair costs, increasing the likelihood that damaged islands would be reclaimed. The lack of federal assistance shifts to the State the cost of aiding local agencies in levee repairs, because State law provides that post-disaster levee repair claims not paid by federal agencies may be reimbursed by the State through DWR's Delta Levees Maintenance Subventions Program (Water Code section 12993). As risks grow with rising seas, the importance of FEMA's hazard mitigation assistance will only increase proportionately.

LIABILITY CONCERNS

USACE and other federal agencies are generally afforded some immunity from liability for damages from flood events under the concept of sovereign immunity and provisions of the Flood Control Act of 1928 (33 United States Code section 702c). Congress provided immunity to federal agencies for some but not all tort damages. However, this immunity does not apply to non-federal agencies.

As the risks of levee failure and corresponding damage increase, California's courts have generally exposed public agencies, and the State specifically, to significant financial liability for flood damages (DWR 2005). The most notable recent court decision on flood liability was the California Court of Appeal decision in Paterno v. State of California (2003) (113 Cal. App. 4th 998). The court found the State was liable for damages caused by the failure of a project levee on the Yuba River that the State did not design, build, or even directly maintain. This decision makes it possible that the State will ultimately be held responsible for the structural integrity of much of the federal flood control system in the Delta and Central Valley. The Paterno v. State of California decision will ultimately cost State taxpayers approximately $464 million in awarded damages.

In Arreola v. County of Monterey (2002) (99 Cal. App. 4th 722), the court held local agencies and the California Department of Transportation (Caltrans) liable for 1995

flood damages to property owners that resulted from a failure to properly maintain levees of the Pajaro River project.

One way to reduce State liability is to expand participation in flood insurance programs. Flood insurance premiums are increasing as Congress reacts to steady program losses from recent flood disasters. High premiums, however, make flood insurance less affordable for many Delta residents. Local government participation in the flood insurance program's community rating system can help lower rates as communities undertake activities that reduce flood risks, like evacuation planning, floodproofing, or buying out repetitively damaged properties.

The California FloodSAFE Strategic Plan states, "Local communities are responsible for land use decisions, but generally have not been found liable for failure of the flood protection system. Continued local actions to approve development within floodplains may increase flood risk, even if levees and other flood protection improvements are made. This creates liability issues which the State is concerned about. Legislation passed in 2007 addresses the need to connect land use planning with diligent and factual consideration of flood risks for areas of proposed development" (DWR 2008a).

In 2007, the Legislature amended the Water Code to address local community liability for approving development in floodprone areas. It provides that "a city or county may be required to contribute its fair and reasonable share of the property damage caused by a flood to the extent that the city or county has increased the state's exposure to liability for property damage by unreasonably approving new development in a previously undeveloped area that is protected by a state flood control project" (Water Code sections 8307(a) and (b)).

Ultimately, however, it is important to note that the State does not own, operate, control, or maintain non-project levees, and does not have authority to do so. The Delta levee subventions program grants financial assistance to local reclamation districts for their levees. The State conducts evaluations to make sure subventions program funds have been spent appropriately, but not to ensure the quality of the work or the stability or structural integrity of non-project levees. Rather, the non-project levees are the sole responsibility of the reclamation districts, and the State is not liable for damages caused by their failure.

Policies and Recommendations

These policies and recommendations are based on the Council's core strategies for reducing flood risks in the Delta, which are:

- Continue to prepare for Delta flood emergencies

- Modernize levee information management
- Prioritize investment in Delta levees
- Update flood management funding strategies
- Manage rural floodplains to avoid increased flood risk
- Protect and expand floodways, floodplains, and bypasses
- Renew assurances of federal assistance for post disaster response
- Limit State liability

Reducing flood risks also relies on locating urban development in the Delta's cities where levees are stronger as discussed in Chapter 5, and retaining rural lands for agriculture, so that development in the most floodprone areas is minimized.

CONTINUE TO PREPARE FOR DELTA FLOOD EMERGENCIES

To effectively and reliably reduce risks to people, property, and State interests in the Delta and to respond rapidly to flood disasters, a multifaceted strategy of coordinated emergency preparedness, appropriate land use planning, and prioritized investment in flood protection infrastructure is necessary (Water Code sections 85305(a) and 85306).

Federal, State, and local governments—and Californians—must be prepared for a variety of emergency situations.

The recommendations prepared by the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force play an important role in planning efforts for the Delta.

PROBLEM STATEMENT

Levee failures and flooding can and will place human life and property in danger, and can have potentially significant implications for the State's water supply and infrastructure, and the health of the Delta ecosystem. Investments in levee maintenance and improvement can reduce but not eliminate these risks. Appropriate emergency preparedness and response planning and implementation activities need to continue and expand.

POLICIES

No policies with regulatory effect are included in this section.

RECOMMENDATIONS

RR R1. Implement Emergency Preparedness and Response

The following actions should be taken to promote effective emergency preparedness and response in the Delta:

- Responsible local, State, and federal agencies with emergency response authority should continue to implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta.
- Materials should be stockpiled in appropriate locations to make post-disaster repairs of breaches in levees along the water supply reliability corridor identified in the Delta Plan's Figure 7-6, the western islands important to protection of water quality, and other levees, to complement improvement of levees as provided in RR P1.
- Local levee-maintaining agencies, with assistance from DWR, should develop their own emergency action plans, training, and floodfight material stockpiles.
- State and local agencies, and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.

MODERNIZE LEVEE INFORMATION MANAGEMENT

PROBLEM STATEMENT

Information about levee conditions is held by many parties. Data is not gathered consistently or shared widely or easily, leading to disagreements about maintenance needs and progress towards objectives for risk reduction and levee improvement. Without adequate information, planning is hindered and program performance is difficult to judge (Committee on Integrating Dam and Levee Safety and Community Resilience 2012).

RR R2. Modernize Levee Information Management

a. **Require Adequate Levee Inspections.** In order to gather information about Delta levee conditions and maintenance needs, the Central Valley Flood Protection Board should update its guidelines for the Delta Levees Maintenance Subventions Program to require local levee maintaining agencies participating in the program to annually inspect their Delta levees in accordance with DWR's guidelines for Local Agency Project and Non-project Levee Maintenance Inspection and to file their inspection reports electronically with DWR. Costs of inspections should continue to be reimbursable through the Delta Levees Maintenance Subventions Program.

b. **Provide Delta Levee Investment Decision Support.** The Delta Stewardship Council should use information from levee inspections reported to DWR and from DWR's annual reports about its levee investments pursuant to this plan's policy regarding levee investment priorities (RR P1) to maintain the decision support tool developed during preparation of this Delta Plan amendment.

PRIORITIZE INVESTMENT IN DELTA FLOOD MANAGEMENT

The Delta Reform Act of 2009 charges the Council to attempt to reduce risks to people, property, and State interests in the Delta (Water Code section 85305) by promoting, in part, strategic investments in Delta levees. The Council is required to recommend in the Delta Plan priorities for investments in levee operation, maintenance, and improvements in the Delta, in consultation with the Central Valley Flood Protection Board (Water Code section 85306). The Council's policy is to reduce flood risk in the Delta with cost-effective investments that further the coequal goals of California law: "a more reliable water supply for California and protecting, restoring and enhancing the Delta ecosystem", in a manner that protects and enhances the "unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place" (Public Resources Code section 29702).

PROBLEM STATEMENT

The Delta Reform Act (Water Code section 85306) requires the Delta Plan to recommend priorities for State investments in Delta levees, including project and non-project levees. Currently, no comprehensive method exists to prioritize State investments in Delta levee operations, maintenance, and improvement projects. Without prioritization, the apportionment of public resources into levees may not occur in a manner that reflects the risks to lives, property, and State interests.

POLICIES

RR P1. Prioritization of State Investments in Delta Levees and Risk Reduction

a. **Fund levee operation and maintenance.** For the purposes of Water Code Section 85306, State investments in levee operation and maintenance of Delta project levees and non-project levees shall be prioritized as follows:

(1) For project levees, funding should be prioritized to ensure levees are operated and maintained in accordance with Code of Federal Regulations, Title 33, Part 208.10 and applicable federal Operation and Maintenance manuals, active in federal Public Law 84–99 Rehabilitation Program, and consistent with Central Valley Flood Protection Board Resolution No. 2018-06 for Acceptable Operation and Maintenance of the State Plan of Flood Control.

(2) For non-project levees, funding should be prioritized to ensure levees are operated and maintained to protect the Delta's physical characteristics.

b. **Delta levees investment strategy.** The priorities listed in Table 7.1 below and depicted in Delta Plan Appendix P dated August 2021, which is incorporated by reference, shall guide State discretionary investments in the improvement of Delta levees. The California Department of Water Resources' funding decisions are subject to its consideration of the benefits, costs, engineering considerations, and other factors. As the California Department of Water Resources selects levee improvement projects for funding through its levee funding programs, it should fund projects at the Very-High priority islands or tracts, before funding projects at High Priority or Other Priority islands or tracts. If available funds are sufficient to fully fund levee improvement projects at the Very-

High Priority islands or tracts, then funds for levee improvement projects on High Priority islands or tracts should be funded and after those projects have been fully funded, then levee improvement projects at Other Priority islands or tracts may be funded.

c. **Annual Report.**

(1) The California Department of Water Resources shall submit a written annual report, as described in paragraph (2), to the Council, as well as present the report to the Council, on State funds distributed or provided by the California Department of Water Resources within the legal Delta. At least 45 days prior to the oral presentation before the Council, and no later than March 1 of each calendar year, the California Department of Water Resources shall submit the written annual report to the Council and make the report publicly available.

(2) The report shall include:

(A) A description of all discretionary State funding for levees awarded by the California Department of Water Resources, during the reporting year; including both of the following: (i) Levee improvement. (ii) Levee operation and maintenance;

(B) A list of each levee improvement project proposal submitted to the California Department of Water Resources for funding, regardless of whether the California Department of Water Resources awarded funding to the project;

(C) A list of the improvement projects awarded funding, the funding level awarded, the local cost share, and the applicable priority of the island or tract from Table 1 in subsection (b) where the levee improvement project is located;

(D) A description, for each awarded project, of changes (when completed) to levee geometry, the specific locations of those changes, and expected changes in the level of flood protection provided or standard achieved;

(E) If the California Department of Water Resources awards funds for any levee improvement project that is inconsistent with the priorities identified in subsection (b), the annual report shall identify for each project: how the funding is inconsistent with the priorities, describe why variation from the priorities is necessary, and explain how the funding nevertheless protects lives, property, or other State interests, such as infrastructure, agriculture, water supply reliability, Delta ecosystem, or Delta communities;

(F) A summary of the California Department of Water Resources' rationale for levee improvement project proposals submitted, but not awarded funding during the reporting year; and

(G) A summary of all previous California Department of Water Resources funded levee improvement project activities completed during the reporting year and location of those activities.

(d) For purposes of Water Code section 85057.5(a)(3) and section 5001(k)(1)(E) of this Chapter, this policy covers a proposed action that involves discretionary State investments in Delta flood risk management, including levee operations, maintenance, and improvements. Nothing in this policy establishes or otherwise changes existing levee standards.

Note: Authority cited: Sections 85210 and 85306, Water Code. Reference: Sections 85020, 85022, 85054, 85057.5, 85300, 85305, 85306, 85307, and 85309, Water Code.

TABLE 7.1 DELTA LEVEES INVESTMENT STRATEGY PRIORITIES

Very High Priority	Bacon Island, Bethel Island, Bishop/DLIS-14 (North Stockton), Brannan-Andrus, Byron Tract, DLIS-19 (Grizzly Slough Area), DLIS-28, DLIS-33, DLIS-63 (Grizzly Island Area), Drexler Tract, Dutch Slough, Hasting Tract, Hotchkiss Tract, Jersey Island, Jones Tract (Upper and Lower), Maintenance Area 9 North, Maintenance Area 9 South, McCormack-Williamson Tract, McDonald Island, McMullin Ranch, Middle and Upper Roberts Island, New Hope Tract, North Stockton, Paradise Junction, Reclamation District 17, Ryer Island, Sherman Island, Staten Island, Terminous Tract, Twitchell Island, Union Island West, Upper Andrus Island, Victoria Island, Webb Tract.
High Priority	Bouldin Island, Brack Tract, Bradford Island, Cache Haas Area, Central Stockton, Clifton Court Forebay, DLIS-01 (Pittsburg Area), DLIS-07 (Knightsen Area), DLIS-08 (Discovery Bay Area), DLIS-20 (Yolo Bypass), DLIS-22 (Rio Vista), DLIS-26 (Morrow Island), DLIS-29, DLIS-30, DLIS-31 (Garabaldi Unit), DLIS-32, DLIS-39, DLIS-41 (Joice Island Area), DLIS-44 (Hill Slough Unit), DLIS-55, DLIS-59, Egbert Tract, Fabian Tract, Glanville, Grand Island, Holland Tract, Honker Bay, Kasson District, Libby McNeil, Little Egbert Tract, Lower Roberts Island, Mandeville Island, Mossdale Island, Netherlands, Palm-Orwood, Paradise Cut, Pearson District, Pescadero District, Rindge Tract, River Junction, Shima Tract, Stewart Tract, Sunrise Club, Tyler Island, Union Island East, Veale Tract, Walnut Grove, Woodward Island, Yolano.
Other Priority	Atlas Tract, Bixler Tract, Canal Ranch Tract, Chipps Island, Coney Island, Dead Horse Island, DLIS- 06 (Oakley Area), DLIS-10, DLIS-15, DLIS-17, DLIS-18, DLIS-25, DLIS-27, DLIS-34, DLIS-35, DLIS-36, DLIS-37 (Chadbourne Area), DLIS-40, DLIS-43 (Potrero Hills Area), DLIS-46, DLIS-47, DLIS-48, DLIS-49, DLIS-50, DLIS-51, DLIS-52, DLIS-53, DLIS- 54, DLIS-56, DLIS- 57, DLIS- 62, Drexler Pocket, Ehrheardt Club, Empire Tract, Fay Island, Glide District, Holt Station, Honker Lake Tract King Island, Lisbon District, Medford Island, Mein's Landing, Merritt Island, Peters Pocket, Pico- Naglee, Prospect Island, Quimby Island, Randall Island, Rio Blanco Tract, Rough And Ready Island, Shin Kee Tract, Stark Tract, Sutter Island, Venice Island, Walthall, West Sacramento, Wetherbee Lake, Winter Island, Wright-Elmwood Tract.

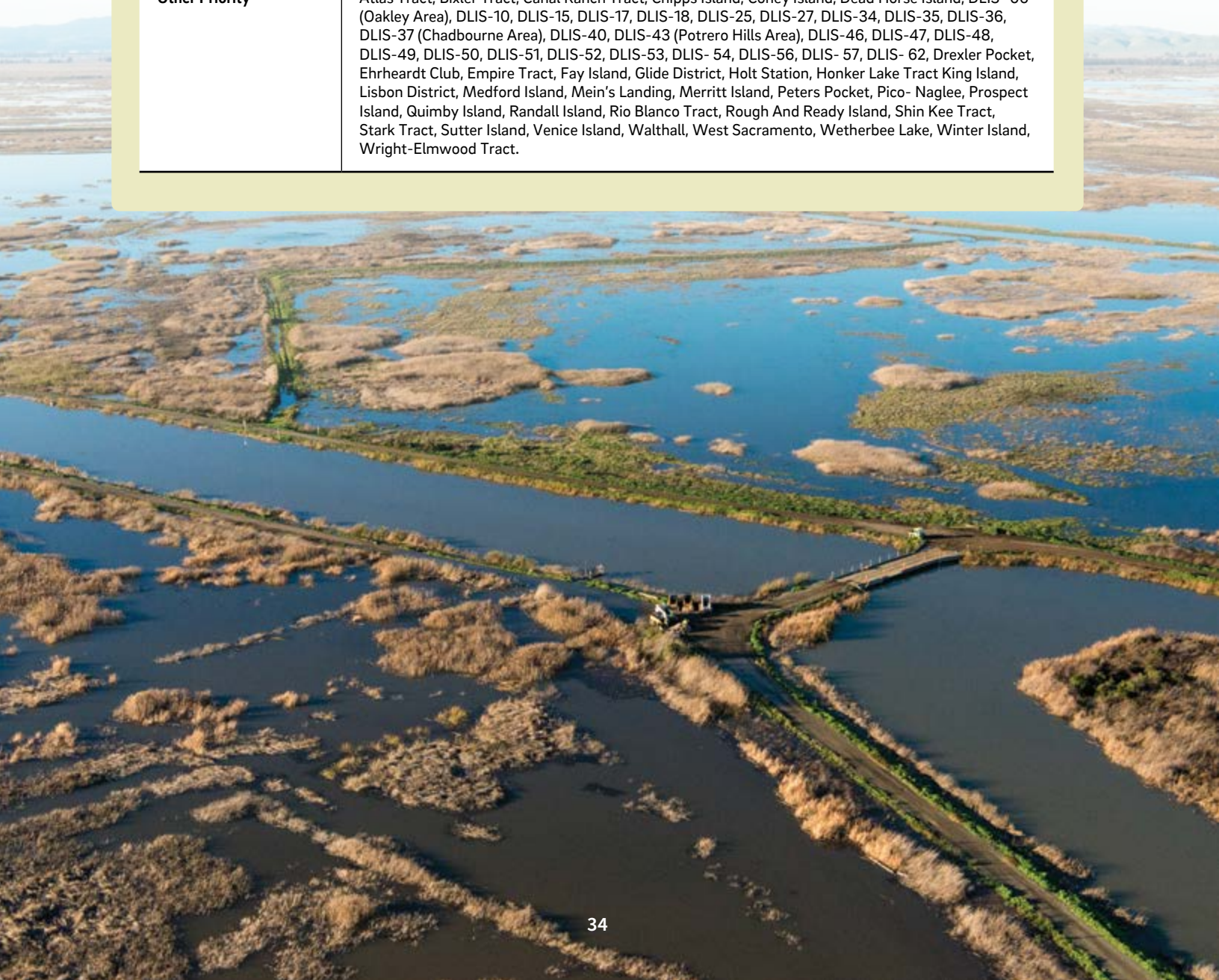
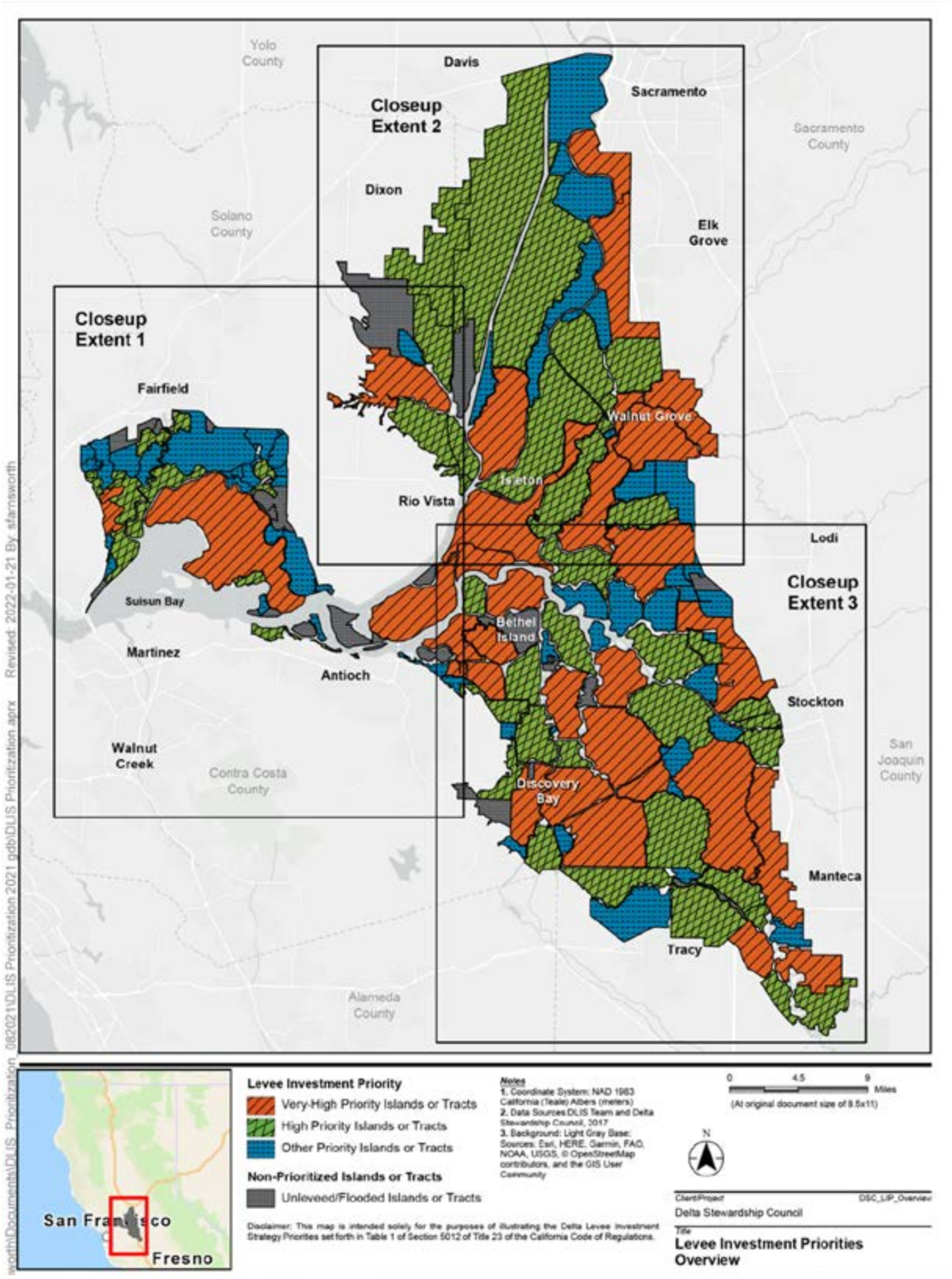
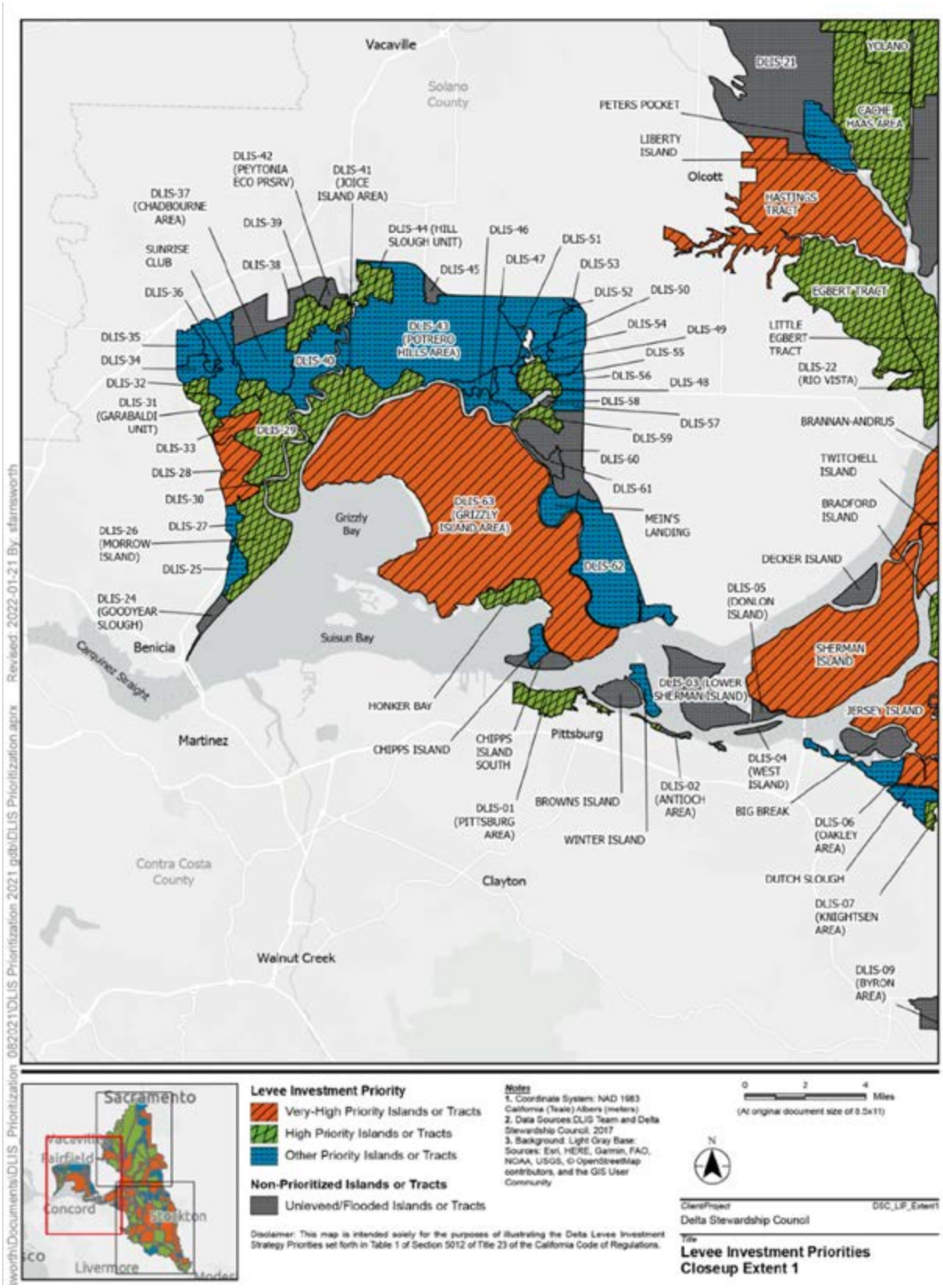


