DRAFT FloodSAFE Strategic Plan

Executive Summary

[To be added.]

I. Introduction

Many Californians currently face unacceptable risk of harm and damage caused by floods. The personal safety and economic stability of large segments of our population rely on flood management systems that do not meet modern engineering standards. The need to improve public safety through integrated flood management is urgent as more people live and work in flood-prone areas and climate changes make large flood flows more likely.

In January 2005, Governor Schwarzenegger focused attention on the State's flood problem, calling for improved maintenance, system rehabilitation, effective emergency response, and sustainable funding. In a white paper entitled *"Flood Warnings: Responding to California's Flood Crisis"*, the Department of Water Resources (DWR) outlined the flood problems that California faces and offered specific recommendations for administrative action and legislative changes.

> ***Integrated Flood Management*** is an approach to dealing with flood risk that recognizes the:
>
> - interconnection of flood management actions within broader water resources management and land use planning
> - value of coordinating across geographic and agency boundaries
> - need to evaluate opportunities and potential impacts from a system perspective
> - importance of environmental stewardship and sustainability

Since that time, California has begun the long process of improving flood management systems by investing heavily to complete emergency repairs near several high risk urban areas, evaluating levees that protect urban areas, informing the public about flood risks, enacting significant new laws, and providing funds to lead a sustained effort to improve flood management statewide. In 2006, the Department of Water Resources launched ***FloodSAFE California*** – a multi-faceted program to improve public safety through integrated flood management. The FloodSAFE Program builds upon recent progress fueled by almost $5 billion provided through recently approved bond measures.

FloodSAFE includes four major categories of program actions as shown in Figure 1. All FloodSAFE program actions are designed to accomplish specific objectives. Program actions are organized and managed as projects. Current FloodSAFE projects are shown in Section IX.

While DWR is leading FloodSAFE, successful implementation of the program depends on active participation from many key partners.

The FloodSAFE Program is designed to help improve integrated flood management statewide with a significant emphasis on the Central Valley and Delta where communities and resources face high risk of catastrophic damage. The FloodSAFE Program is designed with the recognition that eliminating unacceptable risks of flood damage statewide will take decades.

Figure 1 Program Actions for FloodSAFE California

Achieving the FloodSAFE Vision will require significant resources and DWR does not have sufficient funds to achieve FloodSAFE objectives without substantial federal and local cost participation. Most of the State's funds currently available to help implement FloodSAFE are provided by Propositions 1E and 84. The legislature allocated these bond funds for specific purposes and regions, placing a high priority on improving flood protection and preparedness in the Central Valley and Delta as soon as possible due to the high potential of loss of life and property (Figure 2).

Plan Organization

The FloodSAFE Strategic Plan, as presented in this report, describes:

- a shared **vision** for the desired future flood management conditions in California (*Vision*)
- **what** will be accomplished within the next 5 – 20 years to begin realizing the vision (*Goals and Objectives*)
- **who** will be involved to accomplish the objectives (*Partners*)
- **how** DWR will lead a set of collaborative efforts to accomplish the objectives (*Guiding Principles* and *Implementation Framework*)