Figure 7-9 | Delta Levees Investment Priorities




Vacaville
Solano County
DLIS-21
YOLANO
PETERS POCKET
CACHE HAAS AREA
LIBERTY ISLAND
Olcott
HASTINGS TRACT
EGBERT TRACT
LITTLE EGBERT TRACT
DLIS-22 (RIO VISTA)
BRANNAN-ANDRUS
TWITCHELL ISLAND
BRADFORD ISLAND
DECKER ISLAND
DLIS-05 (DONLON ISLAND)
SHERMAN ISLAND
DLIS-03 (LOWER SHERMAN ISLAND)
JERSEY ISLAND
DLIS-04 (WEST ISLAND)
BIG BREAK
DLIS-06 (OAKLEY AREA)
DUTCH SLOUGH
DLIS-07 (KNIGHTSEN AREA)
DLIS-09 (BYRON AREA)
DLIS-02 (ANTIOCH AREA)
BROWNS ISLAND
WINTER ISLAND
DLIS-01 (PITTSBURG AREA)
CHIPPS ISLAND SOUTH
CHIPPS ISLAND
HONKER BAY
Pittsburg
Martinez
Benicia
Carquinez Straight
Suisun Bay
Grizzly Bay
MEIN'S LANDING
DLIS-62
DLIS-63 (GRIZZLY ISLAND AREA)
DLIS-61
DLIS-60
DLIS-59
DLIS-57
DLIS-58
DLIS-48
DLIS-55
DLIS-54
DLIS-49
DLIS-50
DLIS-52
DLIS-53
DLIS-51
DLIS-47
DLIS-46
DLIS-45
DLIS-44 (HILL SLOUGH UNIT)
DLIS-43 (POTRERO HILLS AREA)
DLIS-40
DLIS-42 (PEYTONIA ECO PRSRV)
DLIS-41 (JOICE ISLAND AREA)
DLIS-39
DLIS-38
DLIS-37 (CHADBOURNE AREA)
SUNRISE CLUB
DLIS-36
DLIS-35
DLIS-34
DLIS-32
DLIS-31 (GARABALDI UNIT)
DLIS-29
DLIS-33
DLIS-28
DLIS-30
DLIS-27
DLIS-26 (MORROW ISLAND)
DLIS-25
DLIS-24 (GOODYEAR SLOUGH)
Contra Costa County
Clayton
Walnut Creek
Sacramento
Fairfield
Concord
Stockton
Livermore
Levee Investment Priority
Very-High Priority Islands or Tracts
High Priority Islands or Tracts
Other Priority Islands or Tracts
Non-Prioritized Islands or Tracts
Unleveed/Flooded Islands or Tracts
Notes
1. Coordinate System: NAD 1983 California (Teale) Albers (meters)
2. Data Sources:DLIS Team and Delta Stewardship Council, 2017
3. Background: Light Gray Base: Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
Disclaimer: This map is intended solely for the purposes of illustrating the Delta Levee Investment Strategy Priorities set forth in Table 1 of Section 5012 of Title 23 of the California Code of Regulations.
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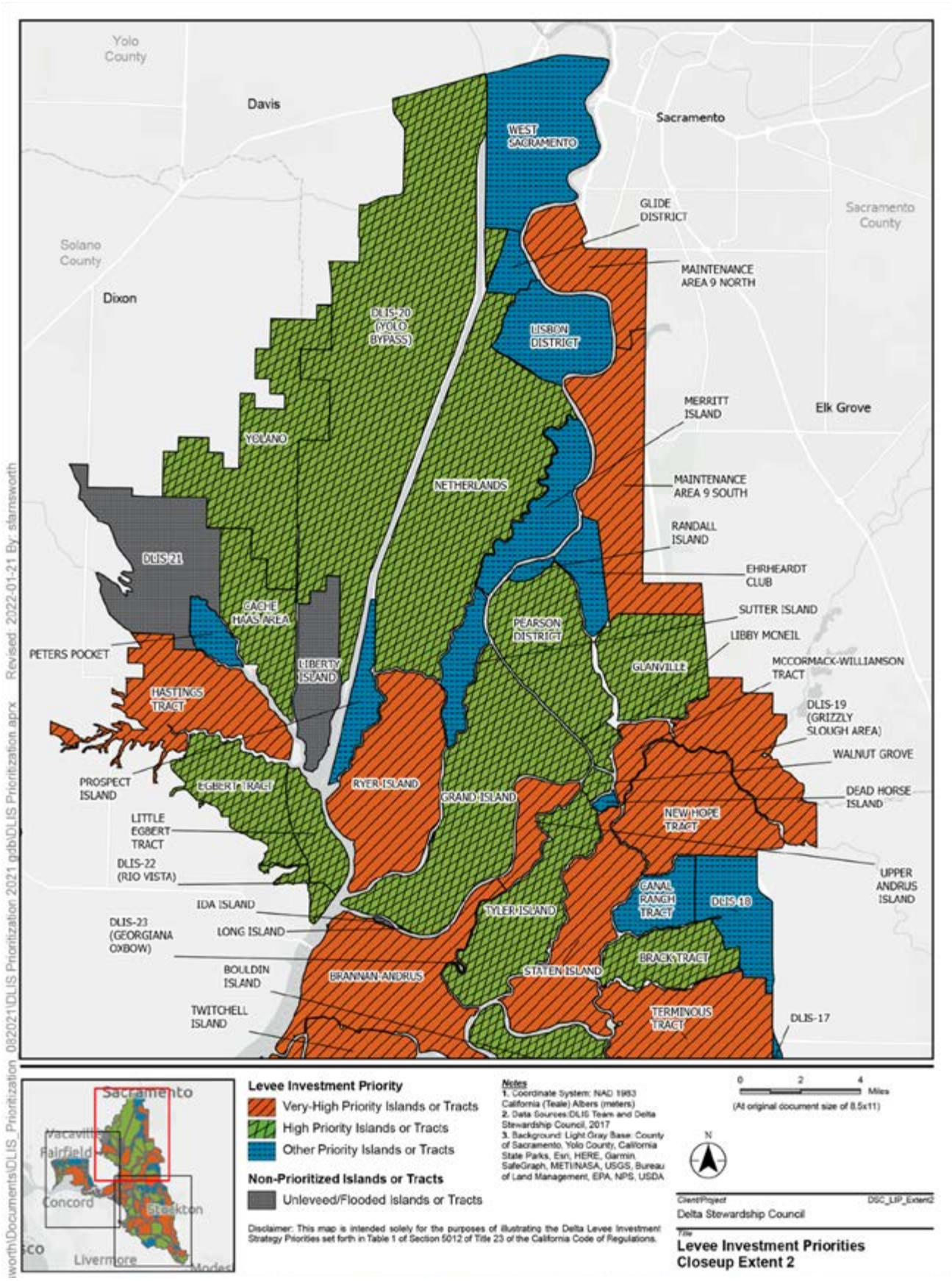
Yolo County
Davis
Sacramento
WEST SACRAMENTO
GLIDE DISTRICT
Sacramento County
Solano County
MAINTENANCE AREA 9 NORTH
Dixon
DLIS-20 (YOLO BYPASS)
LISBON DISTRICT
MERRITT ISLAND
Elk Grove
YOLANO
NETHERLANDS
MAINTENANCE AREA 9 SOUTH
RANDALL ISLAND
DLIS-21
EHRHEARDT CLUB
CACHE HAAS AREA
SUTTER ISLAND
PEARSON DISTRICT
LIBBY MCNEIL
PETERS POCKET
LIBERTY ISLAND
GLANVILLE
MCCORMACK-WILLIAMSON TRACT
HASTINGS TRACT
DLIS-19 (GRIZZLY SLOUGH AREA)
WALNUT GROVE
PROSPECT ISLAND
EGBERT TRACT
RYER ISLAND
GRAND ISLAND
DEAD HORSE ISLAND
NEW HOPE TRACT
LITTLE EGBERT TRACT
DLIS-22 (RIO VISTA)
UPPER ANDRUS ISLAND
CANAL RANCH TRACT
DLIS 18
IDA ISLAND
TYLER ISLAND
DLIS-23 (GEORGIANA OXBOW)
LONG ISLAND
BRACK TRACT
BOULDIN ISLAND
BRANNAN ANDRUS
STATEN ISLAND
TERMINOUS TRACT
TWITCHELL ISLAND
DLIS-17
Sacramento
Vacaville
Fairfield
Concord
Stockton
Livermore
Modesto
Levee Investment Priority
Very-High Priority Islands or Tracts
High Priority Islands or Tracts
Other Priority Islands or Tracts
Non-Prioritized Islands or Tracts
Unleveed/Flooded Islands or Tracts
Notes
1. Coordinate System: NAD 1983 California (Teale) Albers (meters)
2. Data Sources:DLIS Team and Delta Stewardship Council, 2017
3. Background: Light Gray Base: County of Sacramento, Yolo County, California State Parks, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA
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Disclaimer: This map is intended solely for the purposes of illustrating the Delta Levee Investment Strategy Priorities set forth in Table 1 of Section 5012 of Title 23 of the California Code of Regulations.
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Title
Levee Investment Priorities
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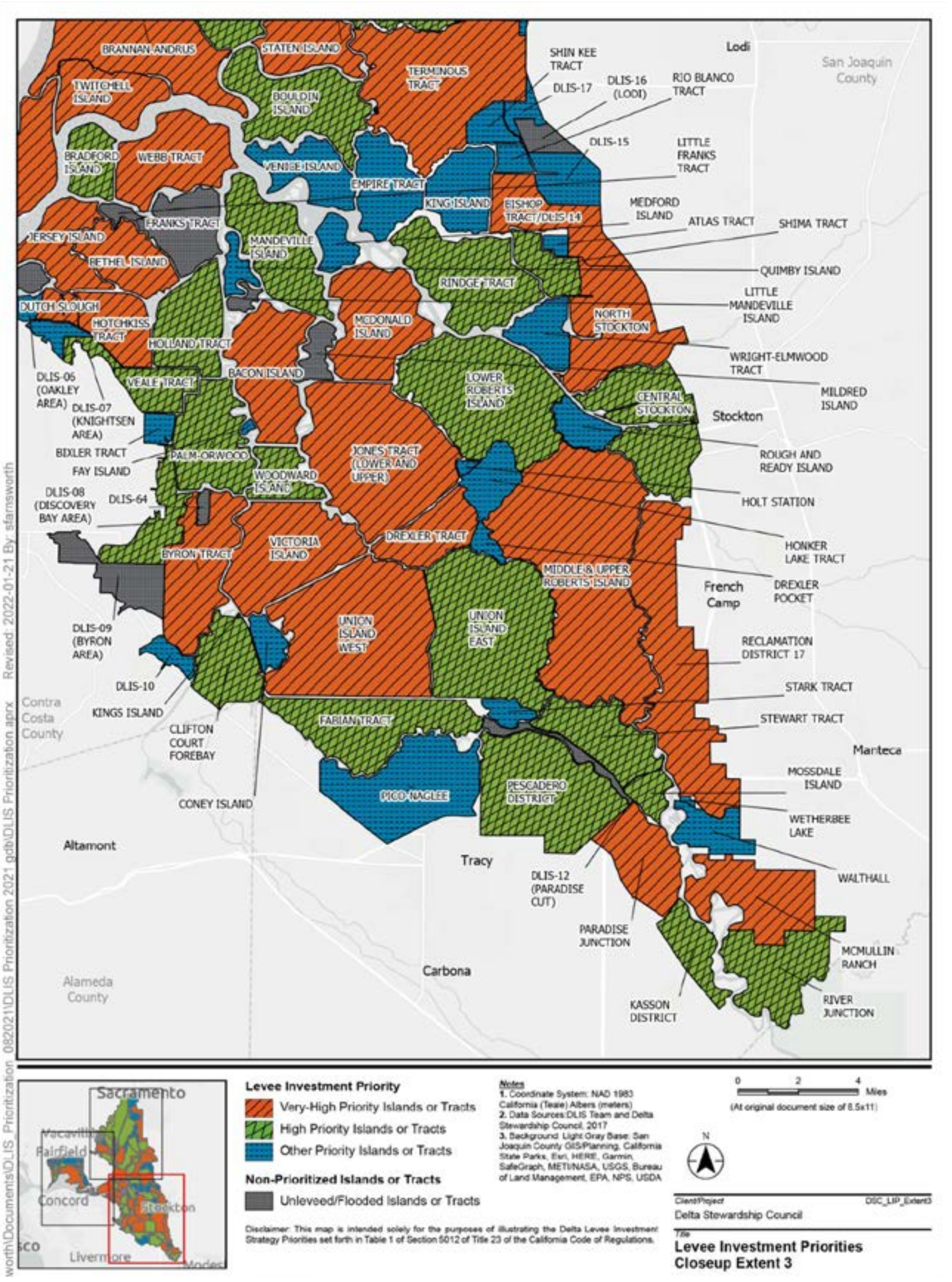
BRANNAN-ANDRUS
STATEN ISLAND
TERMINOUS TRACT
SHIN KEE TRACT
DLIS-17
DLIS-16 (LODI)
RIO BLANCO TRACT
Lodi
San Joaquin County
TWITCHELL ISLAND
BOULDIN ISLAND
DLIS-15
LITTLE FRANKS TRACT
BRADFORD ISLAND
WEBB TRACT
VENICE ISLAND
EMPIRE TRACT
KING ISLAND
BISHOP TRACT/DLIS 14
MEDFORD ISLAND
ATLAS TRACT
SHIMA TRACT
FRANKS TRACT
JERSEY ISLAND
MANDEVILLE ISLAND
RETHEL ISLAND
QUIMBY ISLAND
RINDGE TRACT
LITTLE MANDEVILLE ISLAND
DUTCH SLOUGH
HOTCHKISS TRACT
MCDONALD ISLAND
NORTH STOCKTON
HOLLAND TRACT
WRIGHT-ELMWOOD TRACT
DLIS-06 (OAKLEY AREA)
VEALE TRACT
BACON ISLAND
LOWER ROBERTS ISLAND
MILDRED ISLAND
CENTRAL STOCKTON
Stockton
DLIS-07 (KNIGHTSEN AREA)
BIXLER TRACT
PALM-ORWOOD
JONES TRACT (LOWER AND UPPER)
ROUGH AND READY ISLAND
FAY ISLAND
WOODWARD ISLAND
DLIS-08 (DISCOVERY BAY AREA)
DLIS-64
HOLT STATION
VICTORIA ISLAND
DREXLER TRACT
HONKER LAKE TRACT
BYRON TRACT
MIDDLE & UPPER ROBERTS ISLAND
French Camp
DREXLER POCKET
DLIS-09 (BYRON AREA)
UNION ISLAND WEST
UNION ISLAND EAST
RECLAMATION DISTRICT 17
DLIS-10
STARK TRACT
Contra Costa County
KINGS ISLAND
FABIAN TRACT
STEWART TRACT
CLIFTON COURT FOREBAY
Manteca
MOSSDALE ISLAND
PESCADERO DISTRICT
PICO-NAGLEE
CONEY ISLAND
WETHERBEE LAKE
Altamont
Tracy
DLIS-12 (PARADISE CUT)
WALTHALL
PARADISE JUNCTION
MCMULLIN RANCH
Carbona
Alameda County
KASSON DISTRICT
RIVER JUNCTION
Sacramento
Vacaville
Fairfield
Concord
Stockton
Livermore
Levee Investment Priority
Very-High Priority Islands or Tracts
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3. Background: Light Gray Base: San Joaquin County GIS/Planning, California State Parks, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA
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Disclaimer: This map is intended solely for the purposes of illustrating the Delta Levee Investment Strategy Priorities set forth in Table 1 of Section 5012 of Title 23 of the California Code of Regulations.
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UPDATE FLOOD MANAGEMENT FUNDING STRATEGIES

The responsibility for securing funding for Delta levee maintenance, repairs, and improvements lies with the numerous local levee-maintaining agencies (primarily reclamation districts). These local agencies have varying ability to pay which is influenced by the value of land within the district that can be assessed and the desires of the district's voters, who are usually property owners. Funding is generated through property assessments of local landowners and also is provided by the State under programs administered by DWR, including the Delta Levees Special Flood Control Projects and Delta Levees Maintenance Subventions programs. Federal investments match State and local funds to improve project levees that protect urban and urbanizing areas. The record of declining flooding damage and testimony to the Council reflect these programs' value. These programs should be continued with adequate funding to provide State matching funds for addressing Delta flood risk.

Many other entities that benefit from flood risk management are not assessed, nor do they contribute to maintenance and upkeep of Delta levees, including owners of regional infrastructure that crosses the Delta. The duty of providing for Delta flood risk management should be borne by all entities benefitting from these actions, and an equitable methodology of defining and apportioning assessments should be developed and implemented.

PROBLEM STATEMENT

Currently available funds are insufficient to meet needs for levee maintenance and improvement in the Delta. Further funds are needed. Additional funding strategies need to be fully evaluated. No mechanism exists for ensuring that costs of levee maintenance are borne by all beneficiaries. Current financing emphasize levee maintenance and improvement, rather than a full array of flood risk reduction measures.

POLICIES

No policies with regulatory effect are included in this section.

RECOMMENDATIONS

RR R3. Provide Adequate State Funds to Support Levee Maintenance and Improvement

Adequate State funds to support levee maintenance and improvement should continue to be provided through the Delta Levees Maintenance Subventions Program, the Delta Levee Special Projects Program, and through programs that implement the Central Valley Flood Protection Plan.

RR R4. Update Delta Levees Maintenance Subvention Program's Cost-sharing Provisions

a. **75 percent State cost share.** The Delta Levees Maintenance Subvention Program's maximum 75 percent State cost share for maintenance and major rehabilitation projects should be extended indefinitely.

b. **Update the Delta Levees Maintenance Subventions Program Deductible Provision.** The Legislature should amend the Water Code section 12986(a)-(b) to adjust the current $1,000 per mile deductible amount to account for inflation since the provision was enacted in 1981. The deductible amount should be reevaluated periodically to reflect current inflation and the needs of the program and its participants.

c. **Simplify Consideration of Local Levee Maintaining Agencies' Ability to Pay for Levee Maintenance and Improvement.** The Central Valley Flood Protection Board should revise its guidelines for the Delta Levees Maintenance Subventions Program to provide a simplified approach to the consideration of a local levee agency's ability to pay for the cost of levee maintenance or improvement, as required by Water Code section 12986(a)(3), so that reclamation districts with little ability to pay receive the full 75 percent State cost share recommended above, with reduced State cost shares for reclamation districts that are able to pay more to maintain and improve their levees.

RR R5. Finance Local Flood Management Activities

The Council, DWR, CVFPB, and the DPC, in consultation with the Corps of Engineers and the Department of Finance, should cooperate to further develop levee finance mechanisms, including those studied by the DPC, that create opportunities for "beneficiary pays"-based

funding approaches that supplement State-funding for levee maintenance and improvements. Because no single financial mechanism can meet the requirements of a beneficiary-pays approach to address the full range of beneficiaries and financing needs, a portfolio of mechanisms targeted to particular levee improvements should be evaluated. These mechanisms could include assessments, public funding, water use fees, water conveyance fees, and flood prevention fees.

RR R6. New State Funding for Non-structural Risk Reduction

A hazard mitigation program, funded by the State, should be established to make grants to local governments and flood management agencies to support emergency preparedness actions, such as evacuation planning or prepositioning of flood fight materials, and non-structural flood hazard mitigation actions, such as floodproofing of public or private buildings or the purchase and removal of floodprone structures.

RR R7. Fund Actions to Protect Infrastructure from Flooding and Other Natural Disasters

- The California Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The California Public Utilities Commission, in consultation with the Delta Stewardship Council, the California Department of Water Resources, and the Delta Protection Commission, should allocate these funds among State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency.
- The California Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, to minimize the impact on the State's economy.
- CalTrans should be given authority by the Legislature to enter into agreements with local levee maintaining agencies to fund improvement and maintenance of levees adjoining interstates and State highways when that is the least cost approach to reducing flood risks to those roads.
- State agencies with projects or infrastructure in the Delta should set aside a reasonable amount of funding to pay for flood protection and disaster prevention.

MANAGE RURAL FLOODPLAINS TO AVOID INCREASED FLOOD RISK

To reduce the risk to lives, property, and State interests in the Delta, additional standards are needed to address new residential development. Sea level rise, subsidence, and new residential development combine to potentially put many more lives at risk. The policies in this section are designed to reduce risk while preserving the Delta's unique character and agricultural way of life. These policies should be construed as those required to provide the minimum level of flood protection, and should not be viewed as encouraging development in floodprone Delta areas. Flood insurance, and awareness of local emergency preparedness and response policies is strongly encouraged for all who live in floodprone areas of the Delta.

Consistent with existing law, urban development in the Primary Zone should remain prohibited. Urban development in the Secondary Zone should be confined to existing urban spheres of influence where the 200-year design standard will be fully implemented by 2025. The 2007 flood risk management legislation (SB 5) contained provisions affecting city and county responsibilities relating to local planning requirements, such as general plans, development agreements, zoning ordinances, tentative maps, and other actions (Government Code sections 65865.5, 65962, and 66474.5).

Future land use decisions should not permit or encourage construction of significant numbers of new residences in the non-urban Delta. For the legacy communities in the Delta, structures developed in these areas are required to meet the legal standard of a 100-year minimum level of flood protection. However, developing and maintaining adequate flood protection remains difficult.

PROBLEM STATEMENT

Continued residential development without adequate flood protection increases risk to lives, property, and State interests in the Delta. Flood risks are expected to grow in light of anticipated climate change effects related to peak flows and sea level rise.

POLICIES

The appendices referred to in the policy language below are included in Appendix B of the Delta Plan.

RR P2. Require Flood Protection for Residential Development in Rural Areas

a) New residential development of five or more parcels shall be protected through floodproofing to a level 12 inches above the 100-year base flood elevation, plus sufficient additional elevation to protect against a 55-inch rise in sea level at the Golden Gate, unless the development is located within:

   1) Areas that city or county general plans, as of May 16, 2013, designate for development in cities or their spheres of influence;

   2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except Bethel Island;

   3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or

   4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove, as shown in Appendix 7.

b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves new residential development of five or more parcels that is not located within the areas described in subsection (a).

23 CCR Section 5013
Note: Authority cited: Section 85210(i), Water Code. Reference: Sections 85020, 85300, 85305, and 85306, Water Code.

RECOMMENDATION:

RR R8. Maintain Lower Risk Uses of Floodprone Rural Lands

Agricultural and natural resource land uses and recreational marinas, resorts, or parks are the most appropriate uses for floodprone rural lands and should be maintained, consistent with the regulatory policy Locate New Development Wisely (DP P1).

PROTECT AND EXPAND FLOODWAYS, FLOODPLAINS, AND BYPASSES

Local land use policies guiding development in floodways are not consistent across Delta counties. Floodways have not been established for many of the channels in the Delta by FEMA or by the CVFPB. In light of these inconsistencies, the Delta Plan addresses these issues and highlights the need for the protection of floodplains and floodways consistent with improved flood protection. Over the next 100 years, Delta floodways may expand and deepen because of sea level rise and changing precipitation patterns. Development in existing or potential future designated floodplain or bypass locations in the Delta or upstream of the Delta can permanently eliminate the availability of these areas for future floodplain usage. It is important to identify floodplain areas now for immediate protection and eventual integration into the flood protection system.

PROBLEM STATEMENT

The carrying capacity of the existing flood control system is diminished by encroachments into floodways, critical floodplains, and existing floodplain or bypass locations in the Delta. Local land use policies guiding development in floodways are not consistent across Delta counties. The existing system is already at suboptimal capacity. Expected changes in sea level rise and runoff patterns due to climate change are expected to exacerbate the problem.

POLICIES

RR P3. Protect Floodways

a) No encroachment shall be allowed or constructed in a floodway, unless it can be demonstrated by appropriate analysis that the encroachment will not unduly impede the free flow of water in the floodway or jeopardize public safety.

b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy

covers a proposed action that would encroach in a floodway that is not either a designated floodway or regulated stream.

23 CCR Section 5014
Note: Authority cited: Section 85210(i), Water Code. Reference: Sections 85020, 85300, 85302, and 85305, Water Code.

RR P4. Floodplain Protection

a) No encroachment shall be allowed or constructed in any of the following floodplains unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant adverse impact on floodplain values and functions:

   1) The Yolo Bypass within the Delta;

   2) The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the California Department of Water Resources or the U.S. Army Corps of Engineers (California Department of Water Resources 2010); and

   3) The Lower San Joaquin River Floodplain Bypass area, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the California Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, Reclamation District 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.

b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in any of the floodplain areas described in subsection (a).

c) This policy is not intended to exempt any activities in any of the areas described in subsection (a) from applicable regulations and requirements of the Central Valley Flood Protection Board.

23 CCR Section 5015
Note: Authority cited: Section 85210(i), Water Code. Reference: Sections 85020, 85300, 85302, and 85305, Water Code.

RECOMMENDATION:

RR R9. Fund and Implement San Joaquin River Flood Bypass

The Legislature should fund the California Department of Water Resources and the Central Valley Flood Protection Board to evaluate and implement a bypass and floodway on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstream San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c).

RR R10. Continue Delta Dredging Studies

The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the Delta Dredged Sediment Long-Term Management Strategy (USACE 2007, Appendix K), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta for maintenance purposes, or that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals. Coordinated use of dredged material in levee improvement, subsidence reversal, or wetland restoration is encouraged.

RR R11. Designate Additional Floodways

The Central Valley Flood Protection Board should evaluate whether additional areas both within and upstream of the Delta should be designated as floodways. These efforts should consider the anticipated effects of climate change in its evaluation of these areas.

INTEGRATE DELTA LEVEES AND ECOSYSTEM FUNCTION

Setback levees can provide additional levee system stability, more complex land-water interface structure, and shaded riverine aquatic habitat that benefit ecosystem function in appropriate settings. They can also provide flood control benefits in those areas of the Delta not subject to strong tidal influences where channel capacity improvements can actually increase flood-carrying capacity. Not all locations are amenable or useful for setback levee placement. Each site should be investigated for its potential to provide ecological benefits consistent with levee integrity.

PROBLEM STATEMENT

POLICIES AND RECOMMENDATIONS

An updated problem Statement, policies and recommendations regarding the integration of Delta levees and habitat functions will be considered as part of an amendment to the Delta Plan's Ecosystem Restoration chapter.

Renew Federal Assistance for Post-disaster Response

Federal agencies have been essential partners in recovering from prior Delta floods. Changes in these federal programs have reduced confidence about these agencies' assistance in recovering from future floods.

PROBLEM STATEMENT

The loss of federal assurances of assistance in post-flood disaster response hinders planning and may result in significant loss of Delta property and resources.

RR R12. Renew Federal Assistance for Post-disaster Response

The Council, Office of Emergency Services, DWR, Central Valley Flood Protection Board, and Delta Protection Commission should advocate for reforms of the Federal Emergency Management Agency's rehabilitation assistance program, including a renewed hazard mitigation program for Delta levees, and the Army Corps of Engineer's Rehabilitation and Inspection Program (PL 84-99) to account for the economic value of the Delta's water supplies and transportation services and for the State's commitments to reducing Delta flood risk and improving Delta levees.

To facilitate this consideration, priority should be given to research to quantify the economic value of reliable water supplies and transportation services protected by the Delta's levees, including consideration of the levees' contributions to the protection of water quality, water supply infrastructure, and the conveyance of water for export through levee-lined channels.