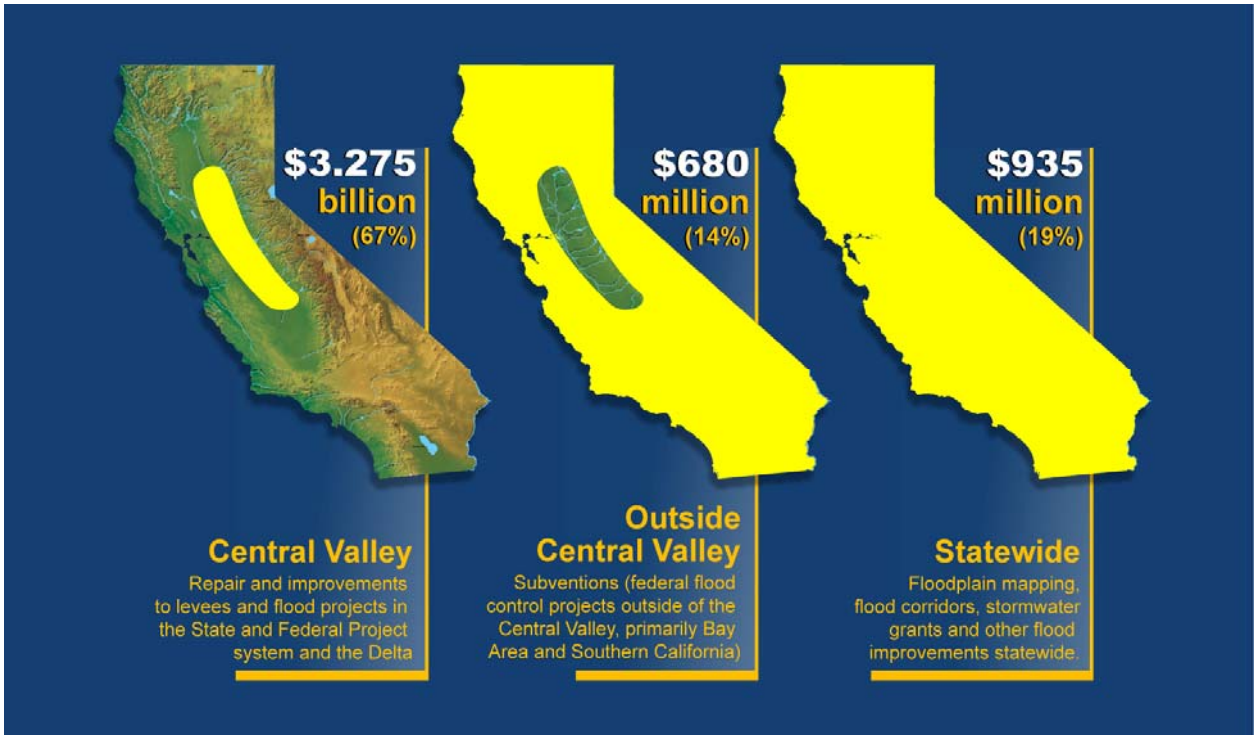


Figure 2 Geographic Distribution of FloodSAFE funding from Propositions 1E and 84

II. Vision

The FloodSAFE Vision is:

> *A sustainable integrated flood management and emergency response system throughout California that improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding.*

The Department of Water Resources will provide leadership and work with local, regional, state, tribal and federal officials to improve flood management and emergency response systems throughout California. DWR will invest the funds provided by Propositions 1E and 84 to reduce potential flood damages in the highest risk areas within the next 10 years in a way consistent with the vision. In order to accomplish the FloodSAFE vision, additional funds must be provided.

In this plan, flood risk is defined by the probability of flooding combined with the damages that result when flooding occurs (a function of the size of flood and resources impacted) (Figure 3). Integrated flood management address both aspects of flood risk: taking actions to reduce the frequency and severity of floods, and taking steps to reduce or mitigate the damages caused when floods happen.

No matter how much is done to reduce the likelihood of floods, there always remains some chance that floods will still occur – this fact leads to residual risk. Flood managers must make choices about different alternative investments to reduce flood risk. One way to inform those investment choices is by weighing the cost of different alternatives expected to reduce flood risk with the cost of damages that can be expected if flooding occurs after the steps to reduce risk have been completed.

Integrated flood management is an approach to dealing with flood risk that recognizes the:

- interconnection of flood management actions within broader water resources management and land use planning
- value of coordinating across geographic and agency boundaries
- need to evaluate opportunities and potential impacts from a system perspective
- importance of environmental stewardship and sustainability

The water resource management system in California is designed to provide public benefits such as water supply, flood protection, water quality, food production, electricity, environmental health, recreation and community development. Many different entities serve in managing the water resources with differing interests, authorities, and jurisdictions. Some actions taken by one

entity can affect many other entities due to the interconnected nature of water resource systems.