LIMIT STATE LIABILITY

The Delta Reform Act requires that the Delta Plan attempt to reduce risks to people, property, and State interests in the Delta by, among other things, recommending priorities for State investments in levee operation, maintenance, and improvements in the Delta, including project and non-project levees (Water Code sections 85305, 85306, and 85307). The law expressly states that these provisions do not affect the liability of the State for flood protection in the Delta or its watershed (Water Code section 85032(j)).

Consequently, no action taken by a State agency as required or recommended by, or otherwise in furtherance of, this Delta Plan shall affect State flood protection liability in the Delta or its watershed. Therefore, the Legislature should consider requiring an adequate level of flood insurance for residences, businesses, and industries in floodprone areas.

PROBLEM STATEMENT

As the risks of levee failure and corresponding damage increase, California courts have generally exposed public agencies and the State, specifically, to significant financial liability for flood damages. DWR's 2005 white paper recommends one way that the State should reduce its liability is to require houses and businesses to have flood insurance (DWR 2005).

POLICIES

No policies with regulatory effect are included in this section.

RECOMMENDATIONS

RR R13. Require Flood Insurance

The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in floodprone areas.

RR R14. Improve Delta Communities' National Flood Insurance Program Community Rating System (CRS) Program Rankings

Delta communities should improve their current National Flood Insurance Program Community Rating System (CRS) ranking through the implementation of risk reduction management practices, when feasible, in order to receive additional discounts on flood insurance premium rates.

RR R15. Limit State Liability

The Legislature should consider statutory and/or constitutional changes that would address the State's potential flood liability, including giving State agencies the same level of immunity with regard to flood liability as federal agencies have under federal law.

RR R16. Provide Public Access on Appropriately-located Delta Levees

When using state funding to improve levees in the Delta that border urban areas, unincorporated towns, publicly-owned nature areas, or other public lands or that intersect with state highways, the levee designs and associated land purchases should consider public access, including but not limited to bank fishing, nature observation, or pedestrian and bicycling trails. When agencies make decisions about funding levee improvements they should identify the types of public access or recreation that may be feasible at the levee and explain how they have considered those opportunities in their decision.

ISSUES FOR FUTURE EVALUATION AND COORDINATION

The following list of issues should be considered in future updates of the Delta Plan. These and other issues will need to be considered as additional information and materials become available. The various activities called for in this Delta Plan, as well as issues that arise from other planning efforts, such as the Central Valley Flood Protection Plan, will be considered. Additional areas of interest and concern related to flood risk in the Delta may deserve consideration in the development of future Delta Plan updates, including:

- **Reoperation of Upstream Reservoirs and Peak Flow Attenuation:** *Reservoir operations upstream of the Delta can have substantial impacts on flood flows through the Delta; therefore, operation procedures among government agencies should be well coordinated and, where possible, focused more on flexibility to prevent flooding in the Delta. Water Code section 85309 directs DWR to develop a proposal to coordinate flood and water supply operations with appropriate State and federal agencies, and this shall be considered by the Council for future inclusion in the Delta Plan.*
- **Post-disaster Recovery:** *Future reviews of this chapter should more thoroughly consider post-disaster flood responses, including whether not reclaiming some flooded islands could provide ecological benefits that might outweigh the advantages of recovering and dewatering the islands.*
- **Utility Corridor Consolidation:** *An attempt to consolidate infrastructure into "utility corridors" as facilities are added and upgraded over time should be further investigated to determine whether this can allow for better management of flood risk consequences to these critical assets.*
- **Strategies to Accommodate To Climate Change and Rising Sea Levels:** *The Council should continue to (a) participate in the Natural Resources Agency's Climate Action Team and adapt to changing estimates of sea level rise when they become available and (b) consult with Caltrans regarding the potential effects of climate change and sea level rise on the three state highways that cross the Delta (Water Code section 85307(c)). Opportunities to assist local Delta agencies in assessing their vulnerability to rising sea levels should be explored.*

- **Governance.** *Because the number and diversity of agencies involved in levee maintenance, improvement, and oversight complicates coordination and effective management of the Delta's levee network, opportunities to improve governance should be explored. This could include reorganization of State agencies' oversight responsibilities in fewer agencies. Opportunities for joint powers agencies or other consolidations of reclamation districts or other local levee maintaining agencies should also be considered.*

SCIENCE AND INFORMATION NEEDS

The Delta system and its influencing factors are not static. The analysis and data gathered to support the Delta Levees Investment Strategy provided an updated foundation of information regarding risk of levee failure in the Sacramento-San Joaquin Delta and the impacts to State interests. However, newer data are always being developed and methods of analyzing it or estimating impacts can always be improved; therefore, research is needed to better understand dynamic issues such as climate change, seismicity, sea level rise, subsidence, and other areas. Continuing investigations into the science, engineering, and economic aspects of the Delta are critical to adaptively managing for expected and unexpected changes, and can provide decision makers and stakeholders with key information for future planning and decision making. Specifically, additional information will be needed in the following areas:

- *Levee conditions, including their geometry and structural makeup, in order to provide better estimates probability of failure.*
- *Updates of information about the population protected by Delta levees, coordinated with periodic censuses, and about Delta assets such as land use, property value and infrastructure as data becomes available.*
- *Possible levee failures' potential to (a) impair water quality and disrupt water supplies, including supplies for in-Delta users and regional suppliers in addition to the SWP and CVP and (b) damage neighboring islands.*
- *Interactions between Delta levees and ecosystem function, including the impacts of levee failures on important Delta ecosystems.*
- *Improved forecasts of sea level rise and other climate change impacts on flood risk, and incorporation into risk reduction criteria.*
- *Effects of seismicity on levee integrity, including expanded observations of Delta ground motions, improved estimates of geologically recent displacement on faults beneath the Delta, and further identification of liquefiable materials and mechanisms beneath levees.*
- *Updated flood stage-probability functions.*
- *Understanding the impacts on floodplain ecosystems and Delta flood management from upstream flood management infrastructure operations, including reservoir operations.*
- *Technologies for assessing levee integrity.*

Efforts to address these needs and others that arise during Delta Plan implementation should be undertaken in a systematic fashion so that information developed and lessons learned can be incorporated into future Delta Plan updates.

PERFORMANCE MEASURES

Final administrative performance measures are listed in Appendix E.

References

- Arcadis. 2016 A. Comparison of PL 84-99 Analyses Delta Levees Investment Strategy (DLIS). Technical memorandum prepared for the Delta Stewardship Council. Sacramento, CA.
- Arcadis. 2016 B. Delta Levees Investment Strategy Risk Analysis Methodology. Technical memorandum prepared for the Delta Stewardship Council. Sacramento, CA.
- Arcadis. 2017. Reclamation District Ability to Pay (ATP) Analysis. Technical memorandum prepared for the Delta Stewardship Council. Sacramento, CA.
- CALFED Bay-Delta Program. 2000. Levee System Integrity Program Plan.
- California Climate Action Team. 2010. *State of California Sea-Level Rise Interim Guidance Document*. Developed by the Sea-Level Rise Task Force of the Coastal and Ocean Working Group, with science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust. October.
- Cal EMA (California Emergency Management Agency). 2009. *SEMS Guidelines: Standard Emergency Management System.* November.
- Cal EMA and FEMA (California Emergency Management Agency and Federal Emergency Management Agency). 2010. Memorandum of Understanding Regarding Criteria for Public Assistance Eligibility for Reclamation Districts in the Sacramento/San Joaquin Legal Delta. February.
- California Ocean Protection Council. 2011. Resolution of the California Ocean Protection Council on Sea-Level Rise. Adopted March 11.
- Central Valley Flood Protection Board. 2016. Delta Levees Subvention Program Guidelines. Sacramento, CA.
- City of Benicia. 2003. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from City of Benicia Land Use map in 2012.
- City of Fairfield. 2008. General Plan land use designations within Suisun Marsh. Received from the City of Fairfield in 2012.

- City of Lathrop. 2012. General Plan Land Use map for the City of Lathrop. October.
- City of Manteca. 2012. General Plan land use designations in GIS format. Received by Eryn Pimentel, AECOM, from Jeffrey Davis, City of Manteca, on September 4.
- City of Rio Vista. 2001. General Plan land use designations in electronic non-GIS format.
- City of Sacramento. 2008. General Plan land use designations in electronic GIS format.
- City of Stockton. 2011a. GIS layers for city spheres of influence.
- City of Stockton. 2011b. General Plan land use designations in GIS format and General Plan land use designations within Suisun Marsh (digitized into GIS format by AECOM from Land Use map in 2012).
- City of Suisun City. 2011. General Plan land use designations within Suisun Marsh. Digitized into GIS format by AECOM from Land Use map in 2012.
- City of Tracy. 2011a. General Plan land use designations provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.
- City of Tracy. 2011b. City of Tracy SOI provided in GIS format. Delivered via file transfer protocol from Victoria Lombardo, Senior Planner, City of Tracy, to Jessica Law, Urban and Environmental Planner, AECOM, on March 10, 2011.
- City of West Sacramento. 2010. General Plan land use designations in GIS format.
- Committee on Increasing National Resilience to Hazards and Disasters. 2012. Disaster Resilience: A National Perspective. National Academies Press, Washington, D.C.
- Committee on Integrating Dam and Levee Safety and Community Resilience. 2012. Dam and Levee Safety and Community Resilience—A Vision for Future Practice. National Academies Press, Washington D.C.

- Contra Costa County. 2008. GIS layer for Urban Limit Line for Contra Costa County. October.
- Contra Costa County. 2010. GIS layer for City Spheres of Influence in Contra Costa County. January.
- Davenport, D., Austin, D. Duryea, J., Huang, D., and Livsey, D. 2016. Improving Habitats along Delta Levees: A Review of Past Projects and Recommended Next Steps. Delta Stewardship Council, Sacramento, CA.
- Delta Independent Science Board. 2016. Workshop report—Earthquakes and High Water as Levee Hazards in the Sacramento-San Joaquin Delta.
- Delta Stewardship Council Staff. 2010a. Flood Risk White Paper. October 18.
- Delta Stewardship Council Staff. 2010b. Emergency Preparedness and Response White Paper. November 10.
- Delta Stewardship Council. 2013. Delta Plan.
- Delta Stewardship Council. 2015. Delta Flood Management Investment Strategy Principles.
- Delta Stewardship Council. 2015. Delta Reclamation District Financing and Budgets.
- Delta Vision Blue Ribbon Task Force. 2008. Delta Vision Strategic Plan. Sacramento, CA. October.
- Dennis, B. and Mooney, C. 2016. Scientists nearly double sea level rise projections for 2100, because of Antarctica. Washington Post. March 30 2016.
- Deverel, S. and Leighton, D. 2010. Historic, Recent, and Future Subsidence, Sacramento-San Joaquin Delta, California, USA. San Francisco Estuary and Watershed Science. August.
- Deverel, S.J., Lucero C., and Bachand, S. 2015. Evolution of Arability and Land Use, Sacramento–San Joaquin Delta, California. San Francisco Estuary and Watershed Science 13(2) 1-34.
- Deverel, S.J., Bachand, S., Brandenberg, S.J., Jones, C. E., Stewart, J.P., and Zimmaro, P. 2016. Factors and Processes Affecting Delta Levee Vulnerability. San Francisco Estuary and Watershed Science 14(4).
- DPC (Delta Protection Commission). 2012. Economic Sustainability Plan for the Sacramento-San Joaquin Delta. January 19.
- DPC (Delta Protection Commission). 2010. Land Use and Resource Management Plan for the Primary Zone of the Delta. Adopted February 25.
- DWR (California Department of Water Resources). 1973. Bulletin 69-72. California High Water 1971–72.
- DWR (California Department of Water Resources). 1980. Seismicity hazards in the Sacramento-San Joaquin Delta. Central District. C-105124. October.
- DWR (California Department of Water Resources). 1983. Flood Hazard Mitigation Plan for the Sacramento-San Joaquin Delta. Sacramento, CA.
- DWR (California Department of Water Resources). 2005. Flood Warnings: Responding to California's Flood Crisis. White paper.
- DWR (California Department of Water Resources). 2008a. Draft FloodSAFE Strategic Plan. May 28.
- DWR (California Department of Water Resources). 2008b. Delta Risk Management Strategy (DRMS) 30 Phase 1, Risk Analysis Report, Final. Prepared by URS Corporation/Jack R. Benjamin & 31 Associates, Inc. Prepared for DWR, USACE, and California Department of Fish and Game. December.
- DWR (California Department of Water Resources). 2008c. Managing an Uncertain Future: Climate Change Adaptation 13 Strategies for California's Water. Sacramento, CA.
- DWR (California Department of Water Resources). 2009. Delta Risk Management Strategy Final Phase 1 Report. March.
- DWR (California Department of Water Resources). 2010. North Delta Flood Control and Ecosystem Restoration Project Final Environmental Impact Report. Sacramento, CA. October.
- DWR (California Department of Water Resources). 2011a. Delta Risk Management Strategy Phase 2 Report. June.

- DWR (California Department of Water Resources). 2011b. Draft Urban Levee Design Criteria. November 15.
- DWR (California Department of Water Resources). 2011c. Central Valley Flood Protection Plan (Public Draft). December.
- DWR (California Department of Water Resources). 2011d. Floodplain inundation and floodways in the vicinity of the Sacramento-San Joaquin Delta.
- DWR (California Department of Water Resources). 2011e. Locations and attributes of levees in California as maintained by the DWR California Levee Database.
- DWR (California Department of Water Resources). 2012. Report to Delta Stewardship Council on the Department of Water Resources' Delta Levees Program. March 15.
- DWR. 2016a. Central Valley Flood Protection Plan Conservation Strategy. November 2016.
- DWR. 2016b. Draft Central Valley Flood Protection Plan 2017 Update. December 2016.
- DWR and DFG (California Department of Water Resources and California Department of Fish and Game). 2008. A Report Pursuant to Requirements of Assembly Bill 1200. Laird. Risks and Options to Reduce Risks to Fishery and Water Supply Uses of the Sacramento/San Joaquin Delta. January.
- FEMA (Federal Emergency Management Agency). 1994. Mitigation of Flood and Erosion Damage to Residential Buildings in Coastal Areas. FEMA 257. October.
- FEMA (Federal Emergency Management Agency). 2001. Ensuring that Structures Built on Fill-In or Near Special Flood Hazard Areas Are Reasonably Safe from Flooding in Accordance with the National Flood Insurance Program. FIA-TB-10. May.
- FEMA (Federal Emergency Management Agency). 2006. National Flood Insurance Program (NFIP) Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials. Unit 3: NFIP Flood Studies and Maps. Figure 3-6.
- Galloway, G., Bolan, J., Burby, R., Groves, C., Susan Longville, Link, L., Mount, J., Opperman, J., Seed, R., Sills, G., Smyth, J., Stork, R., and Thomas, E. 2007. A California Challenge—Flooding in the Central Valley. Report to the Department of Water Resources. Sacramento, CA.
- Healey, M., and J. Mount. 2007. Delta Levees and Ecosystem Function. CALFED Bay-Delta Program.
- Jones & Stokes. 2007. Draft Environmental Impact Report North Delta Flood Control and Ecosystem Restoration Project. Volume 2-Figures. November.
- M.Cubed. 2016. Delta Flood Risk Management Assessment District Feasibility Study. Draft Report to the Delta Protection Commission, West Sacramento, CA.
- Miller, Robin. 2008. Subsidence Reversal in a Re-established Wetland in the Sacramento-San Joaquin Delta, California, USA. U.S. Geological Survey.
- Mitchell, J, Asselman, N, Bolte, J., Cutter, S., McCann, M., Michelsen, A., and Rose, K. 2015. Methodology and Scientific Basis to Support the Delta Levee Investment Strategy. Report to the Delta Stewardship Council. Sacramento, CA.
- Mount, J., and Twiss, R. 2005. Subsidence, Sea Level Rise, Seismicity in the Sacramento-San Joaquin Delta.
- Mountain House Community Services District. 2008. Mountain House Zoning map. September 18, 2008.
- MWD (Metropolitan Water District of Southern California). 2010. 6.5 Magnitude Earthquake Causing 20-Island Failure. Modeling and graphics developed by Resource Management Associates and 34 North for the Metropolitan Water District of Southern California.
- National Research Council. 2012. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future.
- National Committee on Levee Safety. 2009. Draft: Recommendations for a National Levee Safety Program. January 15.

- Natural Resources Agency 2014. Safeguarding California: Reducing Climate Risk An Update to the 2009 California Climate Adaptation Strategy.
- SACOG (Sacramento Area Council of Governments). 2009. GIS layer for Spheres of Influence in SACOG region. December.
- Sacramento County. 2011. General Plan land use designations in GIS format.
- Sacramento County. 2012. Letter from Sacramento County to the Delta Stewardship Council, Re: Revised Maps of the Unincorporated Delta Communities. November 20.
- Sacramento County. 2013. Sacramento County Online Map, Sacramento County, California.
- Sacramento River Delta Historical Society. 1996. Andrus Island. Sacramento River Delta Historical Society Newsletter. Vol. 16, No. 2. December.
- San Joaquin County. 2008a. City of Lathrop sphere of influence map. March 4.
- San Joaquin County. 2008b. City of Manteca sphere of influence map. October 29.
- Shields, F.D., and D.H. Gray. 1992. Effects of woody vegetation on sandy levee integrity. Journal of the American Water Resources Association 28:917–931.
- Solano County. 2008a. GIS layer for City Spheres of Influence in Solano County. May.
- Solano County. 2008b. General Plan land use designations provided in GIS format. Obtained 2009.
- South Delta Levee Protection and Channel Maintenance Authority. 2011. Lower San Joaquin Flood Bypass Proposal. March.
- Suddeth, Robyn, Jeff Mount, and Jay Lund. 2010. Levee Decisions and Sustainability for the Sacramento-San Joaquin Delta. San Francisco Estuary and Watershed Science, 8(2).
- URS Corporation/Jack R. Benjamin & Associates, Inc. 2011. Delta Risk Management Strategy Phase 2.
- USACE (U.S. Army Corps of Engineers). 1996. EM 1110-2-1619. Risk-based Analysis for Flood Damage Reduction Studies. August 1.
- USACE (U.S. Army Corps of Engineers). 2002. Sacramento and San Joaquin River Basins California Comprehensive Study, Interim Report. Sacramento District.
- USACE (U.S. Army Corps of Engineers). 2006. ER 1105-2-101. Risk Analysis for Flood Damage Reduction Studies. January 3.
- USACE (U.S. Army Corps of Engineers). 2007. Delta Dredged Sediment Long-Term Management Strategy (Pinole Shoal Management Area). Study Work Plan. Management Committee Review Draft. San Francisco District. May 9.
- USACE (U.S. Army Corps of Engineers). 2014. Delta Islands and Levees Feasibility Study, California Draft Feasibility Report and Environmental Impact Statement.
- USACE (U.S. Army Corps of Engineers). 2015. American River, California Common Features Project General Reevaluation Report.
- U.S. Bureau of Reclamation. 2014. Suisun Marsh Plan.
- USGS (U.S. Geological Survey). 2011. Atmospheric rivers, floods and the water resources of California. Water 3(2):445-478.
- Yolo County. 2010a. General Plan land use designations in GIS format.
- Yolo County. 2010b. Yolo County General Plan 2030 layer provided in GIS format. Delivered via file transfer protocol from Marcus Neuvert, GIS Specialist, Yolo County DITT, to Dillon Cowan, Staff Engineer, CH2M HILL, Inc., on July 1.

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Delta Stewardship Council

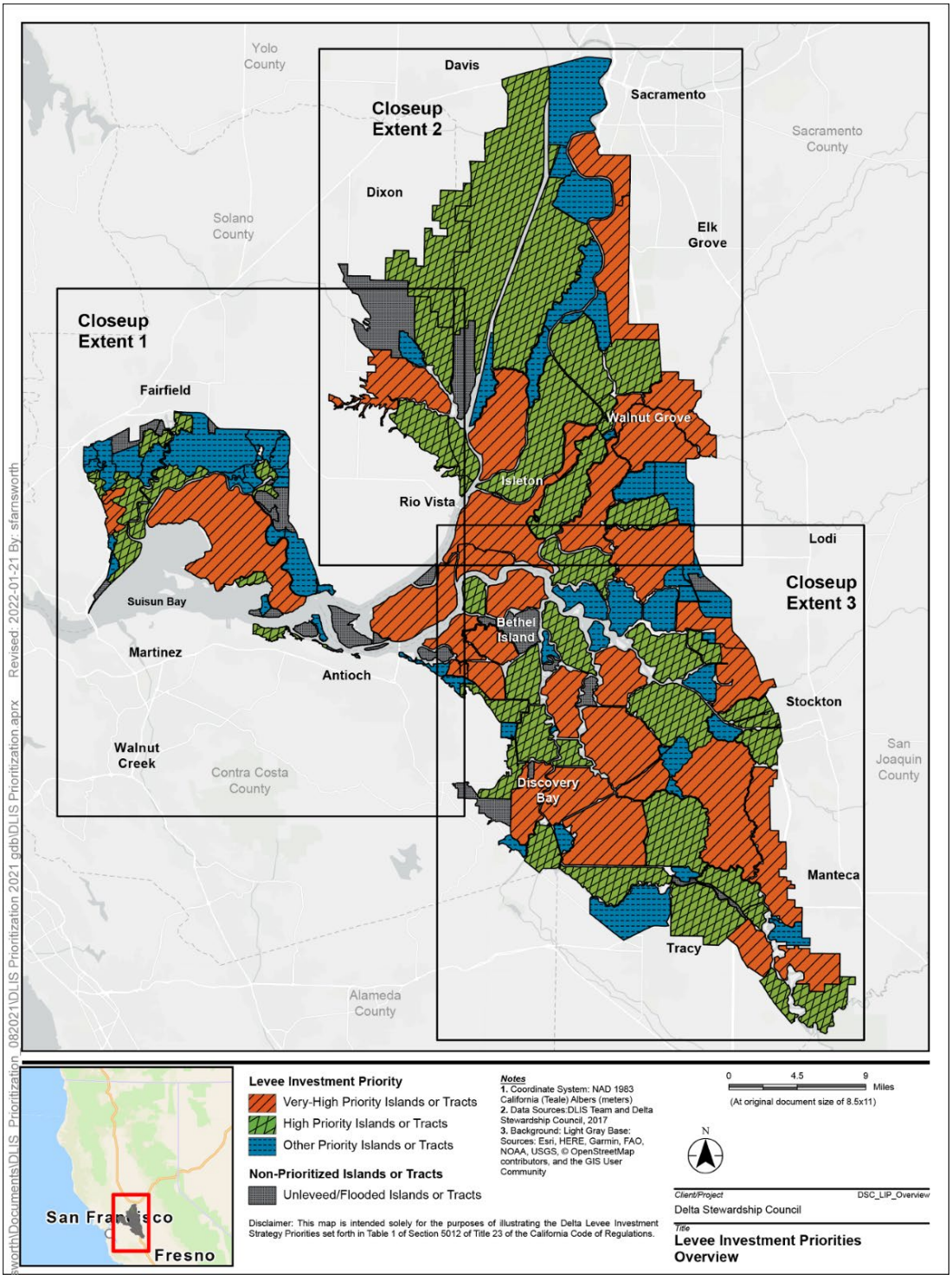
A CALIFORNIA STATE AGENCY

Additional information can be found at:

https://www.deltacouncil.ca.gov/delta-plan/
or by contacting
hello@deltacouncil.ca.gov.

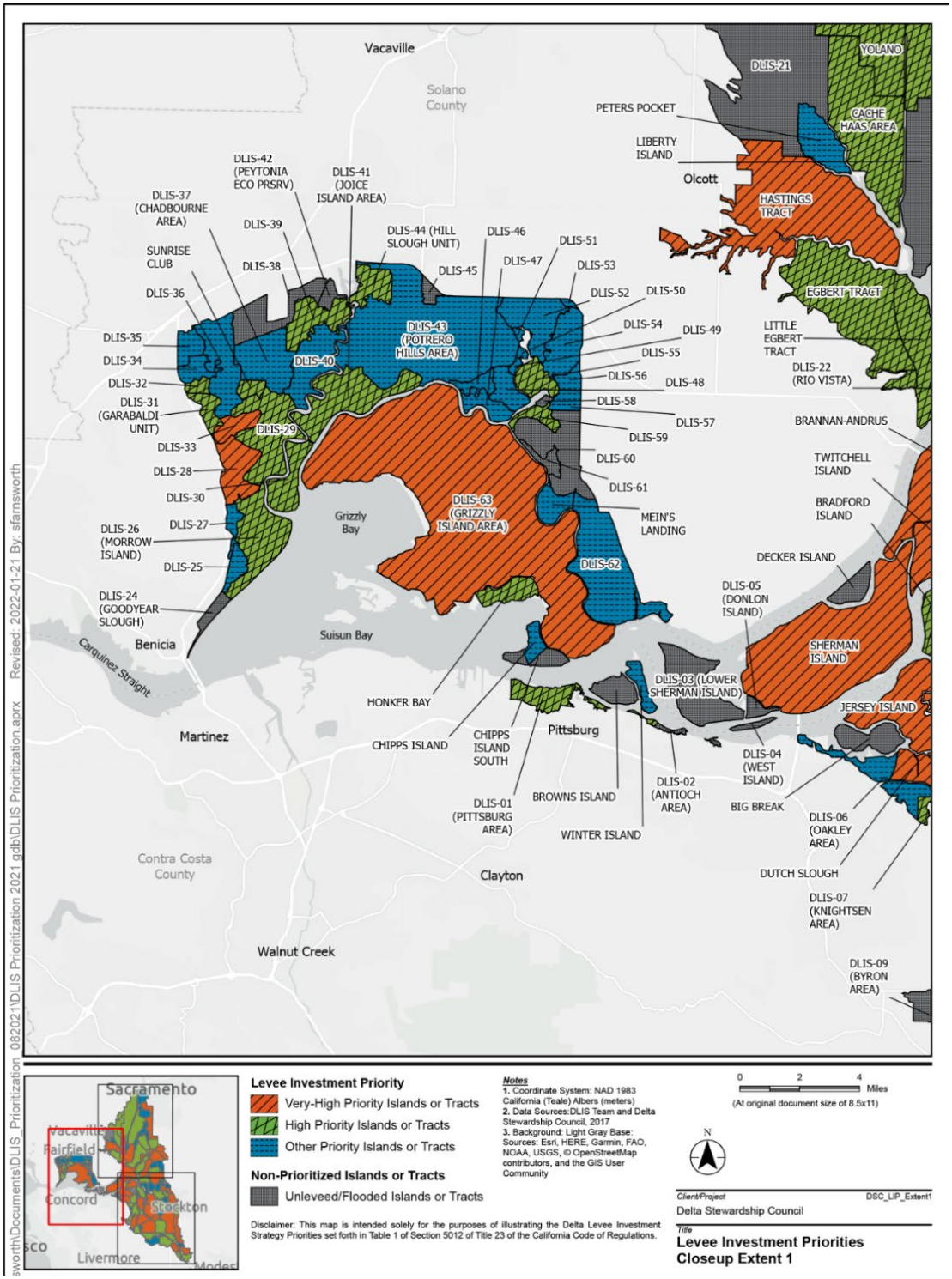
Appendix P

August 2021



Appendix P Closeup Extent 1

August 2021



Appendix P Closeup Extent 3

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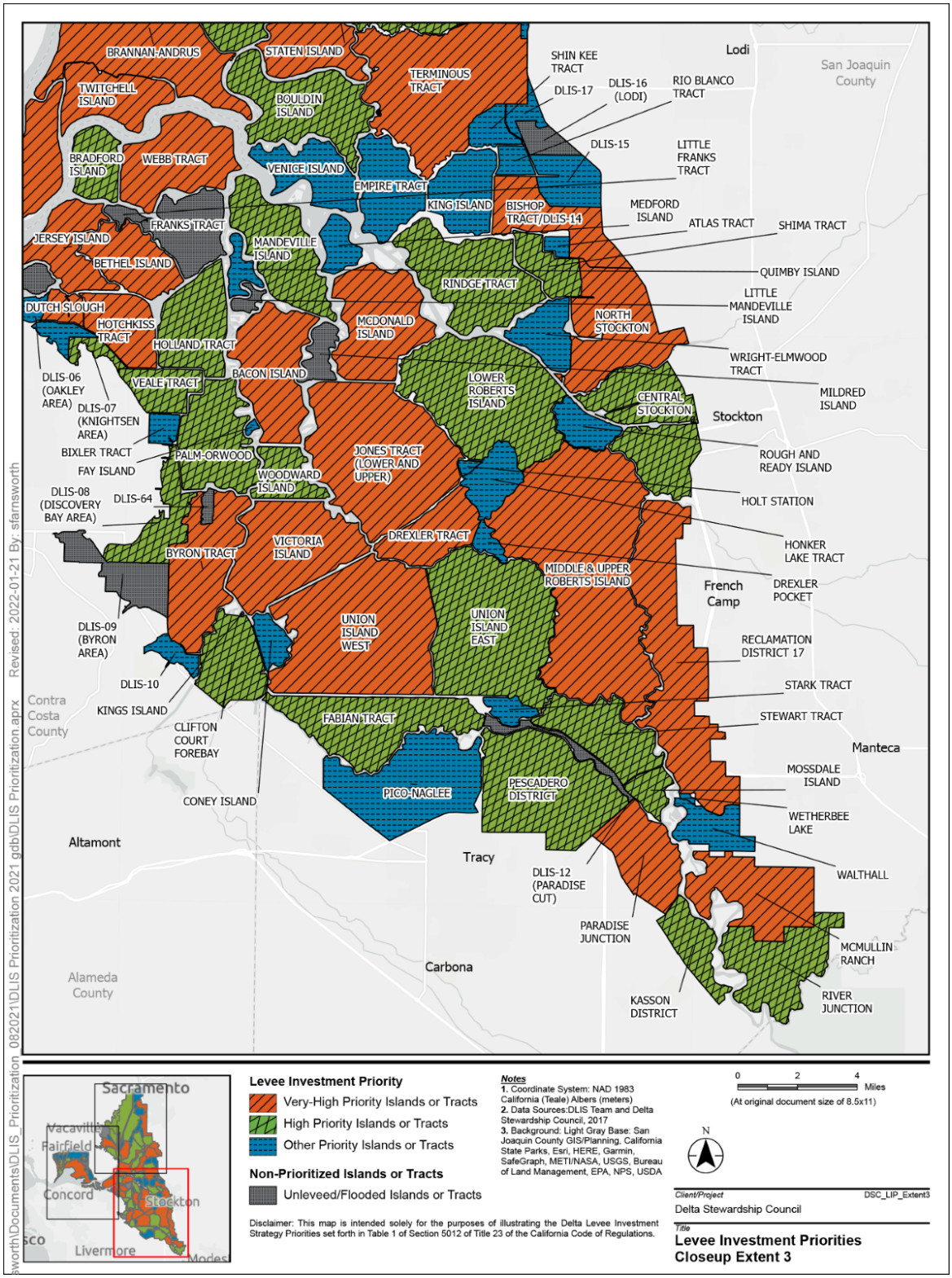
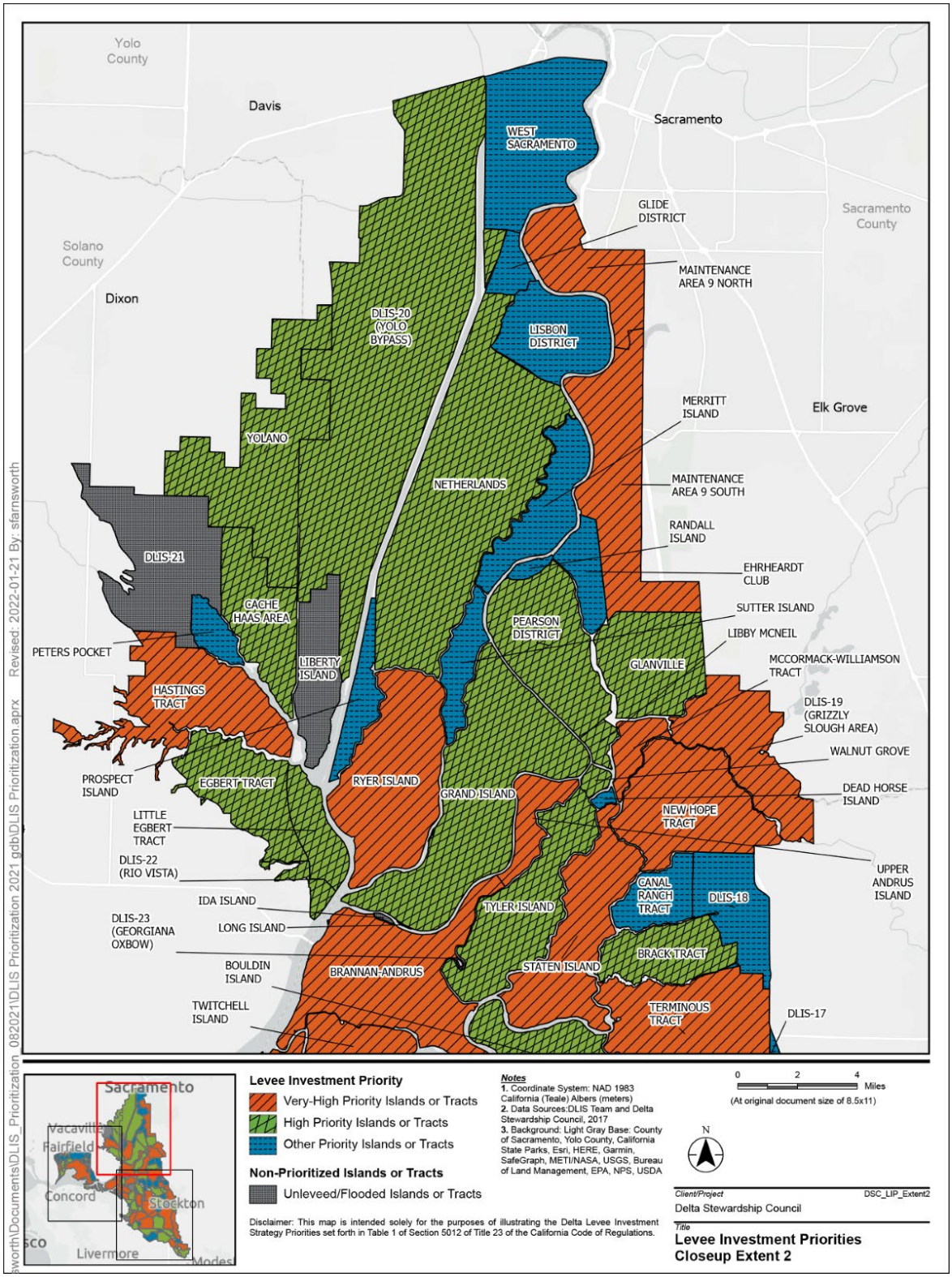


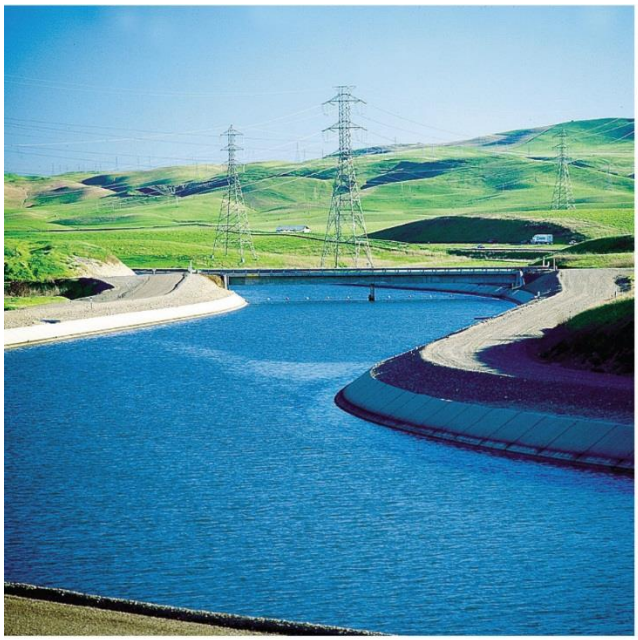
Appendix P Closeup Extent 2

August 2021



Executive Summary

(as amended in 2024)



Executive Summary

The Sacramento-San Joaquin River Delta is the grand confluence of California's waters, the place where the state's largest rivers merge in a web of channels—and in a maze of controversy. The Delta is a zone where the wants of a modern society come into collision with each other and with the stubborn limitations of a natural system. In 2009, seeking an end to decades of conflict over water, the Legislature established the Delta Stewardship Council with a mandate to resolve long-standing issues. The first step toward that resolution is the document you have before you, the Delta Plan.

Though more than 50 miles inland from the Golden Gate, Delta waters rise and fall with ocean tides. The Delta is in fact the upstream, mostly freshwater portion of the San Francisco Estuary, the largest estuarine system on the West Coast of the Americas, and one of California's prime natural assets. It is a major stop on the Pacific Flyway and the portal through which important fish species, including anadromous Chinook salmon, pass on their way to and from their spawning grounds in the interior.

The system of waters in which the Delta is so central has changed dramatically since California became a state. Rivers have been dammed and aqueducts built. Natural flows and fluxes have been disrupted to support cities and make the Central Valley the fruit basket and salad bowl of the nation. Approximately half of the water that historically flowed into and through the Delta is now diverted for human use, never reaching the sea. Much of this diversion occurs at points upstream, before the rivers come down to the Delta; but the last and largest draws take place in the Delta itself. On the southeast edge of the region, near Byron, two sets of mighty pumps extract water for shipment as far south as San Diego.

Two-thirds of California's people and 4.5 million acres of farmland receive some part of their water from the Delta.

The Delta landscape we know is itself the result of a great transformation, from a primeval wetland complex to an archipelago of leveed islands, where soils that once grew vast thickets of tules now yield bountiful corn, alfalfa, tomatoes, and many other crops. The Delta is home to about 12,000 people on farms and in small historic communities, and to about half a million in the larger cities that are

pressing into the region from the fringe. Millions more come to it for boating, fishing, hunting, bird watching, even windsurfing on its 700 miles of channels. Steeped in history, combining notes of the American heartland and of Holland, the Delta looks and feels like no other place in California. This is a land that people love.

It is not doing so well.

The very shape of the modern Delta is in danger. Farming of peat-rich ground like this always leads to oxidation, the literal vanishing of soil, and thus to subsidence. Many Delta islands now lie 15 feet or more below sea level and depend on aging levees to prevent the water in adjacent channels from pouring in. Higher river flows in winter or spring, results of climate change, add to the pressure, and a great earthquake would put further stress on levees. Encroaching urbanization, meanwhile, puts more people and property on dangerous ground.

After years of decline, the condition of the Delta's aquatic ecosystem, as measured especially by the population of wild salmon and other native fishes, has become critical. The list of causes begins, but does not end, with water withdrawals, a kind of tax that leaves the system in a condition of chronic drought. The specific, peculiar manner in which the last large gulps of water are withdrawn adds to the ecological cost. The continual introduction of alien aquatic species from around the world has altered the web of life, often at the expense of native and other valued species. Pollution from the vast and busy watershed does its share of harm.

Today, all those who depend on or value the Delta are, in a word, afraid. Delta residents face the possibility of floods from the east when the rivers flow strongly and of salinity intrusion from the west if they flow too feebly. Fishermen, both commercial and recreational, fret about the future of salmon and other species. Water suppliers that receive water from the Delta find those supplies insecure, subject to interruption by weather vagaries, levee failures, or pumping restrictions imposed in the desperate attempt to stem the decline of fish.

Steeped in history, combining notes of the American heartland and of Holland, the Delta looks and feels like no other place in California. This is a land that people love.

It is not doing so well.

The Coequal Goals, the Delta Stewardship Council, and the Delta Plan

Since the middle 1980s, California has been looking for ways to secure the natural and human values of the Delta while maintaining its place in the state's water plumbing. These efforts have generally started in hope and ended in impasse. In recent years environmentalists turned to the courts, using the blunt tool of the federal Endangered Species Act to force curtailment of water exports at certain times. In reaction, water suppliers south of the Delta have complained of "regulatory drought."

In 2009 the Legislature made its latest, most determined bid to find solutions, passing the Delta Reform Act and associated bills. First and foremost, it declared that State policy toward the Delta must henceforth serve two "coequal goals":

- Providing a more reliable water supply for California, and
- Protecting, restoring, and enhancing the Delta ecosystem.

These goals, the Legislature added, must be met in a manner that:

- Protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.

By affirming the equal status of ecosystem health and water supply reliability, the Legislature changed the terms of the conversation. It changed them further with the following pronouncement: "The policy of the state of California is to reduce reliance on the Delta in meeting California's future water supply needs." Here was recognition that, for the sake of the water system and the Delta both, a partial weaning of the one from the other is required.

The Delta Stewardship Council is the body entrusted with giving practical meaning to these directives. Publication of this Delta Plan completes its first assignment. The product of eight drafts, almost 100 public meetings, and nearly 10,000 comments, the Delta Plan pulls together in one place the steps that need to be taken to meet the coequal goals—measures that, in one way or another, could affect almost everyone in California. The Plan is to be revised every 5 years, or sooner as circumstances change.

The Delta Plan contains policies and recommendations, some broad and some narrowly technical, some novel, some commonsensically familiar. What, in essence, does the Plan propose be done differently? At the risk of oversimplification, we can say that it asks California and Californians to do six large things:

- In order to improve and secure our water supply, while taking pressure off the Delta, we must use water more efficiently in cities and on farms, and develop alternative, usually local, sources.
- We must also get much better at capturing and storing water in the wettest years, building reserves that can be drawn on in dry ones.
- To revitalize the Delta ecosystem, we must provide adequate seaward flows in Delta channels, on a schedule more closely mirroring historical rhythms: what the Plan calls natural, functional flows.
- We must also bring back adequate wetlands and riparian zones in the Delta for the benefit of fish, birds, and people.
- To preserve the Delta as a place, we must restrict new urban development to those peripheral areas already earmarked for such growth, while supporting farming and recreation in the Delta's core.
- And we must reduce flood risk in the Delta, as far as feasible, mainly by improving levees and by providing more overflow zones where swollen rivers can spread without doing harm.

The Delta Plan is *California's* plan for the Delta, prepared in consultation with, and to be carried out by, all agencies in the field: the State Water Resources Control Board, ultimate arbiter of water rights and water quality; the California Department of Water Resources, the state's water planner and also operator of the State Water Project; the California Department of Fish and Wildlife, responsible for the welfare of the living system of the Delta; the Delta Protection Commission, which oversees land use and development on low-lying Delta islands; and many more agencies, State and local. The cooperation of federal players like the Bureau of Reclamation, which runs the Central Valley Project; the U.S. Fish and Wildlife Service; the National Marine Fisheries Service; and the U.S. Army Corps of Engineers is also vital.

The working parts of the Plan are a set of *Recommendations* and *Policies*. *Recommendations* call attention to tasks being done or to be done by others. *Policies* are legal requirements that anyone undertaking a significant project in the Delta must meet. See the sidebar, From Plan to Reality, for more on the mechanics of realizing the Plan and pages ES-17 to ES-57 for a survey of all recommendations and policies.

FROM PLAN TO REALITY

The Legislature instructed the Delta Stewardship Council to "direct efforts across state agencies." This "direction" has three distinct aspects.

First of all, the Council is to **coordinate**. It chairs a high-powered committee dedicated to implementing the Plan. The heads of key State and local agencies are at that table, together with federal representatives. This body meets multiple times each year. Agency staff work with that of the Council daily.

Second, the Council is to **keep track of progress**. Using specific performance metrics contained in the Plan, and guided by the Delta Science Program (see sidebar, Science at the Center), it monitors what is actually being done toward Plan goals, and what changes of course may be indicated. The results are widely publicized.

Third, in certain key areas, the Council can be called upon to **block damaging actions**. The Plan provisions that can trigger this authority are called Policies. To avoid premature encroachment on the work of other agencies, the Legislature devised an indirect path leading to Council intervention.

Actions subject to these Policies are called "covered actions". The Council generally does not declare an action to be covered. It is the proposing agency that makes this determination. Legal standards apply, however, and if an action is questionably deemed not to be covered, the Council or any other party can take the agency to court.

Once an action is determined to be covered, the proposing agency must make sure it is in line with the Policies of the Delta Plan, filing a Certification of Consistency with contents specified in Delta Plan **Governance Policy 1**. If the agency says the action is consistent but another party or citizen thinks it is not, the opponent can then appeal to the Delta Stewardship Council. A Council member or the Council's Executive Officer may initiate the appeal.

Where Is the Money?

The Legislature established "adequate and secure funding" as a need "inherent in the coequal goals." In 2013, the Delta Plan proposed research to identify the amount and types of funding that went into the Delta or benefited aspects of the coequal goals.

SCIENCE AT THE CENTER

The Delta Reform Act mandates that the Delta Plan be based on the best available scientific knowledge of our day. It must, moreover, be open to change as knowledge changes—and as paper proposals meet the test of reality. The results of every action are to be closely tracked, so that corrections can be made in a timely way—a process, much discussed but not sufficiently practiced, known as adaptive management.

To be more than a buzzword, adaptive management must bring two things to bear: new information, and a readiness to let new information disrupt old plans. Both, in the past, have been in scant supply.

Though Delta knowledge has expanded hugely in recent years, it is often a challenge to pull that data together and draw conclusions from it. Studies are done by different agencies for specific purposes and in narrow contexts; findings can be hard to integrate. The Delta Science Program, a part of the Council, seeks to overcome these gaps, linking the whole community of scientists at work. The Delta Science Program leads development of a companion to the Delta Plan called the Delta Science Plan (**Governance Recommendation 1**).

The Delta Science Plan proposes a collaborative structure for doing science in the Delta. It suggests ways of improving communication, resolving conflicting results, and accommodating uncertainty. It offers priorities: how to apportion attention between immediate practical questions, on the one hand, and research aimed at increasing long-term understanding, on the other. It sketches a more integrated approach to monitoring, so that results from different settings can be compared, and considers how computer modeling of the intricate Delta system might be improved.

The first step was an inventory: How much is actually being spent, by all the agencies involved, that can be chalked up to furthering the coequal goals? Second came an assessment of costs: How much would it take to carry out the projects and programs described in the Delta Plan, and what might the sources of support be for each one? Since 2013, this need has informed development of performance measures to inventory and track funding that contributes toward the coequal goals and identify funding gaps. The third step, a comparison of resources and needs, and a reckoning of gaps, remains ongoing: What key elements lack probable funding, and what might be done to fill these holes? (**Funding Principles Recommendations 1 through 3**.) The Delta Plan also tracks funding specific to restoring ecosystem function (**Performance Measure 4.14**). Tracking this funding remains an ongoing activity.

Providing a More Reliable Water Supply for California…

The Delta's contribution to the overall statewide water supply is smaller than many people think. The proportion drawn directly from the Delta, mostly through the pumps near Byron, is only about 8 percent of the total. The bulk of California's water comes from more local sources, and always has.

Nevertheless, the Delta supply is important to many regions. Some 27 million Californians and more than 3.7 million acres of agricultural lands receive water from the Delta and its watersheds. On a more local scale, several water suppliers rely entirely on the Delta, and others have become dependent on this one overtaxed source to a risky degree.

In addition to water pulled directly from the Delta, a great deal is drawn from the Delta's tributary streams before they come down to sea level. San Francisco Bay Area cities reach far inland to tap the Tuolumne and Mokelumne Rivers in the Sierra Nevada, taking 27 percent of their water needs from these sources. Parts of the Central Valley tributary to the Delta get all of their water from that watershed by definition, as do the people and farms of the Delta itself. (See also sidebar, The Problem with Numbers.)

California water planning is full of good intentions. If the laws and policies that are now on the books were consistently carried out, the state's water system—including that part that is tied to the Delta—would work much better.

The Delta Plan addresses water supply on three scales: California-wide, on the Delta watershed level, and in the areas that receive water from the Delta pumps. (See Figure ES-1, The Delta Watershed and Areas Receiving Delta Water.)

California water planning is full of good intentions. If the laws and policies that are now on the books were consistently carried out, the state's water system—including that part that is tied to the Delta—would work much better. The Delta Plan calls on *all* water suppliers to obey the many laws and guidelines that exist, and on the State's regulatory agencies to insist on compliance (**Water Resources Recommendation 1**).

THE PROBLEM WITH NUMBERS

In talking of California water, we put trust in numbers: flows, usages, capacities, trends. But some seemingly solid and much-quoted figures are approximations. By and large, we do not accurately know how much water we are using or how much we are saving through conservation efforts. We know less than we should about Delta inflows and outflows or about groundwater. What information is available is often packaged in inscrutable ways. The Delta Plan asks all the agencies and water suppliers involved to provide or demand better information, and to communicate it better (**Water Resources Policy 2, Water Resources Recommendations 16 through 19**).

Whatever the outcome of some current debates, California's next large increment of water supply will not come from major new engineering but from water conservation, recycling, local stormwater capture, and reasonable use of aquifers (see section, A Better System: Storing Floods to Ride Out Droughts). These measures can yield an amount of water larger than the total that is drawn from the Delta today. State agencies in charge of water matters should systematically promote these practices, and *all* State agencies should model them in their own water usage. (**Water Resources Recommendations 6, 8, and 14**.)

Zooming in a bit from the statewide picture, the Delta Plan calls for all water users linked to the Delta—whether they take water from it directly, or tap the watershed—to reduce their draws. The State Water Resources Control Board should give special scrutiny to water use applications that could boost demand on the watershed. Urban and agricultural water suppliers are already required to write water management plans; these now should include "water supply reliability elements," discussing, among other things, how to deal with the cascading effects if water exports were interrupted for as long as 3 years. (**Water Resources Recommendations 3, 4, 5, and 7**.)

The Plan speaks most directly to those suppliers that serve water within the Delta or pump water out of the region—including the State Water Project, the Central Valley Project, and by extension the many agricultural and urban water purveyors that are the customers of these giants. Any organization that receives water from the projects must do its share to reduce reliance on the Delta, setting specific reduction targets and putting measures in place. The State Water Project is called on to write the corresponding provisions into contracts with its clients when these agreements are renewed or revised (**Water Resources Policies 1 and 2, Water Resources Recommendation 2**).

The Delta Watershed and Areas Receiving Delta Water

Figure ES-1

A Better System: Storing Floods to Ride Out Droughts (and Give the Delta a Break)

The measures so far mentioned will take pressure off the Delta while increasing California's developed water supply. The further key to both goals is to store water that is available from Central Valley rivers in the wettest years, at the

least environmental cost. The need is heightened by the fact of climate change, which is making rainy years all the wetter, and droughts more severe.

There are few opportunities left in California to build large new dams (or to raise the height of old dams), and the options that exist are dauntingly expensive. The California Department of Water Resources and the Bureau of Reclamation have studied several possibilities. (**Water Resources Recommendations 13 and 14**).

California began its history with a vast supply of water stored naturally in underground gravel fields and free for the taking via wells. In parts of the state, including most of the southern Central Valley, this endowment has been significantly exploited, and groundwater levels have dropped, sometimes by hundreds of feet. One of the rationales for sending water south from the Delta has been to recharge aquifers, but not enough recharging has occurred.

The Delta Plan calls for a rededication to using aquifers like bank accounts: to be filled up in wet times, in order that they may be drawn from in dry. It promotes projects that improve conjunctive management of surface and groundwater resources and contribute to achieving groundwater sustainability goals established pursuant to the Sustainable Groundwater Management Act, a State law passed in 2014 that established a statewide framework to protect groundwater resources over the long-term (Wat. Code, § 10720-10738). (**Water Resources Recommendations 12f, 12d, 12e, and 12f**.)

The Delta Plan calls for a rededication to using aquifers like bank accounts: to be filled up in wet times, in order that they may be drawn from in dry.

There is another tool for making the supply stretch further: the sale or trade of water between suppliers, especially in times of shortage. Existing rules governing such transfers are found cumbersome by some and insufficiently protective of water rights and the environment by others.

A Better System: Delta Conveyance

As noted, many of the state's water suppliers take their water from rivers at points upstream of the Delta. The two biggest, however—the State Water Project and the Central Valley Project—are different. Though most of the water they transport has its origin to the north, in the Sacramento River, their withdrawal points are deep in the Delta and well to the south, along Old River. Unlike most other water withdrawals, these affect the region not only by removing water but also by distorting flows.

The pumps at Byron have so much power that they essentially give the Delta a second mouth. In many channels, water runs backward at times, toward the pump intakes, not toward the sea. This situation is bad for salmon, Delta smelt, and other sensitive and legally protected species. The water management plans currently under development all try to resolve these issues by different means.