All of these water related benefits are directly tied to how the ecosystem functions. As a result, environmental stewardship must be a key component of any flood management system improvements. In order to provide lasting benefits, flood management and emergency response systems must be sustainable. All flood management systems require regular maintenance and continued care, and different flood management approaches can have vastly different maintenance requirements or impacts on natural systems.

When evaluating potential investments to improve flood management and emergency response systems, DWR will prioritize components that support improved integrated water resource management, provide multiple benefits, reduce future maintenance costs and minimize negative effects on other parts of the interconnected system.

As conditions in California continue to change in the future, integrated flood management systems must be reevaluated and adjusted.

Understanding Flood Risks

Flood risk reflects both the probability of flooding and the consequences that would result from flooding. Flood risk can be calculated as:

(Probability) x (Consequence) = Flood Risk

For simplicity, assume an agricultural area has a 1 in 50 (or 0.02) chance of flooding in any given year causing on average $10 million worth of damage, the annual flood risk for this area would be:

1/50 x $10 million = $200,000 per year

If levees are improved assume that the area has a 1 in 100 (or 0.01) chance of flooding in any given year, the risk is cut in half:

1/100 x $10 million = $100,000 per year

However, if the area begins to be urbanized and new homes, businesses, and infrastructure are added, the damages or consequences resulting from flooding become much greater. If the consequences of flooding rise from $10 million to $100 million, the flood risk is greatly increased:

1/100 x $100 million = $1,000,000 per year

So, even when the level of flood protection goes up, the risk may be higher if more people and infrastructure are located in the floodplain. For heavily urbanized areas in deep floodplains, the annual risk is commonly in the billions of dollars.

As we saw in New Orleans after Hurricane Katrina, there is also a huge potential for loss of life and countless personal tragedies when we urbanize in deep floodplains. Such losses are difficult to measure in economic terms, but cannot be overlooked. California is working to reduce flood risk in existing urbanized areas and avoid putting people at risk in areas that do not have adequate flood protection.

Figure 3 Understanding Flood Risks

III. Purpose

The purpose of the FloodSAFE Strategic Plan is to document a shared vision of what will be accomplished through the FloodSAFE Initiative and describe an implementation approach that can bring about the desired results. This Strategic Plan will provide a common understanding for use by the Administration, Legislature, public, and California's flood managers at state, federal, tribal, and local levels. DWR will take a lead role to implement FloodSAFE and will work closely with state, tribal, federal, and local partners to help improve integrated flood management systems statewide. The FloodSAFE Strategic Plan will be updated periodically by DWR and its partners based on the input, experiences, and new information gained during implementation.

The FloodSAFE Strategic Plan serves a broad audience: all the residents, businesses, cultural resources, and ecosystems residing in the state's floodplains that benefit directly from activities within the floodplains; and those that are indirectly affected by the disruption that damages from flooding causes. Even people living far from flood-prone areas can be affected by flooding; taxpayers may ultimately be responsible for the liabilities covered by the State government and levee failures in the Sacramento-San Joaquin Delta can disrupt the drinking water supply of many Californians. As demonstrated in the aftermath of hurricane Katrina, flooding can have long-lasting and devastating economic consequences that reach far beyond the boundaries of physical damage.

This Strategic Plan does not provide information on detailed projects and policies necessary to implement FloodSAFE California. The Implementation Framework section describes a structure for a more detailed Implementation Plan that DWR and its partners will develop in the near future. The Implementation Plan will describe specific actions, schedules, resources, partnerships and the coordination required to accomplish the objectives established in this Strategic Plan.