…and Protecting, Restoring, and Enhancing the Delta Ecosystem…

The Delta Plan includes a set of five core strategies that take a balanced approach to ecosystem protection, restoration, and enhancement. These five core strategies are:

1. Create More Natural, Functional Flows
2. Restore Ecosystem Function
3. Protect Land for Restoration and Safeguard Against Land Loss
4. Protect Native Species and Reduce the Impact of Nonnative Invasive Species

5. Improve Institutional Coordination to Support Implementation of Ecosystem Protection, Restoration, and Enhancement.

Create More Natural Functional Flows

Humans have not only reduced the total quantity of runoff through the Delta toward the ocean but also have changed its timing, decreasing the historical torrents of spring and increasing the formerly feeble flows of autumn. The volume, timing, and extent of freshwater flows through the Delta directly affect the health of the Delta ecosystem. More natural functional flows across a restored landscape can support native species recovery, while providing the flexibility needed for water supply reliability. Freshwater flows should be allocated and adaptively managed to more closely resemble the natural volume, timing, frequency, and duration needed to achieve the desired ecosystem functions.

Humans have not only reduced the total quantity of runoff through the Delta toward the ocean but also have changed its timing, decreasing the historical torrents of spring and increasing the formerly feeble flows of autumn.

The minimum seaward flows to be maintained in Delta channels are set by the State Water Resources Control Board, according to season and year type (wet, above normal, below normal, dry, or critical). These required flows help fish; they also prevent saltwater intrusion. As a not-incidental side effect, the rules limit the amount of water that can be exported through the pumps.

The Water Board has been updating the regulations for this flow regime, last comprehensively updated in 2006. The Water Board is also updating comparable flow standards for the major tributary rivers of the Delta. The Delta Plan recommends that the Water Board maintain a regular schedule of reviews of the Bay-Delta Water Quality Control Plan and its flow objectives to reflect changing conditions due to climate change and other factors. The adopted regulations will become elements of the Plan. The Delta Stewardship Council can be called upon to review any project that could significantly affect Delta flows (**Ecosystem Restoration Policy 1, ER Recommendation 1**).

Restore Ecosystem Function

In its primeval state, the Delta was no uniform sea of reeds but a vast mesh of habitats including tule marsh threaded with rivers and sloughs, perched lakes filled by floods and very high tides, natural levees with big trees on them, and seasonal overflow basins behind the levees. Most of this mosaic has disappeared, converted to fifty large and many small leveed islands. Evidence of what was remains in agricultural soils of uncommon quality (and fragility).

Achieving the Delta Reform Act vision for the Delta ecosystem requires the reestablishment of tens of thousands of acres of functional, diverse, and interconnected habitats. The magnitude of the need dictates a change in existing approaches to restoration in the Delta. State agencies need new funding sources to implement large-scale, multi-benefit restoration projects that focus on ecosystem function and are designed and located to continue functioning under a changing climate. Restoration projects should also be compatible with adjacent land uses and support the cultural, recreational, agricultural, and natural resource values of the Delta as an evolving place. (**Ecosystem Restoration Policy A, ER Recommendations A and B**).

Much of the remaining functional habitat in the Delta is found in select areas along the water side of levees or as managed analogues of past habitats, such as wetlands. The Delta Plan includes policies and recommendations to protect and enhance these areas. When levees are rebuilt or altered, the possibility of setting them back from the water to make more habitat areas should always be explored. The

growth of trees along the waterline should be encouraged. However, authority over many levees lies with the U.S. Army Corps of Engineers, and the Corps requires removal of trees and shrubs, on the theory that root systems have a weakening effect. (The matter is debated.) Given the value of tall vegetation for habitat, the Delta Plan asks the Corps to exempt Delta levees from this rule, where appropriate. (**Ecosystem Restoration Policy 4 and ER Recommendation 4**).

Protect Land for Restoration and Safeguard Against Land Loss

As sea levels rise and subsidence continues, opportunities for intertidal and floodplain restoration are shifting toward the upland edges of the Delta, where the soil surface is still high enough to permit marsh plants and riparian vegetation to take root. Restoration of tidal wetlands should focus on opportunities to create interconnected habitats, where elevations will support intertidal habitats into the future. Lands at elevations suitable for current and future restoration must be protected from development, and restoration projects must be designed and located with rising sea levels in mind.

The Delta Plan outlines six such zones suitable for restoration: the Yolo Bypass, the floodplain west of Sacramento into which the Sacramento River spills in wet years; the Cache Slough Complex, where the Bypass rejoins the body of the Delta; a nexus in the eastern Delta, where the Mokelumne River and the Cosumnes River add their strands to the Delta's web; a zone in the southern Delta along the San Joaquin River; a collection of small tracts at the western apex of the Delta, where it narrows to meet Suisun Bay; and finally the Suisun Marsh, fringing that bay to the north. This fresh-to-brackish water marsh, the largest wetland in California, is mostly managed by hunting clubs for seasonal waterfowl ponds. The existing plan for Suisun Marsh, written by the San Francisco Bay Conservation and Development Commission (BCDC), was adopted in 1976 and does not take into account, for example, probable sea level rise. The Delta Plan calls for a plan update for Suisun Marsh, which BCDC is currently undertaking. The Delta Stewardship Council can be appealed to, if necessary, to block development or any other intrusion that might interfere with a restoration site.

Consistent with State law, local and regional plans in the Delta must consider sea level rise as well as the loss of land suitable for ecosystem restoration and the need to accommodate these landscape changes. State agencies should take action to reduce, halt, or reverse subsidence; and incentivize agricultural land management practices that support native wildlife and counter subsidence. (**Ecosystem Restoration Policies 2 and 3, ER Recommendations 5, C, D, and E**).

Protect Native Species and Reduce the Impact of Nonnative Invasive Species

One of the less-visible forces to buffet the Delta ecosystem is the proliferation of nonnative aquatic species—fish, crustaceans, plants, and even the microscopic floating animals of zooplankton. Some were introduced deliberately; others arrived by random routes including the discharge of bilgewater from oceangoing ships and the dumping of household fish tanks.

New arrivals keep appearing. Some of these intruders affect the system little, but other species, notably certain aquatic plants and filter-feeding clams, transform the web of life profoundly. While large-scale ecosystem restoration is the priority approach to support native species recovery, some stressors require more focused interventions. In particular, management actions continue to be necessary to avoid introductions of, and reduce the spread of, non-native invasive species. The Delta Plan prohibits actions that could bring in new invasives or improve conditions for invasive species that are already here. In managing native fish populations, the Delta Plan calls for reestablishing riparian habitat and in-stream connectivity along migratory corridors to support the reproductive success and survival of native fish.

The Delta Plan recommends that hatcheries and harvest regulation employ adaptive management strategies to predict and evaluate outcomes and minimize risks. (**Ecosystem Restoration Policy 5; ER Recommendations 7, 8, 9, H, and I**).

Improve Institutional Coordination

A large and diverse group of public agencies and private organizations are engaged in ecosystem protection, enhancement, restoration, and mitigation in the Delta, with roles ranging from regulatory oversight to project implementation and long-term monitoring and management. Improving the efficiency and effectiveness of these efforts requires institutional commitment to a single, consolidated restoration forum with agency support and discretion to guide restoration strategies, plan investments, align individual agency plans and actions, and resolve barriers to implementation. The Delta Plan recommends that local, State and federal agencies coordinate to support implementation of ecosystem restoration, and that the Delta Plan Interagency Implementation Committee (DPIIC) implement a number of actions, such as establishing a DPIIC restoration subcommittee and increasing tribal engagement and input in agency restoration planning. **(ER Recommendations F and G**).

Water Quality

Watershed pollutants, such as salts, excess nutrients, pesticides, and heavy metals, are bad for the Delta ecosystem and for water users. The Delta Plan urges the responsible agencies—the State Water Resources Control Board, the Central Valley Regional Water Quality Control Board, and the San Francisco Bay Regional Water Quality Control Board—to protect "beneficial uses" of water in the Delta and Suisun Bay. All agencies should consider water quality when weighing actions covered under the Delta Plan. Special attention should be paid to pollution that might degrade habitat restoration sites. (**Water Quality Recommendations 1 through 12**.)

…In a Way that Protects and Enhances the Values of the Delta as an Evolving Place

Because of its role in greater systems—the San Francisco Estuary, the state water plumbing—the Delta is a subject of statewide debate. The conversation can seem to take place over the heads of the people who actually live in the region; and it can seem to overlook the lasting values of the place that is: its thriving agriculture, the beauty of its countryside, its cultural heritage, and its recreational bounty. The Delta Plan strives to redress this balance without promising what is probably impossible: the retention of the landscape exactly as it is today.

Honorific labels do not protect valuable assets, but they can help us recognize them. The Delta Plan asks that the Delta be declared a National Heritage Area by Congress, a recommendation fulfilled when the Delta was designated in 2019 as the first National Heritage Area in California. The Delta Plan also asks that Highway 160, its north-south artery, be designated a National Scenic Byway by the U.S. Department of Transportation (**Delta-as-Place Recommendations 1 and 2**).

Many Delta people fear that their concerns will be brushed aside if new water facilities and habitat restoration are built in the Delta. While deference cannot be guaranteed, the Delta Plan calls on the agencies to respect local plans in siting such projects, to minimize conflict when possible, and to buy land from willing sellers when they can (**Delta-as-Place Policy 2, DP Recommendation 4**).

The distinctive Delta landscape has been much altered by urban encroachment, often entailing higher flood risk. The Delta Protection Commission, created in 1992 and strengthened by the Delta Reform Act of 2009, oversees develop-

ment in the core area called the Primary Zone: Local decisions affecting this zone can be appealed to the Commission and overturned by it. However, this authority does not extend to the peripheral Secondary Zone, where the development pressure is strongest. The Delta Plan tightens control further, restricting new development to areas in the Secondary Zone that were already earmarked for urbanization in local plans when the Delta Plan was adopted. Small housing developments that may occur outside these limits must meet high flood control standards (**Delta-as-Place Policy 1, Risk Reduction Policy 2).** (See Figure ES-2, Delta Communities.)

A little more bustle might actually benefit 11 historic small towns or settlements within the Delta, known as the legacy communities. Most are spaced along the Sacramento River: Freeport, Clarksburg, Hood, Courtland, Locke, Walnut Grove, Ryde, Isleton, and Rio Vista. Knightsen and Bethel Island are near the lower channel of the San Joaquin River. Planners at all levels should respect the character, and promote the vitality, of these places (**Delta-as-Place Recommendation 3**).

The Delta Protection Commission has written an Economic Sustainability Plan containing numerous ideas for the support of the region's farm economy, parks and recreation, and roads and infrastructure. The Delta Plan adapts many of these as **Delta-as-Place Recommendations 5 through 19**.

Flood Risk Reduction

In its primeval state, most of the Delta was wetland and slightly above sea level. Since levees created the modern islands and cultivation began, soils have subsided deeply. Many Delta tracts are strikingly below the level of the water in adjacent channels; rising sea level will make the differential worse. While the occasional levee break is part of Delta lore, multiple failures could bring disaster to the Delta landscape, economy, and ecosystem.

It is estimated that two-thirds of rural Delta levees have met Bulletin 192-82 or PL 84-99 levee standards, meaning one-third of rural Delta islands and tracts are not adequately protected. There is not enough money for all the desirable improvements, nor is there a mechanism for sharing costs among all who benefit.

The Delta Plan urges all agencies in the Delta to plan for emergencies and to continue to implement the recommendations of the Delta Multi-Hazard Coordination Task Force. Every responsible party, public and private, should allocate money for flood prevention and reaction. Utilities should plan to minimize interruptions of service. The Department of Water Resources should expand its stockpiles of stone and earth for the use of all when breaches require rapid plugging. Higher levels of private flood insurance should be required, and the State should gain immunity from lawsuits related to flooding beyond its power to prevent. (**Risk Reduction Recommendations 1, 7, 13, and 15**.)

Delta Communities

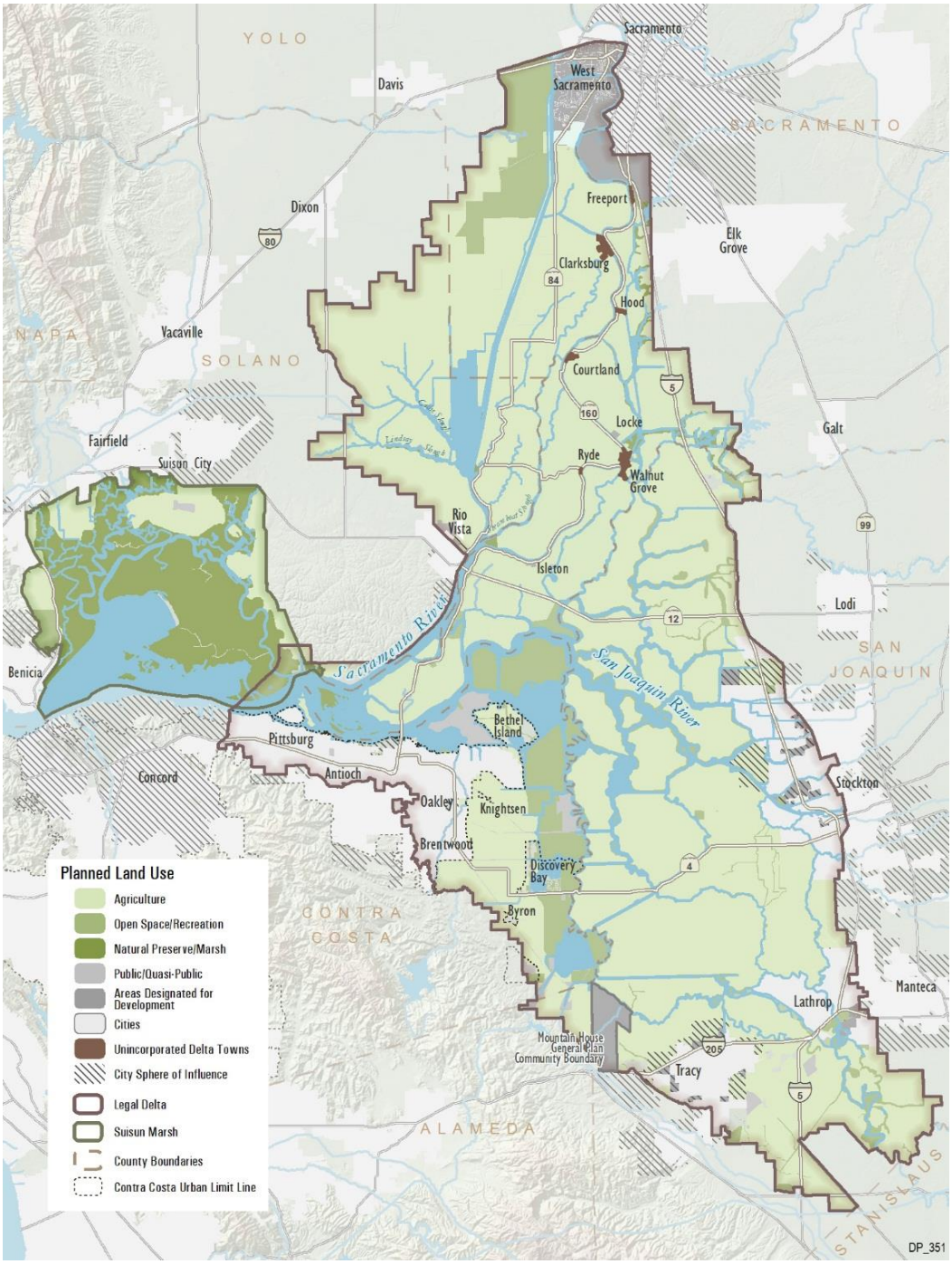


Figure ES-2 *Sources: City of Benicia 2003, Contra Costa County 2008, Contra Costa County 2010, City of Fairfield 2008, City of Lathrop 2012, City of Manteca 2012, Mountain House Community Services District 2008, City of Rio Vista 2001, SACOG 2009, City of Sacramento 2008, Sacramento County 2011, Sacramento County 2012, Sacramento County 2013, San Joaquin County 2008a, San Joaquin County 2008b, Solano County 2008a, Solano County 2008b, City of Stockton 2011a, City of Stockton 2011b, City of Suisun City 2011, City of Tracy 2011a, City of Tracy 2011b, City of West Sacramento 2010, Yolo County 2010a, Yolo County 2010b.*

There are more than 1,000 miles of Delta levees. The State is directly responsible for about one-third of the system; nearly 70 local Reclamation Districts are in charge of the rest. It is estimated that two-thirds of rural Delta levees have met Bulletin 192-82 or PL 84-99 levee standards, meaning one-third of rural Delta islands and tracts are not adequately protected. There is not enough money for all the desirable improvements, nor is there a mechanism for sharing costs among all who benefit. Adequate State funds to support levee maintenance and improvement should be provided through the Delta Levees Maintenance Subventions Program, the Delta Levee Special Projects Program, and through programs that implement the Central Valley Flood Protection Plan. The Delta Plan calls on the Council, DWR, CVFPB, and the DPC, in consultation with the Corps of Engineers and the Department of Finance, to cooperate in the development of levee finance mechanisms, including those studied by the DPC, that create opportunities for "beneficiary pays"-based funding approaches that supplement State funding for levee maintenance and improvements. The Delta Plan calls for a hazard mitigation program, funded by the State, to be established to make grants to local governments and flood management agencies to support emergency preparedness actions, such as evacuation planning or prepositioning of flood fight materials, and non-structural flood hazard mitigation actions, such as flood-proofing of public or private buildings or the purchase and removal of flood-prone structures. Public and private utilities, too, should invest in defense of their facilities and lines. The Delta Plan also calls for reforms of the Federal Emergency Management Agency's rehabilitation assistance program, including a renewed hazard mitigation program for Delta levees, and the Army Corps of Engineers' Rehabilitation and Inspection Program (PL 84-99) to account for the economic value of the Delta's water supplies and transportation services and for the State's commitments to reducing Delta flood risk and improving Delta levees. (**Risk Reduction Recommendations 3, 5, 6, 7, and 12**).

The State contributes massively to levee costs throughout the Delta, but on a not very systematic basis. The Legislature directed the Delta Stewardship Council to set priorities for these investments. **Risk Reduction Policy 1** offers broad principles. Urban areas come first; special attention must be paid to levees guarding roads and energy facilities. The channels through which water flows toward export pumps require protection, as does the pipeline that brings Sierra water across the Delta for the East Bay Municipal Utility District. Levees on the western islands, whose failure could bring salinity deep into the Delta, are also of high concern.

Building on work completed by the Department of Water Resources, the Council has assessed, island by island, the state of levees, the degree of subsidence, the extent and value of assets to be protected, and the cost of long-term defense. The result is a tiered priority list for the expenditure of State levee funds (**Risk Reduction Policy 1 and Risk Reduction Recommendation 4**).

To take pressure off the levee system, floodwaters need room to move and to spread without causing harm (and often to the benefit of plants, birds, and fish). Two such safety valves already exist at the Yolo Bypass and the Cosumnes-Mokelumne floodplain; a third such zone is proposed for the lower San Joaquin River at Paradise Cut. The Delta Plan urges expansion of the flood relief system, and requires that present or potential overflow areas be kept free of encroachments. Levee setbacks are also encouraged. (**Risk Reduction Policies 3 and 4, Risk Reduction Recommendations 8 through 11**.)

Given time, land subsidence can actually be reversed. Experimental plots show that soils can be deepened by growing tules in shallowly flooded fields, at a rate of a little over an inch a year. The tule plots also fix a lot of atmospheric carbon and thus do their bit toward slowing climate change. The Delta Plan encourages expansion of this work (**Delta-as-Place Recommendation 7**).

Finding the Way Through

First adopted in May 2013, the Delta Plan anticipated the need for periodic reviews and updates in response to changing circumstances and conditions in the Delta. Seven amendments have been made to the Delta Plan to date:

- **Performance Measures**: When first adopted, the Delta Plan contained preliminary performance measures developed to monitor implementation of its policies and recommendations. The Delta Plan identified the need for the Council to continue to work with scientific, agency, and stakeholder experts to further refine its performance measures. The Council subsequently conducted a rigorous public process and adopted new and refined performance measures in February 2016. Based on recommendations from the Delta Independent Science Board, in 2018, the Council adopted a further refined set of performance measures to better track Delta Plan outputs and outcomes.
- **Single-Year Water Transfers**: Water transfers across the Delta can be an important tool for improving water supply reliability, especially in drought years when some water rights holders may choose to sell a portion of their water supply to areas of the state that are harder hit or are willing to place a greater value on that water. The Council conducted an environmental review and adopted a regulatory amendment in September 2016 that exempts single-year water transfers from regulation under the Delta Plan and simplifies the implementation of these short-term transfers.
- **Conveyance, Storage, and Operations**: This amendment included a series of recommendations that fulfill the Council's statutory requirement to promote options for water conveyance, storage, and operations of both. Adopted in April 2018, it includes recommendations that the design and implementation of new or improved conveyance infrastructure in the Delta minimize disruptions to transportation and business activities in the Delta, complement the Delta landscape, and are implemented in cooperation with affected communities, local governments, the Delta Protection Commission, and Delta stakeholders.
- **Ecosystem**: The Delta Reform Act called for the Delta Plan to provide a long-term approach to restoring habitat within the Delta and its watershed by the end of this century. When first adopted, the Delta Plan relied on the emerging Bay-Delta Conservation Plan (BDCP) to provide a framework for ecosystem restoration in the Delta. When the State pivoted away from the BDCP in 2015 and split it into the California EcoRestore and WaterFix projects, significantly reducing the scale of restoration targets, it became critical that the Council fill the resulting gap and amend the Delta Plan to provide a framework to guide regional restoration efforts, considering changes in land use, climate, and regulations, and incorporating the latest restoration science and practices. In June 2022, the Council amended the Delta Plan to provide a comprehensive approach to ecosystem protection, restoration, and enhancement in the Delta.
- **Delta Levees Investment Strategy**: The Delta Levees Investment Strategy (DLIS) amendment, adopted in 2023, guides the prioritization of state investments in the Delta (more than $700 million since the 1970s) that reduce flood risk and better integrate Delta levees with other Delta actions and statewide flood control.

We will be doing well if, in a few years' time:

- Many urban and rural water suppliers that draw on the Delta have taken real steps to reduce that reliance, with measured, reported results. Since 2013, many urban and agricultural water management plans have been updated to report reliance on the Delta, and many plan for significant declines in such reliance.
- Flows in Delta channels, controlled under new State Water Resources Control Board rules, are looking a good deal more like the historical ones. The Water Board has been reviewing flow objectives for the Bay-Delta Water Quality Control Plan for several years, negotiating potential voluntary agreements, and other actions, which

could contribute to flows that more closely resemble historical functions.

- Several new habitat restoration projects in the Delta have moved from the planning to the construction stage. Several thousand acres of restoration have been constructed, are in progress, or are now planned in the Delta.
- Subsidence reversal planting has expanded from the small pilot projects seen today.
- Measurably less acreage of Delta waters is dominated by nonnative water plants.
- Stocks of endangered fish are showing a rebound.
- Key levees have been strengthened, especially in the environs of Stockton and Sacramento.
- No further rural farmland has been lost to urbanization.

We envision a Delta landscape that remains essentially itself while adapting gradually and gracefully to a future marked by climate change and sea level rise. We want a Delta ecosystem that works markedly better than today's, reflected partly in a resurgence of native fish. And we want an end to the endless wrangling about Delta flows and plumbing—a truce that can only be achieved if the entire California water system undergoes a measure of reform.

In solving the "Delta problem," we will not only be doing right by a treasured land- and waterscape. We will be putting the entire state of California on a sounder development path.

Driven by cost, environmental concern, and sheer practicality, the water world is already shifting away from reliance on distant dams and aqueducts and toward trust in conservation, local sources, and better use of groundwater storage. This change is reflected in the fact, startling to many, that California's total water consumption has not climbed in recent years; in fact, despite our increasing population, use has slightly dropped. The Delta Plan gives a push to trends already under way.

In solving the "Delta problem," we will not only be doing right by a treasured land- and waterscape. We will be putting the entire state of California on a sounder development path.

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Chapter divider *(clockwise from top left)***:** California Department of Water Resources, Chris Austin, L.A. Yarbrough, California Department of Water Resources

Page ES-1: The Delta Conservancy

Delta Plan Policies and Recommendations

The Delta Plan contains a set of regulatory policies that are enforced by the Delta Stewardship Council's appellate authority and oversight. The Delta Plan also contains priority recommendations, which are nonregulatory but call out actions essential to achieving the coequal goals.