IV. Partners

The responsibility of operating California's flood management systems is spread among multiple agencies at the federal, state, tribal, and local levels. Governor Schwarzenegger's Administration initiated the FloodSAFE Program understanding that accomplishing the vision of FloodSAFE will require broad participation. The Department of Water Resources has been asked to lead the initiative and build strong partnerships as a necessary foundation for successful implementation. Flood management roles and responsibilities are changing. Historically, the U.S. Army Corps of Engineers (Corps) has been the lead agency for all major flood projects within California. With limited federal funding being available and post-Katrina awareness of flood risks, state and local agencies have assumed greater leadership to address California's growing flood management challenges. This section identifies the groups of people and entities that will participate in delivering FloodSAFE and the roles they will serve.

California Department of Water Resources

Mission of the California Department of Water Resources:
To manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments.

The Department of Water Resources (DWR) plays a significant role in California's flood management systems, with staff inspecting and maintaining many miles of levees and other flood management facilities. DWR inspects and evaluates maintenance of all of the State-federal portions[1] of the flood management system in the Central Valley. For simplicity in this report, the State-federal portions of the flood management system in the Central Valley will be called the "State Flood System". Most project levees[2] are maintained by local agencies, however, DWR performs levee maintenance where levees provide broad system benefits and local interests are unable to perform satisfactory maintenance. DWR also maintains some of the Sacramento River system channels, while local agencies maintain the San Joaquin River system channels.

DWR will lead development and implementation of FloodSAFE to establish the FloodSAFE vision statewide. Some of the key roles for DWR within FloodSAFE include:

- Lead efforts to establish integrated flood management and emergency response systems throughout California
- Provide state cost sharing funds to implement new projects
- Implement an environmental stewardship approach to develop integrated projects that produce benefits for multiple objectives

[1] These facilities are specifically defined in Public Resources Code 5096.805 and are referred to as the "Facilities of the State Plan of Flood Control" i

[2] The term "project levee" refers to those levees within the Central Valley and Delta that are part of the "State Plan of Flood Control" as defined in Public Resources Code 5096.805.

- Develop and administer new grant programs to support regional and local efforts to meet the FloodSAFE foundational objectives
- Continue to administer existing state-sponsored flood management programs
- Promote Legislative reforms that support accomplishing FloodSAFE goals and objectives
- Evaluate the Central Valley Flood management system
- Develop funding plans to fully accomplish the FloodSAFE Vision

Central Valley Flood Protection Board

Historically, the State—through the Central Valley Flood Protection Board (previously named Reclamation Board) —shares in the costs of construction, assumes responsibility for ensuring the operation and maintenance of the facilities, and holds the Federal Government harmless from liability. For Central Valley flood management projects, the Central Valley Flood Protection Board (Board) delegates operation and maintenance to DWR or local flood agencies.

The Board has the legal responsibility for oversight of the entire Central Valley flood management system. Its jurisdiction extends through 14 counties, comprises 1.7 million acres lying along the most flood-prone portions of the Sacramento and San Joaquin rivers, and has authority within its jurisdiction to:

- Cooperate with the Corps in building and operating State Plan of Flood Control Facilities
- Provide, without cost to the United States, all lands, easements, and rights-of-way necessary for the construction of the project under the adopted plan of flood control
- Hold and save the United States free from damage due to construction works
- Maintain and operate all works after completion in accordance with the regulations prescribed by the Secretary of Defense
- Approve or deny plans for reclamation of flood control, drainage, improvement, dredging or work, that includes or contemplates the construction, enlargement, revetment or alteration of any levee, embankment, canal or other excavation in the bed of or along or near the banks of the Sacramento or San Joaquin Rivers or any of their tributaries (involving excavation near rivers)
- Provide oversight of flood management facility operation and maintenance
- Designate and administer floodways throughout the Sacramento and San Joaquin River’s drainage
- Acquire property necessary for flood management
- Construct, clear, and maintain bypasses, levees, canals, sumps, overflow channels and basins, reservoirs, and other flood control works