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
Chapter 2		
G P1 (23 CCR section 5002)	Detailed Findings to Establish Consistency with the Delta Plan	*(a) This policy specifies what must be addressed in a certification of consistency filed by a State or local public agency with regard to a covered action. This policy only applies after a "proposed action" has been determined by a State or local public agency to be a covered action because it is covered by one or more of the regulatory policies contained in Article 3. Inconsistency with this policy may be the basis for an appeal.* *(b) Certifications of consistency must include detailed findings that address each of the following requirements:* *(1) Covered actions, in order to be consistent with the Delta Plan, must be consistent with this regulatory policy and with each of the regulatory policies contained in Article 3 implicated by the covered action. The Delta Stewardship Council acknowledges that in some cases, based upon the nature of the covered action, full consistency with all relevant regulatory policies may not be feasible. In those cases, the agency that files the certification of consistency may nevertheless determine that the covered action is consistent with the Delta Plan because, on whole, that action is consistent with the coequal goals. That determination must include a clear identification of areas where consistency with relevant regulatory policies is not feasible, an explanation of the reasons why it is not feasible, and an explanation of how the covered action nevertheless, on whole, is consistent with the coequal goals. That determination is subject to review by the Delta Stewardship Council on appeal;* *(2) Covered actions not exempt from CEQA must include all applicable feasible mitigation measures adopted and incorporated into the Delta Plan as amended April 26, 2018 (unless the measure(s) are within the exclusive jurisdiction of an agency other than the agency that files the certification of consistency), or substitute mitigation measures that the agency that files the certification of consistency finds are equally or more effective;* *(3) As relevant to the purpose and nature of the project, all covered actions must document use of best available science;* *(4) Ecosystem restoration and water management covered actions must include adequate provisions, appropriate to the scope of the covered action, to assure continued implementation of adaptive management. This requirement shall be satisfied through both of the following:*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		(A) An adaptive management plan that describes the approach to be taken consistent with the adaptive management framework in Appendix 1B, and *(B) Documentation of access to adequate resources and delineated authority by the entity responsible for the implementation of the proposed adaptive management process.* *(c) A conservation measure proposed to be implemented pursuant to a natural community conservation plan or a habitat conservation plan that was:* *(1) Developed by a local government in the Delta; and* (2) Approved and permitted by the California Department of Fish and Wildlife prior to May 16, 2013 *is deemed to be consistent with sections 5005 through 5009 of this Chapter if the certification of consistency filed with regard to the conservation measure includes a statement confirming the nature of the conservation measure from the California Department of Fish and Wildlife.*
G R1	Development of a Delta Science Plan	*The Delta Stewardship Council's Delta Science Program should develop a Delta Science Plan by December 31, 2013. The Delta Science Program should work with the Interagency Ecological Program, Bay Delta Conservation Plan, California Department of Fish and Wildlife, and other agencies to develop the Delta Science Plan. To ensure that best science is used to develop the Delta Science Plan, the Delta Independent Science Board should review the draft Delta Science Plan.* *The Delta Science Plan should address the following:* ▪ *A collaborative institutional and organizational structure for conducting science in the Delta* ▪ *Data management, synthesis, scientific exchange, and communication strategies to support adaptive management and improve the accessibility of information* ▪ *Strategies for addressing uncertainty and conflicting scientific information* ▪ *The prioritization of research and balancing of the short-term immediate science needs with science that enhances comprehensive understanding of the Delta system over the long term* ▪ *Identification of existing and future needs for refining and developing numerical and simulation models along with enhancing existing Delta conceptual models (e.g., the Interagency Ecological Program (IEP) Pelagic Organism Decline (POD) and the Delta Regional Ecosystem Restoration Implementation Plan (DRERIP) models)* ▪ *An integrated approach for monitoring that incorporates existing and future monitoring efforts* ▪ *An assessment of financial needs and funding sources to support science*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
Chapter 3		
WR P1 (23 CCR section 5003)	Reduce Reliance on the Delta through Improved Regional Water Self-Reliance	*(a) Water shall not be exported from, transferred through, or used in the Delta if all of the following apply:* *(1) One or more water suppliers that would receive water as a result of the export, transfer, or use have failed to adequately contribute to reduced reliance on the Delta and improved regional self-reliance consistent with all of the requirements listed in paragraph (1) of subsection (c);* *(2) That failure has significantly caused the need for the export, transfer, or use; and* *(3) The export, transfer, or use would have a significant adverse environmental impact in the Delta.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action to export water from, transfer water through, or use water in the Delta, but does not cover any such action unless one or more water suppliers would receive water as a result of the proposed action.* *(c) (1) Water suppliers that have done all of the following are contributing to reduced reliance on the Delta and improved regional self-reliance and are therefore consistent with this policy:* *(A) Completed a current Urban or Agricultural Water Management Plan (Plan) which has been reviewed by the California Department of Water Resources for compliance with the applicable requirements of Water Code Division 6, Parts 2.55, 2.6, and 2.8;* *(B) Identified, evaluated, and commenced implementation, consistent with the implementation schedule set forth in the Plan, of all programs and projects included in the Plan that are locally cost effective and technically feasible which reduce reliance on the Delta; and* *(C) Included in the Plan, commencing in 2015, the expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance. The expected outcome for measurable reduction in Delta reliance and improvement in regional self-reliance shall be reported in the Plan as the reduction in the amount of water used, or in the percentage of water used, from the Delta watershed. For the purposes of reporting, water efficiency is considered a new source of water supply, consistent with Water Code section 1011(a).* *(2) Programs and projects that reduce reliance could include, but are not limited to, improvements in water use efficiency, water recycling, stormwater capture and use, advanced water technologies, conjunctive use projects, local and regional water supply and storage projects, and improved regional coordination of local and regional water supply efforts.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
WR R1	Implement Water Efficiency and Water Management Planning Laws	*All water suppliers should fully implement applicable water efficiency and water management laws, including urban water management plans (Water Code section 10610 et seq.); the 20 percent reduction in statewide urban per capita water usage by 2020 (Water Code section 10608 et seq.); agricultural water management plans (Water Code section 10608 et seq. and 10800 et seq.); and other applicable water laws, regulations, or rules.*
WR R2	Require SWP Contractors to Implement Water Efficiency and Water Management Laws	*The California Department of Water Resources should include a provision in all State Water Project contracts, contract amendments, contract renewals, and water transfer agreements that requires the implementation of all State water efficiency and water management laws, goals, and regulations, including compliance with Water Code section 85021.*
WR R3	Compliance with Reasonable and Beneficial Use	*The State Water Resources Control Board should evaluate all applications and petitions for a new water right or a new or changed point of diversion, place of use, or purpose of use that would result in new or increased long-term average use of water from the Delta watershed for consistency with the constitutional principle of reasonable and beneficial use. The State Water Resources Control Board should conduct its evaluation consistent with Water Code sections 85021, 85023, 85031, and other provisions of California law. An applicant or petitioner should submit to the State Water Resources Control Board sufficient information to support findings of consistency, including, as applicable, its urban water management plan, agricultural water management plan, and environmental documents prepared pursuant to the California Environmental Quality Act.*
WR R4	Expanded Water Supply Reliability Element	*Water suppliers that receive water from the Delta watershed should include an expanded water supply reliability element, starting in 2015, as part of the update of an urban water management plan, agricultural water management plan, integrated water management plan, or other plan that provides equivalent information about the supplier's planned investments in water conservation and water supply development. The expanded water supply reliability element should detail how water suppliers are reducing reliance on the Delta and improving regional self-reliance consistent with Water Code section 85201 through investments in local and regional programs and projects, and should document the expected outcome for a measurable reduction in reliance on the Delta and improvement in regional self-reliance. At a minimum, these plans should include a plan for possible interruption of water supplies for up to 36 months due to catastrophic events impacting the Delta, evaluation of the regional water balance, a climate change vulnerability assessment, and an evaluation of the extent to which the supplier's rate structure promotes and sustains efficient water use.*
WR R5	Develop Water Supply Reliability Element Guidelines	*The California Department of Water Resources, in consultation with the Delta Stewardship Council, the State Water Resources Control Board, and others, should develop and approve, by December 31, 2014, guidelines for the preparation of a water supply reliability element so that water suppliers can begin implementation of WR R4 by 2015.*

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WR R6	Update Water Efficiency Goals	*The California Department of Water Resources and the State Water Resources Control Board should establish an advisory group with other State agencies and stakeholders to identify and implement measures to reduce impediments to achievement of statewide water conservation, recycled water, and stormwater goals by 2014. This group should evaluate and recommend updated goals for additional water efficiency and water resource development by 2018. Issues such as water distribution system leakage should be addressed. Evaluation should include an assessment of how regions are achieving their proportional share of these goals.*
WR R7	Revise State Grant and Loan Priorities	*The California Department of Water Resources, the State Water Resources Control Board, the California Department of Public Health, and other agencies, in consultation with the Delta Stewardship Council, should revise State grant and loan ranking criteria by December 31, 2013, to be consistent with Water Code section 85021 and to provide a priority for water suppliers that includes an expanded water supply reliability element in their adopted urban water management plans, agricultural water management plans, and/or integrated regional water management plans.*
WR R8	Demonstrate State Leadership	*All State agencies should take a leadership role in designing new and retrofitted State-owned and -leased facilities, including buildings and California Department of Transportation facilities, to increase water efficiency, use recycled water, and incorporate stormwater runoff capture and low-impact development strategies.*
WR R9	Update Bulletin 118, California's Groundwater Plan	*The California Department of Water Resources, in consultation with the Bureau of Reclamation, U.S. Geological Survey, the State Water Resources Control Board, and other agencies and stakeholders should update Bulletin 118 information using field data, California Statewide Groundwater Elevation Monitoring (CASGEM), groundwater agency reports, satellite imagery, and other best available science by December 31, 2014, so that this information can be included in the next California Water Plan Update and be available for inclusion in 2015 urban water management plans and agricultural water management plans. The Bulletin 118 update should include a systematic evaluation of major groundwater basins to determine sustainable yield and overdraft status; a projection of California's groundwater resources in 20 years if current groundwater management trends remain unchanged; anticipated impacts of climate change on surface water and groundwater resources; and recommendations for State, federal, and local actions to improve groundwater management. In addition, the Bulletin 118 update should identify groundwater basins that are in a critical condition of overdraft.*
WR R10	Implement Groundwater Management Plans in Areas that Receive Water from the Delta Watershed	*Water suppliers that receive water from the Delta watershed and that obtain a significant percentage of their long-term average water supplies from groundwater sources should develop and implement sustainable groundwater management plans that are consistent with both the required and recommended components of local groundwater management plans identified by the California Department of Water Resources Bulletin 118 (Update 2003) by December 31, 2014.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
WR R11	Recover and Manage Critically Overdrafted Groundwater Basins	*Local and regional agencies in groundwater basins that have been identified by the California Department of Water Resources as being in a critical condition of overdraft should develop and implement a sustainable groundwater management plan, consistent with both the required and recommended components of local groundwater management plans identified by the California Department of Water Resources Bulletin 118 (Update 2003), by December 31, 2014. If local or regional agencies fail to develop and implement these plans, the State Water Resources Control Board should take action to determine if the continued overuse of a groundwater basin constitutes a violation of the State's Constitution Article X, Section 2, prohibition on unreasonable use of water and whether a groundwater adjudication is necessary to prevent the destruction of or irreparable injury to the quality of the groundwater, consistent with Water Code sections 2100 and 2101.*
WR R12a	Promote Options for New and Improved Infrastructure Related to Water Conveyance	*Subject to completion of environmental review and approval by the lead agency, and applicable regulatory approvals from other public agencies, the following infrastructure options are hereby promoted:* *(1) The California Department of Water Resources (DWR) the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and local beneficiary agencies should pursue a dual-conveyance option for the Delta. Dual conveyance is a combination of through-Delta conveyance and isolated conveyance to allow operational flexibility. Dual conveyance alternatives should be evaluated, and a selected plan designed and implemented, consistent with WR R12b, below. Dual conveyance should incorporate existing and new intakes and facility improvements for both isolated, below-ground conveyance and through-Delta conveyance of State Water Project (SWP) and Central Valley Project (CVP) water supplies from the Sacramento River to the south Delta, as follows:* *(a) The isolated conveyance should incorporate one or more new screened intakes that protect native fish and that are operated to minimize harmful reverse flow conditions in Old and Middle rivers while maintaining water quality for in-Delta uses. Isolated conveyance should complement existing and improved through-Delta conveyance to promote operational flexibility, protect water quality, and support ecosystem restoration.* *(b) To protect the Delta ecosystem, the State Water Resources Control Board should ensure that operational criteria for new and improved conveyance facilities comply with applicable State Water Resources Control Board requirements, including any flow criteria adopted pursuant to Water Code 85086(c)(2).* *(c) Dual conveyance requires continued maintenance and further improvement of through-Delta conveyance. Through-Delta conveyance improvements may include channel improvements consistent with the Delta Plan and additional facilities that could provide for improved operations for native fish protection.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		(2) DWR in collaboration with local beneficiary agencies should pursue new intake and conveyance facilities for conveying SWP supplies from the Sacramento River to SWP contractors in Solano and Napa Counties. This is both to protect native fish and improve the quality and reliability of water supplies delivered via the North Bay Aqueduct. *(3) Local agencies, in coordination with DWR and Reclamation, should pursue new conveyance facilities or conveyance facility improvements that allow use of multiple Delta intakes associated with the Los Vaqueros Project. This would increase operational flexibility for local, SWP, and CVP municipal and environmental water supplies conveyed from the south Delta.* *(4) DWR, Reclamation, and local beneficiary agencies, in coordination with the California Department of Fish and Wildlife, National Marine Fisheries Service and U.S. Fish and Wildlife Service, should evaluate and identify for near-term implementation feasible actions to contribute to reducing fish losses associated with existing pumping operations at the Banks Pumping Plant and Jones Pumping Plant, consistent with the 2009 Biological Opinion and Conference Opinion on the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan; the 2009 Biological Opinion on the Coordinated Operations of the Central Valley Project and State Water Project in California; and the 2014 Recovery Plan for Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead. These actions may include, but are not limited to:* *(a) Implementing changes to the operations and physical infrastructure of the facilities where such changes can improve fish screening and salvage operations and reduce mortality from entrainment and salvage.* *(b) Evaluating and implementing effective predator control actions, such as fishery management or directed removal programs, for minimizing predation on juvenile salmon and steelhead in Clifton Court Forebay and in the primary channel at the Tracy Fish Collection Facility.* *(c) Evaluating and implementing effective predation reduction actions associated with salvage operations, such as transporting and releasing fish in multiple locations in the Delta.* *(d) Installing equipment to monitor for the presence of predators and to monitor flows at the fish collection facilities.* *(e) Modifying Delta Cross Channel gate operations and evaluating methods to control access to Georgiana Slough and other migration routes into the interior Delta to reduce diversion of listed juvenile fish from the Sacramento River and the San Joaquin River into the southern or central Delta..*
WR R12b	Evaluate, Design, and Implement	*(1) In selecting new and improved Delta infrastructure for conveying SWP, CVP, and market transfer water supplies from the Sacramento River to*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
	New or Improved Conveyance or Diversion Facilities in the Delta	*the south Delta, project proponents should analyze and evaluate a range of alternatives including, but not limited to the following:* *(a) A reasonable range of flow criteria, rates of diversion, and other operational criteria required to satisfy applicable requirements of State and federal fish and wildlife agencies and the State Water Resources Control Board, and other operational requirements and flows necessary for protecting, restoring, and enhancing the Delta ecosystem under a reasonable range of hydrologic conditions (as described under WR R12h, below). This includes identifying water available for export and other beneficial uses, consistent with water quality requirements of the State Water Resources Control Board.* *(b) A reasonable range of dual-conveyance alternatives, including options for the number and location of new intakes, a range of isolated conveyance capacities, through-Delta conveyance improvements, and other facilities that could improve operations for native fish and in-Delta water quality, as applicable.* *(c) The potential effects of climate change on the conveyance alternatives under consideration, including possible precipitation and runoff pattern changes, temperature, and sea level rise estimates consistent with guidance provided by the California Natural Resources Agency, National Research.* *(d) Council, or other appropriate projections. The potential effects on migratory fish and aquatic resources and habitats.* *(e) The potential effects on Sacramento River and San Joaquin River flood management.* *(f) The resilience and recovery of Delta conveyance alternatives to catastrophic failure caused by earthquake, flood or other natural disaster.* *(g) The potential effects of each Delta conveyance alternative on Delta water quality, flows, and water levels, including the effects of these changes on in-Delta water users.* *(h) The operational benefits and/or detriments of providing multiple intake locations.* *(i) The potential short-term and long-term effects of each Delta conveyance alternative on terrestrial species.* *(j) The potential effects of each Delta conveyance alternative on the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.* *(k) The cost-effectiveness of the alternatives in furthering the coequal goals. Cost-effectiveness means the degree to which a project or action is effective in achieving desired outcomes in relation to its cost.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		(2) Project proponents should design and implement new or improved conveyance infrastructure in the Delta consistent with the following parameters: *(a) Located in areas with seasonally favorable freshwater conditions, and areas that are less vulnerable to degradation during sustained droughts and under anticipated future climate change and sea level rise conditions.* *(b) Located to avoid impacts to and, where possible, improve conditions for habitat restoration opportunities in priority restoration areas identified in the Delta Plan, and other important restoration opportunity areas identified by the California Department of Fish and Wildlife.* *(c) Located, designed, and operated to minimize adverse conditions for native aquatic and terrestrial species, including but not limited to those conditions related to flow direction and water quality.* *(d) Designed to avoid or minimize native fish entrainment and impingement.* *(e) Designed to balance adverse project impacts against the project's long- and short-term benefits.* *(f) Designed to minimize disruptions to transportation and business activities during routine maintenance activities, with consideration given to scheduling planned maintenance activities in consultation with local governments to minimize impacts to residents and businesses, and establishing communication protocols to notify residents of planned and unplanned maintenance activities.* *(g) Designed to complement the Delta landscape and minimize aesthetic impacts, including visual impacts of spoils material stockpiles.* *(h) Designed to maximize beneficial reuse of spoils materials to the extent practicable and feasible.* *(i) Implemented in accordance with detailed project implementation plans developed in cooperation with affected communities, local governments, the Delta Protection Commission, and stakeholders to minimize and/or mitigate adverse environmental effects consistent with Delta Plan Policy GP 1, and avoid or reduce conflicts with existing or planned land uses consistent with Delta Plan Policy DP P2, and in consideration of Delta Plan recommendations DP R14, DP R16 and DP R17. Project implementation plans should consider and protect the unique character and historical importance of legacy communities, be consistent with the State's policy regarding the human right to water, and incorporate good neighbor policies to avoid negative impacts on agricultural lands, residents, and business. Items that should be addressed in the plans include, but are not limited to, the following:* *i. Construction sequencing or phasing;* *ii. Temporary and long-term spoils placement;*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		iii. Plans for temporary traffic routing that are consistent with local transportation plans, including consideration of permanent improvements to transportation and alternative transportation routes to avoid the most severe impacts to levels of service during construction; *iv. Effects of construction activities on recreation and other visitor-related activities and businesses, including disruptions to transportation, temporary waterway closures, aesthetic and noise effects, and access to marinas, parks, and other recreation facilities;* *v. Effects on local surface water and groundwater supplies during construction;* *vi. Mechanisms for communicating with landowners, communities, and local governments before and during construction;* *vii. Mechanisms by which community members and stakeholders can raise concerns during construction and in association with ongoing facility operations and maintenance; and* *viii. Legally-permissible project delivery methods which are cost effective and provide for an expedited design and construction timeline that minimizes disruption to affected communities.*
WR R12c	Improve or Modify Through-Delta Conveyance	*(1) Project proponents should design, implement, and adaptively manage improved or modified through-Delta conveyance and appurtenant facilities (such as gates, permanent barriers, or fish handling facilities) to:* *(a) Substantially lessen or avoid impacts and provide net improvements to riparian habitat and channel margin habitat along anadromous fish migratory corridors and, where feasible, enhance conditions for native fish.* *(b) Substantially lessen or avoid impediments and provide net improvements to anadromous fish migration.* *(c) Substantially lessen or avoid impacts to public safety and include or contribute to levee improvements along Old and Middle Rivers consistent with Chapter 7 of the Delta Plan.* *(d) Modify the conveyance capacity or hydraulic characteristics of existing Delta waterways (e.g., improving levees and/or dredging) in a manner that provides multiple benefits, including: taking advantage of periods when water flow and quality conditions are favorable for improving water supply delivery reliability, quality, and flexibility and for protecting, restoring, and enhancing the Delta ecosystem; improving floodplain values and functions; improving habitat conditions during fish migration; and reducing flood risks.*
WR R12d	Promote Options for New or Expanded Water Storage	*Subject to completion of environmental review and approval by the lead agency, and applicable regulatory approvals from other public agencies, options for new or expanded water storage are hereby promoted as follows:*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		(1) Within the Delta watershed, project proponents should design and operate new or expanded offstream or onstream surface water storage projects consistent with the criteria in WR R12h to: *(a) Provide water supply reliability, water quality, operational flexibility to adapt to changing conditions, and ecosystem benefits under variable hydrologic conditions, and, where possible, flood risk management benefits.* *(b) Improve resilience to the effects of climate change, sea level rise, higher stream temperatures, long-term drought conditions, and emergency supply disruptions.* *(c) Allow greater flexibility in storing water supplies during periods when more water is available for carryover into periods when less water is available and/or Delta exports are reduced.* *(d) Take advantage of periods when the water flow, quality, and environmental requirements of State and federal agencies are being met, for improving water supply delivery reliability and flexibility and protecting, restoring, and enhancing the Delta ecosystem.* *(e) Contribute to improved conjunctive management of both surface and groundwater resources to maximize efficient water use and contribute to sustainable management of groundwater basins, consistent with the Sustainable Groundwater Management Act.* *(2) Within the Delta water export area, project proponents should implement new or expanded surface water storage projects that improve resilience to the effects of climate change and drought and are operated to allow storage of exported and local surface water supplied during wetter periods for use during dryer periods when exports from the Delta are reduced. Opportunities to store stormwater and recycled water supplies of suitable quality should also be promoted as a strategy for improved regional water management and reduced reliance on the Delta. This includes projects in the San Francisco Bay Area, San Joaquin Valley, Central Coast region, and Southern California.* *(3) Within the Delta watershed and Delta water export area, project proponents should implement groundwater storage and extraction projects, including facilities for groundwater withdrawal, recharge, injection, and monitoring that are consistent with the criteria in WR R12f below.* *(4) The State Water Resources Control Board should review and consider revisions to existing regulations to facilitate the safe use of recycled water, stormwater, and other local water supplies for groundwater replenishment.*
WR R12e	Design, Construct and Implement New or Expanded Surface Water Storage	*(1) Project proponents should design, implement, and adaptively manage new or expanded surface storage projects in the Delta, its watershed, and Delta water export areas to:* *(a) Improve resilience of the State's water supply system through demonstration of benefits under current and anticipated future*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		conditions, including climate change, changing water demands, and regulatory conditions. *(b) Contribute to regional self-reliance and reduced reliance on the Delta.* *(c) Demonstrate contributions to the goals of the Sustainable Groundwater Management Act by promoting conjunctive use to achieve long-term groundwater basin sustainability.* *(d) Enable participation in water exchanges and transfers that benefit the Delta ecosystem and improve regional water supply reliability.* *(e) Demonstrate cost-effectiveness, where cost-effectiveness means the degree to which a project or action is effective in achieving desired outcomes in relation to its cost.* *(f) Minimize and mitigate the impacts of storage on stream flows and water quality, including impacts during construction.* *(2) Project proponents should design and implement new or expanded surface water storage projects in the Delta and Delta watershed, where feasible, to further achievement of the coequal goals by:* *(a) Providing for the dedicated storage of water during wet periods for carry over and later use during dry periods, while balancing the benefits of providing more natural, functional flows to the Delta and its tributaries, meeting other ecosystem needs and providing flood risk management benefits.* *(b) Enhancing water temperature management on Delta tributaries either directly or through coordinated operations with other facilities.* *(c) Incorporating storage space dedicated to ecosystem benefits, such as flow management, water temperature, other water quality benefits, or providing water supplies to wildlife refuges.* *(d) Integrating new and/or expanded storage with other existing or planned storage and conveyance systems to increase ecosystem and water supply benefits. This includes developing and/or updating coordinated operations plans, and/or agreements with other storage and conveyance systems.* *(e) Contributing to the protection of water quality in the Delta and its watershed for all beneficial uses consistent with the State Water Resources Control Board's Bay-Delta Plan.* *(f) Contributing to more natural, functional flows that support ecosystem health.* *(3) Project proponents should design and implement, where feasible, new or expanded surface water storage projects outside the Delta watershed, but within the Delta water export area, such as projects within the San Joaquin Valley, Central Coast, or Southern California regions, to:* *(a) Contribute to reduced reliance on the Delta and regional self-reliance and, particularly during dry periods, through storage of*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
		available water supplies during wet periods for use during dry periods. *(b) Promote conjunctive management of surface and groundwater resources, and contribute to achieving groundwater sustainability goals established pursuant to the Sustainable Groundwater Management Act or applicable local plans, as appropriate.* *(c) Contribute to a comprehensive, integrated water management approach that considers multiple water supply sources including, but not limited to, stream flow, groundwater, imported water, stormwater, and recycled water, as applicable.*
WR R12f	Implement New or Expanded Groundwater Storage	*(1) Funding, planning, and technical support provided by State and regional agencies for groundwater projects should:* *(a) Promote multiple benefits, minimize harmful effects to the ecosystem, help achieve Bay-Delta Plan objectives, as applicable, and be consistent with guidance from the State Water Resources Control Board and DWR for implementing the Sustainable Groundwater Management Act.* *(b) Promote increased groundwater recharge using locally available water, such as recharge via stream-aquifer interactions, floodwater or stormwater capture, recharge using recycled water, or others, provided such actions do not result in harmful impacts to functional flows in local streams.* *(c) Promote conjunctive management of surface water and groundwater resources, including in-lieu recharge.* *(d) Promote new or expanded groundwater banking and exchange projects.* *(e) Promote the construction of new or improved local conveyance infrastructure to convey water to and from groundwater recharge and recovery facilities.* *(f) Promote the construction of new or improved conveyance infrastructure that interconnects Delta export conveyance facilities with local conveyance facilities.* *(g) Promote implementation of the Central Valley Salt and Nitrate Management Plan and achievement of management goals and priorities for protection of water quality, where appropriate.* *(h) Promote wellhead treatment, access to conjunctively-managed surface supplies, or other means of providing access to safe, clean, and affordable water supplies for communities relying on impaired groundwater.* *(i) Demonstrate consistency with applicable Groundwater Sustainability Plans under the Sustainable Groundwater Management Act.* *(j) Include new infrastructure that is consistent with WR R12f (1)(a)-(c), above.*

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		(k) Assess the ecosystem and water supply impacts and benefits to the Delta, including providing mitigation, as appropriate. *(l) Promote opportunities for storage of flood waters (e.g., floodplain storage) or stormwater that can be managed for groundwater recharge.* *(2) DWR should develop a model ordinance for groundwater recharge that urges cities and counties to incorporate groundwater recharge and storage into land-use planning and zoning, and to protect areas with the highest potential for groundwater recharge from incompatible uses. (Note: A representative map showing the soil suitability index for groundwater banking projects on agricultural lands is shown in Figure 3-11.* *(3) DWR or the State Water Resources Control Board should prepare a proposal for an incentive program, in coordination with the Department of Conservation or the U.S. Department of Agriculture's conservation programs, for landowners to protect lands with high groundwater recharge potential for the purpose of contributing to sustainable groundwater management.*
WR R12g	Promote Options for Operations of Storage and Conveyance Facilities	*Subject to completion of environmental review and approval by the lead agency, the following options for the operation of conveyance and storage are hereby promoted:* *(1) DWR, in coordination with Reclamation, should develop a Drought Water Operations Strategy for the SWP and CVP to meet State Water Resources Control Board-specified flow and water quality criteria during extended drought conditions lasting up to six years, or for the extended timeframe recommended by the Real Time Drought Operations Team (RTDOT) describing opportunities and tools to improve routine operations to adapt to drought conditions. In developing the Strategy, DWR and Reclamation should include criteria for defining appropriate levels or stages of drought affecting the SWP and CVP, in coordination with the RTDOT agencies and the North, Central, and South Delta Water Agencies. The Strategy should consider in-Delta actions and activities, and operations and storage of other facilities or projects that support achievement of the coequal goals. This strategy should be submitted to the Delta Stewardship Council by 2020 and be updated following future declarations of emergency associated with extreme hydrological conditions pursuant to the California Emergency Services Act (Government Code Sections 8550-8668), within one year of completing an After-Action Report, or when physical or regulatory changes necessitate an update.* *(2) DWR and Reclamation should use an adaptive management approach, consistent with the Delta Plan's adaptive management framework and in alignment with existing collaborative adaptive management efforts, for the coordinated operation of SWP and CVP through-Delta conveyance to promote the coequal goals, including considerations for protecting, enhancing, and restoring the ecosystem and maintaining*

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		adequate flows, flow direction, water levels, and water quality for Delta agriculture, recreation, and communities. *(3) Lead agencies for new or modified conveyance facilities, and new and expanded storage facilities—including those options identified in WR R12a and WR R12d should develop operational plans consistent with WR R12h, below.* *(4) To improve water management flexibility and to support coordinated operations with new storage facilities, local agencies—in coordination with DWR and Reclamation, as appropriate—should pursue the following new or improved conveyance facilities outside of the Delta, to reduce reliance on the Delta and promote regional self-reliance:* *(a) Facilities that promote the movement or exchange of SWP, CVP, and local water supplies, such as between the east and west sides of the San Joaquin Valley or between other regions.* *(b) Facilities that improve groundwater recharge and/or conjunctive use in overdrafted aquifers of the San Joaquin Valley, Tulare Lake Basin, and other Delta water export areas.* *(c) Facilities that increase groundwater banking or exchange, or that promote increased use of stormwater, recycled water, desalinated water, or other local water supplies in regions tributary to, or that rely on, Delta water supplies.*
WR R12h	Operate Delta Water Management Facilities Using Adaptive Management Principles	*(1) Project proponents should develop plans for the operation or reoperation of water conveyance and control facilities in the Delta, or new or modified storage facilities in the Delta and its watershed, that incorporate adaptive management consistent with the Delta Plan's adaptive management framework and further achievement of the coequal goals by:* *(a) Including specific and measurable operating objectives (consistent with State Water Resources Control Board's Bay-Delta Plan objectives), that address:* *i. Protection for and enhancements to the Delta ecosystem, including improved water temperature management, while reliably delivering water.* *ii. Avoidance or mitigation of adverse effects on in-Delta recreation and in-Delta water quality, including identifying salinity targets for the south Delta that are designed to prevent severe water quality degradation and toxic events in dry and critically dry years.* *iii. Avoidance or mitigation of adverse effects on stream flows and water quality.* *iv. Avoid or mitigate adverse effects on agriculture in the Delta, including identifying salinity targets suitable for the types of crops grown in the Delta.* *v. Protection of the quality, reliability, and affordability of water supplies for communities relying on impaired water supplies,*

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		including disadvantaged communities, consistent with California Water Code section 106.3. *(b) Enabling diversions during periods when Delta water flow, quality, and environmental requirements are being met for improving water supply delivery reliability and flexibility to changing conditions, and for protecting, restoring, and enhancing the Delta ecosystem.* *(c) Incorporating adaptive management plans, consistent with the Delta Plan's adaptive management framework and developed in coordination with operators and applicable regulatory agency staff, for modifying operations to meet State Water Resources Control Board flow and water quality requirements, and California Department of Fish and Wildlife conservation and recovery goals, under the following:* *i. Extended drought conditions (more than three years in duration).* *ii. Changed climate conditions including sea level rise and changed hydrologic conditions over the anticipated project life.* *iii. Extreme wet years and flood events.* *(d) Demonstrating that projects can contribute to a more reliable water supply, and can protect, restore, and enhance the Delta ecosystem under a range of future conditions, including changing climate and sea level rise projections from the California Natural Resources Agency or National Research Council, or other appropriate projections.* *(e) Evaluating the applicability of forecast-informed reservoir operations.* *(f) Considering coordination and integration of operations with existing and/or planned conveyance and water storage facilities to maximize their potential to contribute to the goals of the Sustainable Groundwater Management Act, and the goals of other applicable programs and plans related to sustainable groundwater, stormwater, and floodwater management.* *(g) Reviewing and updating, as needed, the flood space reservation guidelines for upstream reservoirs in coordination with the U.S. Army Corps of Engineers and reservoir owners or operators.* *(2) Project proponents should develop operation plans for new water conveyance facilities in the Delta, and new or expanded storage facilities in the Delta watershed, that:* *(a) Ensure that operations are adequately monitored, evaluated, and revised using adaptive management to make progress towards achieving defined performance measures.* *(b) Be based upon accurate, timely, and transparent water accounting and budgeting.* *(c) Ensure that operations provide water levels, water flow, and water quality suitable for in-Delta agricultural and recreational uses.*

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WR R12i	Update the Bay-Delta Plan and Consider Drought	*(1) In developing and implementing updates to the Bay-Delta Plan, and flow requirements for priority tributaries to the Delta to protect beneficial uses in the Bay-Delta watershed, the State Water Resources Control Board should:* *(a) Consider and contribute to achievement of applicable Delta Plan performance measures.* *(b) Require water diverters in the Delta and its watershed that are responsible for meeting Bay-Delta Plan requirements, including but not limited to DWR and Reclamation, to develop a process and plan for meeting applicable flow and water quality requirements during extended drought conditions (characterized by multiple, successive dry years) to further the coequal goals and minimize reliance on temporary urgency change petitions and related requests.*
WR R12j	Operate New or Improved Conveyance and Diversion Facilities Outside of the Delta	*(1) Conveyance facilities outside the Delta should be operated in consideration of effects on Delta water quality, the timing and magnitude of flows in the Delta, water supplies available for export from the Delta, and effects on opportunities to protect, restore, and enhance the Delta ecosystem.* *(2) In allocating funding for new water conveyance and conveyance improvement projects outside the Delta that support regional self-reliance, the State should give preference to projects that:* *(a) Reduce reliance on the Delta for water supply during dry and critically dry years by the specific designation, in operational agreements or plans, of carryover storage for beneficial use during these periods.* *(b) Improve conjunctive management of surface and groundwater resources and contribute to achieving groundwater sustainability goals established pursuant to the Sustainable Groundwater Management Act or local plans, as appropriate.* *(c) Support ecosystem enhancement and/or provide more natural, functional flows in the Delta and its tributaries.* *(d) Improve the ability of regions that rely on the Delta, for all or a portion of their water supplies, to withstand and adapt to changing current and future hydrologic conditions.* *(e) Improve the quality, reliability, and affordability of water supplies for communities relying on impaired water supplies, including disadvantaged communities, consistent with California Water Code section 106.3.* *(f) Contribute to a comprehensive, integrated water management approach that considers multiple water supply sources including, but not limited to, stream flow, groundwater, imported water, stormwater, desalinated water, water saved through increased efficiency, and recycled water, as applicable.* *(g) Improve flexibility to accommodate water market transfer and exchange opportunities that benefit the environment.*

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WR R12k	Promote Water Operations Monitoring Data Management, and Data Transparency	*In meeting the requirements of the 2016 Open and Transparent Water Data Act, DWR should coordinate with the Council to incorporate information related to Delta Plan performance measures and links to the Council's online tracking and reporting tools, as appropriate, in an effort to promote transparency and accessibility of data in tracking progress toward achieving the coequal goals.*
WR R13	Complete Surface Water Storage Studies	*The California Department of Water Resources should complete surface water storage investigations of proposed off-stream surface storage projects by December 31, 2012, including an evaluation of potential additional benefits of integrating operations of new storage with proposed Delta conveyance improvements, and recommend the critical projects that need to be implemented to expand the state's surface storage.*
WR R14	Identify Near-term Opportunities for Storage, Use, and Water Transfer Projects	*The California Department of Water Resources, in coordination with the California Water Commission, Bureau of Reclamation, State Water Resources Control Board, California Department of Public Health, the Delta Stewardship Council, and other agencies and stakeholders, should conduct a survey to identify projects throughout California that could be implemented within the next 5 to 10 years to expand existing surface and groundwater storage facilities, create new storage, improve operation of existing Delta conveyance facilities, and enhance opportunities for conjunctive use programs and water transfers in furtherance of the coequal goals. The California Water Commission should hold hearings and provide recommendations to the California Department of Water Resources on priority projects and funding.*
WR R15	Improve Water Transfer Procedures	*The California Department of Water Resources and the State Water Resources Control Board should work with stakeholders to identify and recommend measures to reduce procedural and administrative impediments to water transfers and protect water rights and environmental resources by December 31, 2016. These recommendations should include measures to address potential issues with recurring transfers of up to 1 year in duration and improved public notification for proposed water transfers.*
WR P2 (23 CCR section 5004)	Transparency in Water Contracting	*(a) The contracting process for water from the State Water Project and/or the Central Valley Project must be done in a publicly transparent manner consistent with applicable policies of the California Department of Water Resources and the Bureau of Reclamation referenced below.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers the following:* *(1) With regard to water from the State Water Project, a proposed action to enter into or amend a water supply or water transfer contract subject to California Department of Water Resources Guidelines 03-09 and/or 03-10 (each dated July 3, 2003), which are attached as Appendix 2A; and*

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		(2) With regard to water from the Central Valley Project, a proposed action to enter into or amend a water supply or water transfer contract subject to section 226 of P.L. 97-293, as amended or section 3405(a)(2)(B) of the Central Valley Project Improvement Act, Title XXXIV of Public Law 102-575, as amended, which are attached as Appendix 2B, and Rules and Regulations promulgated by the Secretary of the Interior to implement these laws.
WR R16	Supplemental Water Use Reporting	*The State Water Resources Control Board should require water rights holders submitting supplemental statements of water diversion and use or progress reports under their permits or licenses to report on the development and implementation of all water efficiency and water supply projects and on their net (consumptive) use.*
WR R17	Integrated Statewide System for Water Use Reporting	*The California Department of Water Resources, in coordination with the State Water Resources Control Board, California Department of Public Health, California Public Utilities Commission, California Energy Commission, Bureau of Reclamation, California Urban Water Conservation Council, and other stakeholders, should develop a coordinated statewide system for water use reporting. This system should incorporate recommendations for inclusion of data needed to better manage California's water resources. The system should be designed to simplify reporting; reduce the number of required reports where possible; be made available to the public online; and be integrated with the reporting requirements for the urban water management plans, agricultural water management plans, and integrated regional water management plans. Water suppliers that export water from, transfer water through, or use water in the Delta watershed should be full participants in the data base.*

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WR R18	California Water Plan	*The California Department of Water Resources, in consultation with the State Water Resources Control Board, and other agencies and stakeholders, should evaluate and include in the next and all future California Water Plan updates information needed to track water supply reliability performance measures identified in the Delta Plan, including an assessment of water efficiency and new water supply development, regional water balances, improvements in regional self-reliance, reduced regional reliance on the Delta, and reliability of Delta exports, and an overall assessment of progress in achieving the coequal goals.*
WR R19	Financial Needs Assessment	*As part of the California Water Plan Update, the California Department of Water Resources should prepare an assessment of the state's water infrastructure. This should include the costs of rehabilitating/replacing existing infrastructure, an assessment of the costs of new infrastructure, and an assessment of needed resources for monitoring and adaptive management for these projects. The California Department of Water Resources should also consider a survey of agencies that may be planning small-scale projects (such as storage or conveyance) that improve water supply reliability.*
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ER P1 (23 CCR section 5005)	Delta Flow Objectives	*(a) The State Water Resources Control Board's Bay Delta Water Quality Control Plan flow objectives shall be used to determine consistency with the Delta Plan. If and when the flow objectives are revised by the State Water Resources Control Board, the revised flow objectives shall be used to determine consistency with the Delta Plan.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, the policy set forth in subsection (a) covers a proposed action that could significantly affect flow in the Delta.*
ER R1	Update Delta Flow Objectives	*The State Water Resources Control Board (SWRCB) should maintain a regular schedule of reviews of the Bay-Delta Plan to reflect changing conditions due to climate change and other factors. The SWRCB should consult with the Delta Science Program on adaptive management and the use of best available science.*

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ER PA (Not yet codified; rule-making in progress)	Disclose Contributions to Restoring Ecosystem Function and Providing Social Benefits	*(a) A complete certification of consistency for a covered action described in Subsection (b) shall disclose and include all of the information and documentation required by the following Sections in Appendix 3A:* *1. Section 1 (Priority Attributes) of Appendix 3A (Disclosing Contributions to Restoring Ecosystem Function and Providing Social Benefits) to demonstrate that the covered action has one or more of the priority attributes, to disclose its contribution to the restoration of a resilient, functioning Delta ecosystem, and to identify the Ecosystem Restoration Tier associated with that covered action based on the identified priority attributes; and* *2. Section 2 (Social Benefits) of Appendix 3A (Disclosing Contributions to Restoring Ecosystem Function and Providing Social Benefits) to demonstrate and disclose the cultural, recreational, agricultural, and/or natural resource benefits anticipated to result from project implementation.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy applies to a covered action that includes protection, enhancement, or restoration of the ecosystem.*

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ER P2 (Not yet codified; rule-making in progress)	Restore Habitats at Appropriate Elevations	*a) The certification of consistency for a covered action described in Subsection (d) must be carried out in a manner consistent with Appendix 4A, which provides guidance on appropriate elevations for particular ecosystem types within the Sacramento-San Joaquin Delta and Suisun Marsh.* *1. The certification of consistency must include a completed Appendix 4A and all of the documentation and information required by Appendix 4A.* *2. If a covered action is not consistent with the Table 1.1 in Appendix 4A, the certification of consistency shall provide, based on best available science, the rationale for any inconsistency with Table 1.1 and how it is nonetheless consistent with this policy.* *b) The certification of consistency for a covered action that takes place, in whole or in part, in the Intertidal Elevation Band and Sea Level Rise Accommodation Band shall, based on best available science:* *1. Explain, how the action is designed to accommodate each of the following:* *i. future marsh migration;* *ii. anticipated sea level rise; and* *iii. tidal inundation; and* *2. If the action does not implicate one or more of the elements set forth in subsection (1) of section (b) of this regulation, for each such element, explain why it does not.* *3. The information required by this regulation may be included in an adaptive management plan, where required by section 5002 of this Chapter.* *c) The certification of consistency for a covered action that takes place, in whole or in part, in the Shallow Subtidal Elevation Band or the Deep Subtidal Elevation Band shall explain, based on best available science, how the action is designed to safeguard against levee failure over the design life of the project. This information may be included in an adaptive management plan, where required by section 5002 of this Chapter.* *d) For purposes of Water Code Section 85057.5(a)(3) and Section 5001(j)(1)(E) of this Chapter, this policy applies to a covered action that includes protection, restoration, or enhancement of the ecosystem.*

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ER P3 (Not yet codified; rule-making in progress)	Protect Opportunities to Restore Habitat	*(a) Within the priority habitat restoration areas depicted in Appendix 5, significant adverse impacts to the opportunity to restore habitat as described in section 5006 of this Chapter, must be avoided or mitigated.* *(b) Impacts referenced in subsection (a) will be deemed to be avoided or mitigated if the project is designed and implemented so that it will not preclude or otherwise interfere with the ability to restore habitat as described in section 5006 of this Chapter.* *(c) If the impacts referenced in subsection (a) are mitigated (rather than avoided), they must be mitigated to the extent that the project has no significant impact on the opportunity to restore habitat as described in section 5006 of this Chapter.* *(d) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions in the priority habitat restoration areas depicted in Appendix 5. It does not cover proposed actions outside those areas.*
ER P4 (Not yet codified; rule-making in progress)	Expand Floodplains and Riparian Habitats in Levee Projects	*(a) Certifications of consistency for levee projects must evaluate, and where feasible incorporate into the levee project, alternatives that would increase floodplains and riparian habitats.* *1. Levee projects located in the following areas (as depicted in Appendix 8A): (1) The Sacramento River between the Deepwater Ship Channel and Steamboat Slough, the San Joaquin River from the Stanislaus River confluence to Rough and Ready Island, the Stanislaus River, the Cosumnes River, Middle River, Old River, Paradise Cut, Elk Slough, Sutter Slough; and the North and South Forks of the Mokelumne River, and (2) Urban levee improvement projects in the cities of West Sacramento and Sacramento, shall evaluate alternatives that would remove all or a portion of the original levee prism in order to physically expand the width of the channel.* *2. All levee projects located in whole or in part in the Delta shall evaluate alternatives that would increase levee waterside habitat.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action to construct a new flood control work or make a permanent structural change or improvement that enhances a flood control work's function, changes its level of protection, or adapts it for new or different use.*
ER RA	Increase Public Funding for Restoring Ecosystem Function	*New funding sources are needed to achieve the scale of ecosystem restoration envisioned by the Delta Reform Act. Future State funding opportunities for implementing restoration projects in the Delta, including grant and loan programs, should be directed to projects that would achieve Ecosystem Restoration Tier 1 or 2, as defined in Appendix 3A.*

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ER RB	Use Good Neighbor Checklist to Coordinate Restoration with Adjacent Uses	*Restoration projects should use the Good Neighbor Checklist in the planning and design of restoration projects, in order to avoid or reduce conflicts with existing uses.*
ER R4	Exempt Delta Levees from the U.S. Army Corps of Engineers' Vegetation Policy	*Considering the ecosystem value of remaining riparian and shaded riverine aquatic habitat along Delta levees, the U.S. Army Corps of Engineers should agree with the California Department of Fish and Wildlife and the California Department of Water Resources on a variance that exempts Delta levees from the U.S. Army Corps of Engineers' levee vegetation policy where appropriate.*
ER R5	Update the Suisun Marsh Protection Plan	*The San Francisco Bay Conservation and Development Commission should update the Suisun Marsh Protection Plan to adapt to sea level rise and ensure consistency with the Suisun Marsh Preservation Act, the Delta Reform Act, and the Delta Plan, and support local government and districts with jurisdiction in the Suisun Marsh in amending their components of the Suisun Marsh Local Protection Program accordingly.*
ER RC	Fund Targeted Subsidence Reversal Actions	*(a) The Delta Conservancy should develop incentive programs for public and private land owners that encourage land management practices that stop subsidence on deeply subsided lands in the Delta and Suisun Marsh.* *(b) In order to ensure the long-term durability of state investments in restoration, State agencies that fund ecosystem restoration in subsided areas should direct investments to areas that have opportunities to both reverse subsidence and restore intertidal marsh habitat.*
ER RD	Funding to Enhance Working Landscapes	*State agencies should be provided with funding in order to provide resources and support to Resource Conservation Districts (RCDs), Reclamation Districts (RDs), and other local agencies and districts, in their efforts to restore ecosystem function or improve agricultural land management practices that support native species. State agencies should work with RCDs, RDs, and other local agencies and districts, to adaptively manage agricultural land management practices to improve habitat conditions for native species.*
ER RE	Develop and Update Management Plans to Halt or Reverse Subsidence on Public Lands	*For all publicly-owned lands in the Delta or Suisun Marsh, State and local agencies, including Reclamation Districts, should develop or update plans that identify land management goals; identify appropriate public or private uses for that property; and describe the operation and maintenance requirements needed to implement management goals. These plans should address subsidence and consider the feasibility of subsidence reversal.*
ER P5 (23 CCR section 5009)	Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species	*(a) The potential for new introductions of or improved habitat conditions for nonnative invasive species, striped bass, or bass must be fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that has*

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		the reasonable probability of introducing or improving habitat conditions for nonnative invasive species.
ER R7	Prioritize and Implement Actions to Control Nonnative Invasive Species	*The Delta Conservancy, Delta Science Program, California Department of Fish and Wildlife, California Department of Food and Agriculture, California Department of Parks and Recreation, Division of Boating and Waterways, and other State and federal agencies should develop and implement communication and funding strategies to manage existing nonnative invasive species and for rapid response to new introductions of nonnative invasive species, based on scientific expertise and research.*
ER RH	Prioritize Unscreened Diversions within the Delta	*The California Department of Fish and Wildlife should collect field data to inform prioritization of unscreened diversions within the Delta.*
ER RI	Fund Projects to Improve Survival of Juvenile Salmon	*Public agencies should fund and implement projects that improve aquatic habitat conditions and reduce predation risk for juvenile salmon along the priority migration corridors identified in Chapter 4, Figure 4-8. Projects that could improve survival of juvenile salmon include levee setbacks and waterside habitat improvements, placement of fish guidance structures, and nonnative aquatic weed management.*
ER R8	Manage Hatcheries to Reduce Risk of Adverse Effects	*All public agencies that manage hatcheries potentially affecting listed fish species should develop, or continue to develop, periodically update, and implement scientifically sound Hatchery and Genetic Management Plans (HGMPs) to reduce risks to Central Valley natural-origin and listed species.*

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ER R9	Coordinate Fish Migration and Survival Research	*The California Department of Fish and Wildlife, in cooperation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, should seek coordination among researchers studying juvenile anadromous fish migration pathways and survival upstream of and within the Delta waterways to improve synthesis of results across research efforts and application to adaptive management actions.*
ER RF	Support Implementation of Ecosystem Restoration	*Local, State and federal agencies should coordinate to support implementation of ecosystem restoration, and the Delta Plan Interagency Implementation Committee (DPIIC) should:* *(a) Consider establishing an ecosystem restoration subcommittee that includes tribal representation.* *(b) Develop strategies for acquisition and long-term ownership and management of lands necessary to achieve ecosystem restoration consistent with the guidance in Appendix Q2.* *(c) Develop a funding strategy that identifies a portfolio of approaches to remove institutional barriers and fund Ecosystem Restoration Tier 1 or 2 actions within the Delta.* *(d) Establish program-level endangered species permitting mechanisms that increase efficiency for Ecosystem Restoration Tier 1 or 2 actions within the Delta and compatible ecosystem restoration projects within the Delta watershed.* *(e) Coordinate with the Delta Science Program to align State, federal, and local resources for scientific support of restoration efforts, including adaptive management, data tools, monitoring, synthesis, and communication.* *(f) Develop a landscape-scale strategy for recreational access to existing and future restoration sites, where appropriate and while maintaining ecological value.* *(g) Increase tribal engagement and input in planning conducted by agencies responsible for implementing and coordinating ecosystem restoration and protection projects in the Delta.*
ER RG	Align State Restoration Plans and Conservation Strategies with the Delta Plan	*Agencies should coordinate, and the Delta Plan Interagency Implementation Committee (DPIIC) should consider establishing a subcommittee, to align State, local, or regional restoration strategies, plans or programs in the Delta to be consistent with the priority attributes described in Appendix Q2. These include:* *(a) The Delta Conservation Framework;* *(b) The CVFPP Conservation Strategy;* *(c) The Public Lands Strategy;* *(d) Regional Conservation Investment Strategies;* *(e) Regional Conservation Strategies or Partnerships; and.* *(f) San Francisco Bay and Suisun Marsh Conservation Strategies, Investments and Partnerships, as appropriate.*
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DP R1	Designate the Delta as a National Heritage Area	*The Delta Protection Commission should complete its application for designation of the Delta and Suisun Marsh as a National Heritage Area, and the federal government should complete the process in a timely manner.*
DP R2	Designate State Route 160 as a National Scenic Byway	*The California Department of Transportation should seek designation of State Route 160 as a National Scenic Byway, and prepare and implement a scenic byway plan for it.*
DP P1 (23 CCR section 5010)	Locate New Urban Development Wisely	*(a) New residential, commercial, and industrial development must be limited to the following areas, as shown in Appendix 6 and Appendix 7:* *(1) Areas that city or county general plans as of May 16, 2013, designate for residential, commercial, and industrial development in cities or their spheres of influence;* *(2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except no new residential, commercial, and industrial development may occur on Bethel Island unless it is consistent with the Contra Costa County general plan effective as of May 16, 2013;* *(3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or* *(4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove.* *(b) Notwithstanding subsection (a), new residential, commercial, and industrial development is permitted outside the areas described in subsection (a) if it is consistent with the land uses designated in county general plans as of May 16, 2013, and is otherwise consistent with this Chapter.* *(c) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve new residential, commercial, and industrial development that is not located within the areas described in subsection (a). In addition, this policy covers any such action on Bethel Island that is inconsistent with the Contra Costa County general plan effective as of May 16, 2013. This policy does not cover commercial recreational visitor-serving uses or facilities for processing of local crops or that provide essential services to local farms, which are otherwise consistent with this Chapter.* *(d) This policy is not intended in any way to alter the concurrent authority of the Delta Protection Commission to separately regulate development in the Delta's Primary Zone.*

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DP P2 (23 CCR section 5011)	Respect Local Land Use When Siting Water or Flood Facilities or Restoring Habitats	*(a) Water management facilities, ecosystem restoration, and flood management infrastructure must be sited to avoid or reduce conflicts with existing uses or those uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration must consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased. Measures to mitigate conflicts with adjacent uses may include, but are not limited to, buffers to prevent adverse effects on adjacent farmland.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve the siting of water management facilities, ecosystem restoration, and flood management infrastructure.*
DP R3	Plan for the Vitality and Preservation of Legacy Communities	*Local governments, in cooperation with the Delta Protection Commission and Delta Conservancy, should prepare plans for each community that emphasize its distinctive character, encourage historic preservation, identify opportunities to encourage tourism, serve surrounding lands, or develop other appropriate uses, and reduce flood risks.*
DP R4	Buy Rights of Way from Willing Sellers When Feasible	*Agencies acquiring land for water management facilities, ecosystem restoration, and flood management infrastructure should purchase from willing sellers, when feasible, including consideration of whether lands suitable for proposed projects are available at fair prices.*
DP R5	Provide Adequate Infrastructure	*The California Department of Transportation, local agencies, and utilities should plan infrastructure, such as roads and highways, to meet needs of development consistent with sustainable community strategies, local plans, the Delta Protection Commission's* Land Use and Resource Management Plan for the Primary Zone of the Delta*, and the Delta Plan.*
DP R6	Plan for State Highways	*The Delta Stewardship Council, as part of the prioritization of State levee investments called for in Water Code section 85306, should consult with the California Department of Transportation as provided in Water Code section 85307(c) to consider the effects of flood hazards and sea level rise on State highways in the Delta.*
DP R7	Subsidence Reduction and Reversal	*The following actions should be considered by the appropriate State agencies to address subsidence reversal:* ▪ *State agencies should not renew or enter into agricultural leases on Delta or Suisun Marsh islands if the actions of the lessee promote or contribute to subsidence on the leased land, unless the lessee participates in subsidence reversal or reduction programs.* ▪ *State agencies currently conducting subsidence reversal projects in the Delta on State-owned lands should investigate options for scaling up these projects if they have been deemed successful. The California Department of Water Resources should develop a plan, including*