- Construct, maintain, and operate ditches, canals, pumping plants, and other drainage works
- Collaborate with State and federal agencies, if appropriate, regarding multi-objective flood management strategies that incorporate agricultural conservation, ecosystem protection and restoration, or recreational components
- The board may maintain actions in the name of the people of the State to restrain, or to recover damages for, the doing of any act or thing that may be injurious to any of the works necessary to the plan of flood control or that may interfere with the successful execution of the plan
- Establish a standard of levee construction
- Maintain any actions in the name of the people of the State to restrain the diversion of the water of any stream that will increase the flow of water in the Sacramento of San Joaquin Rivers or their tributaries
- Rent, lease for oil, gas or other hydrocarbons, or dispose by sale, exchange, or in payment for work done or services rendered, of any land, property, material, equipment, or any other thing in the possession of the drainage district, which, in the opinion of the board, is no longer needed for the purposes of flood control works or other necessary or convenient purposes.
- Regulate encroachments on the flood management system
- The Board, other state agencies, cities, counties, and districts are authorized to cooperate with one another and with the agencies of the work within the Sacramento and San Joaquin Rivers and their tributaries, and may furnish money, services, equipment and property to that end
- Establish and enforce standards for maintenance and operation of flood management works along the Sacramento River, the San Joaquin River, their tributaries, and related areas
- Hear and adjudicate complaints on flood control matters
- Establish and enforce standards for the maintenance and operation of flood management works along the Sacramento River, the San Joaquin River, their tributaries, and related areas

Perhaps most importantly, the Board has authority to approve or deny any plan of land reclamation (related to public works and equipment necessary for the unwatering, watering, or irrigation of lands) or flood protection that involves excavation near the rivers and their tributaries.

Some of the key roles for the Board within FloodSAFE include:

- Approve and adopt a schedule for mapping areas at risk of flooding in the Sacramento River and San Joaquin River drainage by December 31, 2008 and annually thereafter
- Hold public hearings on a newly developed Central Valley Flood Protection Plan and approve and adopt the final plan by July 1, 2012

- Help establish a system of mitigation banking by which mitigation credits may be acquired in advance for flood control work to be performed related to the State Plan of Flood Control
- Adopt a status report, prepared by DWR, for the State Plan of Flood Control
- Participate in developing and implementing federal flood protection projects in the Central Valley with local agencies
- Review and comment on local flood emergency management plans and updates to general plans based on the Central Valley Flood Protection Plan
- Investigate and evaluate, in cooperation with DWR, the feasibility of potential bypasses or floodways that would significantly reduce stage in the San Joaquin River Watershed, upstream and south of Paradise Cut
- Participate with the Corps of Engineers under PL 84-99 to restore or repair flood-damaged works after a flood. Under this program the Board provides the Corps with the necessary rights-of-way and relocations
- Disburse funds for maintenance and rehabilitation of Delta levees maintained by local agencies (Delta Levee Subvention Program)

The Governor's Office of Emergency Services

The Governor's Office of Emergency Services' mission is to ensure the state is ready and able to mitigate against, prepare for, respond to, and recover from the effects of emergencies that threaten lives, property, and the environment.

OES coordinates the activities of all state agencies relating to preparation and implementation of the State Emergency Plan. OES also coordinates the disaster response efforts of state and local agencies to ensure maximum effect with minimum overlap and confusion. Additionally, OES coordinates the integration of federal resources into state and local response and recovery operations, including the Federal Emergency Management Agency's (FEMA's) pre- and post- disaster mitigation grants.

OES led the effort to complete the 2007 Enhanced State of California Multi-Hazard Mitigation Plan (SHMP), which includes a flood component. The SHMP is the official statement of the State's hazard identification, vulnerability analysis, and hazard mitigation strategy. The SHMP is the result of a collaborative multi-agency planning process, which involved DWR, and public participation.

OES also coordinates the Federal Emergency Management Agency's (FEMA's) Repetitive Flood Loss Program within the National Flood Insurance Program (NFIP), Flood Mitigation Assistance Program, Pre-Disaster Mitigation Grant Program and Hazard Mitigation Grant Program. DWR's Alluvial Fan Task Force is funded 75 percent via a PDM grant.