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		funding needs, for increasing the extent of their subsidence reversal and carbon sequestration projects to 5,000 acres by January 1, 2017. ▪ *The Delta Stewardship Council, in conjunction with the California Air Resources Board (CARB) and the Delta Conservancy, should investigate the opportunity for the development of a carbon market whereby Delta farmers could receive credit for carbon sequestration by reducing subsidence and growing native marsh and wetland plants. This investigation should include the potential for developing offset protocols applicable to these types of plants for subsequent adoption by the CARB.*
DP R8	Promote Value-added Crop Processing	*Local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, should encourage value-added processing of Delta crops in appropriate locations.*
DP R9	Encourage Agritourism	*Local governments and economic development organizations, in cooperation with the Delta Protection Commission and the Delta Conservancy, should support growth in agritourism, particularly in and around legacy communities. Local plans should support agritourism where appropriate.*
DP R10	Encourage Wildlife-friendly Farming	*The California Department of Fish and Wildlife, the Delta Conservancy, and other ecosystem restoration agencies should encourage habitat enhancement and wildlife-friendly farming systems on agricultural lands to benefit both the environment and agriculture.*
DP R11	Provide New and Protect Existing Recreation Opportunities	*Water management and ecosystem restoration agencies should provide recreation opportunities, including visitor-serving business opportunities, at new facilities and habitat areas whenever feasible; and existing recreation facilities should be protected, using California State Parks'* Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh *and Delta Protection Commission's* Economic Sustainability Plan for the Sacramento-San Joaquin Delta *as guides.*
DP R12	Encourage Partnerships to Support Recreation and Tourism	*The Delta Protection Commission and Delta Conservancy should encourage partnerships between other State and local agencies, and local landowners and business people to expand recreation, including boating, promote tourism, and minimize adverse impacts to nonrecreational landowners.*
DP R13	Expand State Recreation Areas	*California State Parks should add or improve recreation facilities in the Delta in cooperation with other agencies. As funds become available, it should fully reopen Brannan Island State Recreation Area, complete the park at Delta Meadows-Locke Boarding House, and consider adding new State parks at Barker Slough, Elkhorn Basin, the Wright-Elmwood Tract, and south Delta.*
DP R14	Enhance Nature-based Recreation	*The California Department of Fish and Wildlife, in cooperation with other public agencies, should collaborate with nonprofits, private landowners, and business partners to expand wildlife viewing, angling, and hunting opportunities.*
DP R15	Promote Boating Safety	*The California Department of Boating and Waterways should coordinate with the U.S. Coast Guard and State and local agencies on an updated marine patrol strategy for the region.*

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DP R16	Encourage Recreation on Public Lands	*Public agencies owning land should increase opportunities, where feasible, for bank fishing, hunting, levee-top trails, and environmental education.*
DP R17	Enhance Opportunities for Visitor-serving Businesses	*Cities, counties, and other local and State agencies should work together to protect and enhance visitor-serving businesses by planning for recreation uses and facilities in the Delta, providing infrastructure to support recreation and tourism, and identifying settings for private visitor-serving development and services.*
DP R18	Support the Ports of Stockton and West Sacramento	*The ports of Stockton and West Sacramento should encourage maintenance and carefully designed and sited development of port facilities.*
DP R19	Plan for Delta Energy Facilities	*The California Energy Commission and California Public Utilities Commission should cooperate with the Delta Stewardship Council as described in Water Code section 85307(d) to identify actions that should be incorporated in the Delta Plan by 2017 to address the needs of Delta energy development, storage, and distribution.*
Chapter 6		
WQ R1	Protect Beneficial Uses	*Water quality in the Delta should be maintained at a level that supports, enhances, and protects beneficial uses identified in the applicable State Water Resources Control Board or regional water quality control board water quality control plans.*
WQ R2	Identify Covered Action Impacts	*Covered actions should identify any significant impacts to water quality.*
WQ R3	Special Water Quality Protections for the Delta	*The State Water Resources Control Board or regional water quality control board should evaluate and, if appropriate, propose special water quality protections for priority habitat restoration areas identified in recommendation ER R2 or other areas of the Delta where new or increased discharges of pollutants could adversely impact beneficial uses.*
WQ R4	Complete Central Valley Drinking Water Policy	*The Central Valley Regional Water Quality Control Board should complete the Central Valley Drinking Water Policy by July 2013.*
WQ R5	Complete North Bay Aqueduct Alternative Intake Project	*The California Department of Water Resources should complete the North Bay Aqueduct Alternate Intake Project Environmental Impact Report by December 31, 2012, and begin construction as soon as possible thereafter.*
WQ R6	Protect Groundwater Beneficial Uses	*The State Water Resources Control Board should complete development of a Strategic Workplan for protection of groundwater beneficial uses, including groundwater use for drinking water, by December 31, 2012.*
WQ R7	Participation in CV-SALTS	*The State Water Resources Control Board and Central Valley Regional Water Quality Control Board should consider requiring participation by all relevant water users that are supplied water from the Delta or the Delta watershed or*

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		discharge wastewater to the Delta or the Delta watershed to participate in the Central Valley Salinity Alternatives for Long-Term Sustainability Program.
WQ R8	Completion of Regulatory Processes, Research, and Monitoring for Water Quality Improvement	*The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards are currently engaged in regulatory processes, research, and monitoring essential to improving water quality in the Delta. In order to achieve the coequal goals, it is essential that these ongoing efforts be completed and, if possible, accelerated, and that the Legislature and Governor devote sufficient funding to make this possible. The Delta Stewardship Council specifically recommends that:* ▪ *The State Water Resources Control Board should complete development of the proposed policy for nutrients for inland surface waters of the State of California by January 1, 2014.* ▪ *The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards should prepare and begin implementation of a study plan for the development of objectives for nutrients in the Delta and Suisun Marsh by January 1, 2014. Studies needed for development of Delta and Suisun Marsh nutrient objectives should be completed by January 1, 2016. The water boards should adopt and begin implementation of nutrient objectives, either narrative or numeric, where appropriate, for the Delta and Suisun Marsh by January 1, 2018.* ▪ *The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for diazinon and chlorpyrifos by January 1, 2013.* ▪ *The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should prioritize and accelerate the completion of the Central Valley Pesticide Total Maximum Daily Load and Basin Plan Amendment for pyrethroids by January 1, 2016.* ▪ *The State Water Resources Control Board and the San Francisco Bay and Central Valley Regional Water Quality Control Boards have completed Total Maximum Daily Load and Basin Plan Amendments for methylmercury, and efforts to support their implementation should be coordinated. Parties identified as responsible for current methylmercury loads or proponents of projects that may increase methylmercury loading in the Delta or Suisun Marsh should participate in control studies or implement site-specific study plans that evaluate practices to minimize methylmercury discharges. The Central Valley Regional Water Quality Control Board should review these control studies by December 31, 2018, and determine control measures for implementation starting in 2020.*

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WQ R9	Implement Delta Regional Monitoring Program	*The State Water Resources Control Board and Regional Water Quality Control Boards should work collaboratively with the California Department of Water Resources, California Department of Fish and Wildlife, and other agencies and entities that monitor water quality in the Delta to develop and implement a Delta Regional Monitoring Program that will be responsible for coordinating monitoring efforts so Delta conditions can be efficiently assessed and reported on a regular basis.*
WQ R10	Evaluate Wastewater Recycling, Reuse, or Treatment	*The Central Valley Regional Water Quality Control Board, consistent with existing water quality control plan policies and water rights law, should require responsible entities that discharge wastewater treatment plant effluent or urban runoff to Delta waters to evaluate whether all or a portion of the discharge can be recycled, otherwise used, or treated in order to reduce contaminant loads to the Delta by January 1, 2014.*
WQ R11	Manage Dissolved Oxygen in Stockton Ship Channel	*The State Water Resources Control Board and the Central Valley Regional Water Quality Control Board should complete Phase 2 of the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in the Stockton Deep Water Ship Channel by January 1, 2015.*
WQ R12	Manage Dissolved Oxygen in Suisun Marsh	*The State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board should complete the Total Maximum Daily Load and Basin Plan Amendment for dissolved oxygen in Suisun Marsh wetlands by January 1, 2014.*

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Chapter 7		
RR R1	Implement Emergency Preparedness and Response	*The following actions should be taken to promote effective emergency preparedness and response in the Delta:* ▪ *Responsible local, State, and federal agencies with emergency response authority should continue to implement the recommendations of the Sacramento-San Joaquin Delta Multi-Hazard Coordination Task Force (Water Code section 12994.5). Such actions should support the development of a regional response system for the Delta.* ▪ *Materials should be stockpiled in appropriate locations to make post-disaster repairs of breaches in levees along the water supply reliability corridor identified in the Delta Plan's Figure 7-6, the western islands important to protection of water quality, and other levees, to complement improvement of levees as provided in RR P1.* ▪ *Local levee-maintaining agencies, with assistance from DWR, should develop their own emergency action plans, training, and floodfight material stockpiles.* ▪ *State and local agencies, and regulated utilities that own and/or operate infrastructure in the Delta should prepare coordinated emergency response plans to protect the infrastructure from long-term outages resulting from failures of the Delta levees. The emergency procedures should consider methods that also would protect Delta land use and ecosystem.*
RR R2	Modernize Levee Information Management	*a)* ***Require Adequate Levee Inspections.*** *In order to gather information about Delta levee conditions and maintenance needs, the Central Valley Flood Protection Board should update its guidelines for the Delta Levees Maintenance Subventions Program to require local levee maintaining agencies participating in the program to annually inspect their Delta levees in accordance with DWR's guidelines for Local Agency Project and Nonproject Levee Maintenance Inspection and to file their inspection reports electronically with DWR. Costs of inspections should continue to be reimbursable through the Delta Levees Maintenance Subventions Program.* *b)* ***Provide Delta Levee Investment Decision Support****. The Delta Stewardship Council should use information from levee inspections reported to DWR and from DWR's annual reports about its levee investments pursuant to this plan's policy regarding levee investment priorities (RR P1) to maintain the decision support tool developed during preparation of this Delta Plan amendment.*

POLICY OR RECOMMENDATION NUMBER	SHORT TITLE	POLICY/RECOMMENDATION LANGUAGE
RR R3	Provide Adequate State Funds to Support Levee Maintenance and Improvement	*Adequate State funds to support levee maintenance and improvement should continue to be provided through the Delta Levees Maintenance Subventions Program, the Delta Levee Special Projects Program, and through programs that implement the Central Valley Flood Protection Plan.*
RR P1 (23 CCR section 5012)	Prioritization of State Investments in Delta Levees and Risk Reduction	*a) **Fund levee operation and maintenance.** For the purposes of Water Code Section 85306, State investments in levee operation and maintenance of Delta project levees and nonproject levees shall be prioritized as follows:* *(1) For project levees, funding should be prioritized to ensure levees are operated and maintained in accordance with Code of Federal Regulations, Title 33, Part 208.10 and applicable federal Operation and Maintenance manuals, active in federal Public Law 84- 99 Rehabilitation Program, and consistent with Central Valley Flood Protection Board Resolution No. 2018-06 for Acceptable Operation and Maintenance of the State Plan of Flood Control.* *(2) For nonproject levees, funding should be prioritized to ensure levees are operated and maintained to protect the Delta's physical characteristics.* *b) **Delta Levees Investment Strategy.** The priorities listed in Table 1 below and depicted in Delta Plan Appendix P dated August 2021, which is incorporated by reference, shall guide State discretionary investments in the improvement of Delta levees. The California Department of Water Resources' funding decisions are subject to its consideration of the benefits, costs, engineering considerations, and other factors. As the California Department of Water Resources selects levee improvement projects for funding through its levee funding programs, it should fund projects at the Very-High priority islands or tracts, before funding projects at High Priority or Other Priority islands or tracts. If available funds are sufficient to fully fund levee improvement projects at the Very-High Priority islands or tracts, then funds for levee improvement projects on High Priority islands or tracts should be funded and after those projects have been fully funded, then levee improvement projects at Other Priority islands or tracts may be funded.* *c) **Annual Report.** The California Department of Water Resources shall submit a written annual report, as described in paragraph (2), to the Council, as well as present the report to the Council, on State funds distributed or provided by the California Department of Water Resources within the legal Delta. At least 45 days prior to the oral presentation before the Council, and no later than March 1 of each calendar year, the California Department of Water Resources shall submit the written annual report to the Council and make the report publicly available.*

The report shall include:

(A) A description of all discretionary State funding for levees awarded by the California Department of Water Resources, during the reporting year; including both of the following: (i) Levee improvement. (ii) Levee operation and maintenance

(B) A list of each levee improvement project proposal submitted to the California Department of Water Resources for funding, regardless of whether the California Department of Water Resources awarded funding to the project;

(C) A list of the improvement projects awarded funding, the funding level awarded, the local cost share, and the applicable priority of the island or tract from Table 1 in subsection (b) where the levee improvement project is located;

(D) A description, for each awarded project, of changes (when completed) to levee geometry, the specific locations of those changes, and expected changes in the level of flood protection provided or standard achieved;

(E) If the California Department of Water Resources awards funds for any levee improvement project that is inconsistent with the priorities identified in subsection (b), the annual report shall identify for each project: how the funding is inconsistent with the priorities, describe why variation from the priorities is necessary, and explain how the funding nevertheless protects lives, property, or other State interests, such as infrastructure, agriculture, water supply reliability, Delta ecosystem, or Delta communities;

(F) A summary of The California Department of Water Resources' rationale for levee improvement project proposals submitted, but not awarded funding during the reporting year; and

(G) A summary of all previous California Department of Water Resources funded levee improvement project activities completed during the reporting year and location of those activities.

(d) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves discretionary State investments in Delta flood risk management, including levee operations, maintenance, and improvements. Nothing in this policy establishes or otherwise changes existing levee standards.

Note: Authority cited: Sections 85210 and 85306, Water Code. Reference: Sections 85020, 85022, 85054, 85057.5, 85300, 85305, 85306, 85307, and 85309, Water Code.

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Table 1:

Very High Priority	*Bacon Island, Bethel Island, Bishop/DLIS-14 (North Stockton), Brannan-Andrus, Byron Tract, DLIS-19 (Grizzly Slough Area), DLIS-28, DLIS-33, DLIS-63 (Grizzly Island Area), Drexler Tract, Dutch Slough, Hasting Tract, Hotchkiss Tract, Jersey Island, Jones Tract (Upper and Lower), Maintenance Area 9 North, Maintenance Area 9 South, McCormack-Williamson Tract, McDonald Island, McMullin Ranch, Middle and Upper Roberts Island, New Hope Tract, North Stockton, Paradise Junction, Reclamation District 17, Ryer Island, Sherman Island, Staten Island, Terminous Tract, Twitchell Island, Union Island West, Upper Andrus Island, Victoria Island, Webb Tract.*
High Priority	*Bouldin Island, Brack Tract, Bradford Island, Cache Haas Area, Central Stockton, Clifton Court Forebay, DLIS-01 (Pittsburg Area), DLIS-07 (Knightsen Area), DLIS-08 (Discovery Bay Area), DLIS-20 (Yolo Bypass), DLIS-22 (Rio Vista), DLIS-26 (Morrow Island), DLIS-29, DLIS-30, DLIS-31 (Garabaldi Unit), DLIS-32, DLIS-39, DLIS-41 (Joice Island Area), DLIS-44 (Hill Slough Unit), DLIS-55, DLIS-59, Egbert Tract, Fabian Tract, Glanville, Grand Island, Holland Tract, Honker Bay, Kasson District, Libby McNeil, Little Egbert Tract, Lower Roberts Island, Mandeville Island, Mossdale Island, Netherlands, Palm-Orwood, Paradise Cut, Pearson District, Pescadero District, Rindge Tract, River Junction, Shima Tract, Stewart Tract, Sunrise Club, Tyler Island, Union Island East, Veale Tract, Walnut Grove, Woodward Island, Yolano.*
Other Priority	*Atlas Tract, Bixler Tract, Canal Ranch Tract, Chipps Island, Coney Island, Dead Horse Island, DLIS- 06 (Oakley Area), DLIS-10, DLIS-15, DLIS-17, DLIS-18, DLIS-25, DLIS-27, DLIS-34, DLIS-35, DLIS-36, DLIS-37 (Chadbourne Area), DLIS-40, DLIS-43 (Potrero Hills Area), DLIS-46, DLIS-47, DLIS-48, DLIS-49, DLIS-50, DLIS-51, DLIS-52, DLIS-53, DLIS-54, DLIS- 56, DLIS- 57, DLIS- 62, Drexler Pocket, Ehrheardt Club, Empire Tract, Fay Island, Glide District, Holt Station, Honker Lake Tract, King Island, Lisbon District, Medford Island, Mein's Landing, Merritt Island, Peters Pocket, Pico- Naglee, Prospect Island, Quimby Island, Randall Island, Rio Blanco Tract, Rough And Ready Island, Shin Kee Tract, Stark Tract, Sutter Island, Venice Island, Walthall, West Sacramento, Wetherbee Lake, Winter Island, Wright-Elmwood Tract.*

RR R4	Update Delta Levees Maintenance Subvention Program's Cost-sharing Provisions	▪ ***75 percent State cost share***. *The Delta Levees Maintenance Subvention Program's maximum 75 percent State cost share for maintenance and major rehabilitation projects should be extended indefinitely.* ▪ ***Update the Delta Levees Maintenance Subventions Program Deductible Provision***. *The Legislature should amend the Water Code section 12986(a)-(b) to adjust the current $1000 per mile deductible amount to account for inflation since the provision was enacted in 1981. The deductible amount should be reevaluated periodically to reflect current inflation and the needs of the program and its participants.* ▪ ***Simplify Consideration of Local Levee Maintaining Agencies' Ability to Pay for Levee Maintenance and Improvement***. *The Central Valley Flood Protection Board should revise its guidelines for the Delta Levees Maintenance Subventions Program to provide a simplified approach to the consideration of a local levee agency's ability to pay for the cost of levee maintenance or improvement, as required by Water Code section 12986(a)(3), so that reclamation districts with little ability to pay receive the full 75 percent State cost share recommended above, with reduced State cost shares for reclamation districts that are able to pay more to maintain and improve their levees.*
RR P2 (23 CCR section 5013)	Require Flood Protection for Residential Development in Rural Areas	*(a) New residential development of five or more parcels shall be protected through floodproofing to a level 12 inches above the 100-year base flood elevation, plus sufficient additional elevation to protect against a 55-inch rise in sea level at the Golden Gate, unless the development is located within:* *(1) Areas that city or county general plans, as of May 16, 2013, designate for development in cities or their spheres of influence;* *(2) Areas within Contra Costa County's 2006 voter-approved urban limit line, except Bethel Island;* *(3) Areas within the Mountain House General Plan Community Boundary in San Joaquin County; or* *(4) The unincorporated Delta towns of Clarksburg, Courtland, Hood, Locke, Ryde, and Walnut Grove, as shown in Appendix 7.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that involves new residential development of five or more parcels that is not located within the areas described in subsection (a).*

RR P3 (23 CCR section 5014)	Protect Floodways	*(a) No encroachment shall be allowed or constructed in a floodway, unless it can be demonstrated by appropriate analysis that the encroachment will not unduly impede the free flow of water in the floodway or jeopardize public safety.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in a floodway that is not either a designated floodway or regulated stream.*
RR P4 (23 CCR section 5015)	Floodplain Protection	*(a) No encroachment shall be allowed or constructed in any of the following floodplains unless it can be demonstrated by appropriate analysis that the encroachment will not have a significant adverse impact on floodplain values and functions:* *(1) The Yolo Bypass within the Delta;* *(2) The Cosumnes River-Mokelumne River Confluence, as defined by the North Delta Flood Control and Ecosystem Restoration Project (McCormack-Williamson), or as modified in the future by the California Department of Water Resources or the U.S. Army Corps of Engineers (California Department of Water Resources 2010); and* *(3) The Lower San Joaquin River Floodplain Bypass area, located on the Lower San Joaquin River upstream of Stockton immediately southwest of Paradise Cut on lands both upstream and downstream of the Interstate 5 crossing. This area is described in the Lower San Joaquin River Floodplain Bypass Proposal, submitted to the California Department of Water Resources by the partnership of the South Delta Water Agency, the River Islands Development Company, Reclamation District 2062, San Joaquin Resource Conservation District, American Rivers, the American Lands Conservancy, and the Natural Resources Defense Council, March 2011. This area may be modified in the future through the completion of this project.* *(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that would encroach in any of the floodplain areas described in subsection (a).* *(c) This policy is not intended to exempt any activities in any of the areas described in subsection (a) from applicable regulations and requirements of the Central Valley Flood Protection Board.*
RR R5	Finance Local Flood Management Activities	*The Council, DWR, CVFPB, and the DPC, in consultation with the Corps of Engineers and the Department of Finance, should cooperate to further develop levee finance mechanisms, including those studied by the DPC, that create opportunities for "beneficiary pays"-based funding approaches that supplement State-funding for levee maintenance and improvements. Because no single financial mechanism can meet the requirements of a beneficiary-pays approach to address the full range of beneficiaries and financing needs, a portfolio of mechanisms targeted to particular levee improvements should be evaluated. These mechanisms could include assessments, public funding, water use fees, water conveyance fees, and flood prevention fees.*

RR R6	New State Funding for Non-structural Risk Reduction	*A hazard mitigation program, funded by the State, should be established to make grants to local governments and flood management agencies to support emergency preparedness actions, such as evacuation planning or prepositioning of flood fight materials, and non-structural flood hazard mitigation actions, such as flood-proofing of public or private buildings or the purchase and removal of flood-prone structures.*
RR R7	Fund Actions to Protect Infrastructure from Flooding and Other Natural Disasters	▪ *The California Public Utilities Commission should immediately commence formal hearings to impose a reasonable fee for flood and disaster prevention on regulated privately owned utilities with facilities located in the Delta. Publicly owned utilities should also be encouraged to develop similar fees. The California Public Utilities Commission, in consultation with the Delta Stewardship Council, the California Department of Water Resources, and the Delta Protection Commission, should allocate these funds among State and local emergency response and flood protection entities in the Delta. If a new regional flood management agency is established by law, a portion of the local share would be allocated to that agency.* ▪ *The California Public Utilities Commission should direct all regulated public utilities in their jurisdiction to immediately take steps to protect their facilities in the Delta from the consequences of a catastrophic failure of levees in the Delta, to minimize the impact on the State's economy.* ▪ *CalTrans should be given authority by the Legislature to enter into agreements with local levee maintaining agencies to fund improvement and maintenance of levees adjoining interstates and State highways when that is the least cost approach to reducing flood risks to those roads.* ▪ *State agencies with projects or infrastructure in the Delta should set aside a reasonable amount of funding to pay for flood protection and disaster prevention.*
RR R8	Maintain Lower Risk Uses of Flood-Prone Rural Areas	*Agricultural and natural resource land uses and recreational marinas, resorts, or parks are the most appropriate uses for floodprone rural lands and should be maintained, consistent with the regulatory policy Locate New Development Wisely (DP P1).*
RR R9	Fund and Implement San Joaquin River Flood Bypass	*The Legislature should fund the California Department of Water Resources and the Central Valley Flood Protection Board to evaluate and implement a bypass and floodway on the San Joaquin River near Paradise Cut that would reduce flood stage on the mainstream San Joaquin River adjacent to the urban and urbanizing communities of Stockton, Lathrop, and Manteca in accordance with Water Code section 9613(c).*
RR R10	Continue Delta Dredging Studies	*The current efforts to maintain navigable waters in the Sacramento River Deep Water Ship Channel and Stockton Deep Water Ship Channel, led by the U.S. Army Corps of Engineers and described in the Delta Dredged Sediment Long-Term Management Strategy (USACE 2007, Appendix K), should be continued in a manner that supports the Delta Plan and the coequal goals. Appropriate dredging throughout other areas in the Delta for maintenance purposes, or that would increase flood conveyance and provide potential material for levee maintenance or subsidence reversal should be implemented in a manner that supports the Delta Plan and coequal goals.*

		Coordinated use of dredged material in levee improvement, subsidence reversal, or wetland restoration is encouraged.
RR R11	Designate Additional Floodways	*The Central Valley Flood Protection Board should evaluate whether additional areas both within and upstream of the Delta should be designated as floodways. These efforts should consider the anticipated effects of climate change in its evaluation of these areas.*
RR R12	Renew Federal Assistance for Post-disaster Response	*The Council, Office of Emergency Services, DWR, Central Valley Flood Protection Board, and Delta Protection Commission should advocate for reforms of the Federal Emergency Management Agency's rehabilitation assistance program, including a renewed hazard mitigation program for Delta levees, and the Army Corps of Engineer's Rehabilitation and Inspection Program (PL 84-99) to account for the economic value of the Delta's water supplies and transportation services and for the State's commitments to reducing Delta flood risk and improving Delta levees.* *To facilitate this consideration, priority should be given to research to quantify the economic value of reliable water supplies and transportation services protected by the Delta's levees, including consideration of the levees' contributions to the protection of water quality, water supply infrastructure, and the conveyance of water for export through levee-lined channels.*
RR R13	Require Flood Insurance	*The Legislature should require an adequate level of flood insurance for residences, businesses, and industries in floodprone areas.*
RR R14	Improve Delta Communities' National Flood Insurance Program Community Rating System (CDS) Program Rankings	*Delta communities should improve their current National Flood Insurance Program Community Rating System (CRS) ranking through the implementation of risk reduction management practices, when feasible, in order to receive additional discounts on flood insurance premium rates.*
RR R15	Limit State Liability	*The Legislature should consider statutory and/or constitutional changes that would address the State's potential flood liability, including giving State agencies the same level of immunity with regard to flood liability as federal agencies have under federal law.*
RR R16	Provide Public Access on Appropriately-located Delta Levees	*When using state funding to improve levees in the Delta that border urban areas, unincorporated towns, publicly-owned nature areas, or other public lands or that intersect with state highways, the levee designs and associated land purchases should consider public access, including but not limited to bank fishing, nature observation, or pedestrian and bicycling trails. When agencies make decisions about funding levee improvements they should identify the types of public access or recreation that may be feasible at the levee and explain how they have considered those opportunities in their decision.*

Chapter 8		
FP R1	Conduct Current Spending Inventory	*An inventory of current State and federal spending on programs and projects that do or may achieve the coequal goals will be conducted. Data sources to be used include the CALFED cross-cut budget, State bond balance reports, and the annual State budget, among others. Consideration will be given to selecting an independent agency (which could include a non-governmental organization) to conduct the inventory.*
FP R2	Develop Delta Plan Cost Assessment	*Costs will be assigned to the projects and programs proposed in the Delta Plan (Chapters 2 through 7) and sources of funding will be identified.*
FP R3	Identify Funding Gaps	*Current State and federal funding gaps will be identified that are determined to hinder progress toward meeting the coequal goals.*