DWR continues to partner with OES in emergency response and hazard mitigation issues.

California Department of Fish and Game

The California Department of Fish and Game (DFG) serves a dual role. They are the State's primary agency that manages the native fish, wildlife, plant species and natural communities for their intrinsic and ecological value. In addition, they serve a regulatory role for the protection of natural resources, enforcing the California Endangered Species Act and Fish and Game Code 1600, Streambed Alteration Agreements. DFG will be an integral partner assisting DWR in its environmental stewardship responsibilities, including:

- Providing input on mitigation strategies, including banking opportunities and possible partnerships
- Identifying specific habitat and species restoration and enhancement opportunities
- Providing input on modeling for impact assessment
- Providing input on and reviewing environmental documentation under CEQA
- Permitting under California Endangered Species Act and FG Code 1600 for implementation of FloodSAFE projects

California Building Standards Commission

The California Building Standards code needs to be updated pertaining to construction requirements in areas protected by the facilities of the Central Valley Flood Protection Plan where flood levels are anticipated to exceed three feet for the 1 in 200 flood event.

The U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps) has primary responsibility for regulating the placement of dredge or fill material in the "waters of the United States," (United States Constitution's Commerce Clause) which includes the Sacramento and San Joaquin Rivers. In addition to its regulatory authority, the Corps has a long history of building water projects, particularly for flood protection. Traditionally, Congress authorizes and appropriates funds for specific Corps flood protection projects using the "Water Resources Development Act" (the authorizing law which passes every 2-3 years). The "Energy and Water Development Act" is the appropriations mechanism which is passed annually. Any substantial change to those water projects requires an updated and sometimes new authorization.

The State anticipates that the Corps will continue to participate as full partners to help establish the FloodSAFE vision. Some of the key roles for the Corps within FloodSAFE will be to:

- Continue to play a major role in statewide and regional planning efforts
- Assign team members to work on delivering FloodSAFE projects
- Cooperate in project development

- Provide authorized federal cost sharing, crediting, and reimbursement
- Express the importance to the Office of Management and Budget (OMB) and Congress for full funding of selected crucial projects, such as Folsom Dam Modifications and other high priority flood risk reduction projects
- Apply existing federal programs such as the Sacramento River Bank Protection and PL 84-99 programs to help satisfy FloodSAFE goals and objectives
- Inspect and coordinate inspection of completed works and rehabilitation to ensure compliance with regulations and O&M manual requirements to maintain active status for PL 84-99
- Regulate projects with regard to federal and State environmental laws
- Review and, as necessary, modify reservoir water control diagrams for improved flood management, including consideration of climate change
- Certify levees that meet design criteria and assist in levee certification process
- Provide hydrology and hydraulics technical support
- Perform economic feasibility studies and NED analyses
- Help understand and implement risk-based flood management techniques

U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation (Reclamation) operates several of the major reservoirs within the Central Valley. These multi-purpose reservoirs include flood protection space and Reclamation operates that flood space under the Corps' direction.

Some of the key roles for Reclamation within FloodSAFE will be to participate in planning efforts in the Central Valley and provide input and technical assistance related to reservoir reoperation studies.

Federal Emergency Management Agency

The Federal Emergency Management Agency's (FEMA's) Map Modernization Program will produce digital flood hazard data, provide access to flood hazard data and maps via the Internet, and implement a nationwide state-of-the-art infrastructure that enables all-hazard mapping. DWR is a FEMA Cooperating Technical Partner for floodplain mapping.

FEMA is a sponsor for the California Levee Database (CLD). The CLD is a GIS resource tool for storing and retrieving statewide levee attribute information and technical resources data for levee evaluation. Within FloodSAFE, the Central Valley Floodplain Evaluation and Delineation Project will provide 100-, 200-, and 500-year floodplain maps as well as datasets that meet FEMA, USACE and DWR standards. The information collected by CVFED can be used for FEMA's Digital Flood Insurance Rate Map (DFIRM) production, USACE Flood Damage Reduction Feasibility Studies, and DWR planning studies.

DWR is also FEMA's California NFIP Coordinating Office. The NFIP is a federal program enabling property owners in participating communities to purchase affordable flood insurance. As part of the NFIP, communities are required to adopt building standards that meet FEMA NFIP criteria.

DWR will continue to partner with FEMA to provide accurate flood hazard maps, develop and maintain a GIS database of California levees and flood control structures, provide technical outreach to communities and citizens on floodplain management issues, and support the NFIP.

National Weather Service

[To be added.]

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) mission is to provide Federal leadership in the conservation, protection, and enhancement of fish and wildlife and their habitats for the continuing benefit of people. Similar to DFG's role, USFWS has both management and regulatory responsibilities. DWR expects to work collaboratively with the USFWS in

- Providing input on mitigation strategies, including banking opportunities
- Identifying specific habitat and species restoration and enhancement opportunities
- Providing input on modeling for impact assessment
- Providing input on and reviewing environmental documentation under NEPA
- Permitting under Federal Endangered Species Act for implementation of FloodSAFE projects

National Marine Fisheries Service

Under the U.S. Department of Commerce, the National Marine Fisheries Service (NMFS) is responsible for the conservation, protection, and management of living marine resources. Specifically related to FloodSAFE, NMFS has responsibility for anadromous fish species that utilize rivers, streams and delta waterways of the state. DWR collaborates with NMFS on activities that could impact critical habitat for a number of aquatic species. Some of the key roles for NMFS include:

- Providing input on mitigation strategies, including banking opportunities
- Identifying specific habitat and species restoration and enhancement opportunities
- Providing input on modeling for impact assessment
- Providing input on and reviewing environmental documentation under NEPA

- Permitting under Federal Endangered Species Act for implementation of FloodSAFE projects

Tribal Governments

There are over 100 federally recognized tribal governments in the State of California each with their own form of government and laws. Tribes have a unique government to government relationship with the United States Government through federal case law and executive orders. Tribal governments are responsible for providing for the health, safety and welfare of all citizens within their territory and also have roles with flood management. Many tribal lands are adjacent to local, state and federal infrastructure that could impact lives, agriculture and economic enterprises. Tribes maintain, operate, and have responsibility for flood management facilities in coordination with counties, the State and United States Government.

FloodSAFE programs should include consultation and collaboration with tribal governments to ensure:

- Local and state construction projects include tribal consultation in accordance to federal laws
- Tribal, state and local governments should collaborate to develop integrated regional plans with regard to tribal wetland conservation plans
- Local, state and tribal consultation and contingency planning to preserve historical, cultural and other sites of significance
- Develop mitigation and emergency operations plans to include flood management
- Inform residents on flood risks regardless of level of flood protection
- Provide political support to help secure Federal funding
- Conduct assessments of risks and vulnerabilities

Definitions: (PL110-53)

(1) TRIBAL GOVERNMENT.—The term 'tribal government' means the government of an Indian tribe.
'(2) INDIAN TRIBE.—The term 'Indian tribe' has the meaning given that term in section 4(e) of the Indian Self-Determination Act (25 U.S.C. 450b(e)).

Local Agencies

Local agencies and governments play a significant role in flood management. Their activities and responsibilities are as diverse as their legal structures and include levee maintenance, reclamation districts, counties, cities and water districts. In many areas, these local agencies maintain, operate, and assume responsibility for project levees and other flood management facilities on the State's behalf. In 1986, federal and state law shifted greater financial responsibility for flood management facility construction to local agencies; they currently pay around 10.5% - 17.5% of construction or rehabilitation costs for

state-federal project facilities. In other cases, local agencies pay the entire cost of flood management, but remain subject to Central Valley Flood Protection Board and Corps of Engineers oversight. One key distinction between various local agencies is whether they have responsibility and authority for land use planning and decisions. Typically, land use planning is conducted by city and county governments.

Some of the key roles of local agencies within FloodSAFE will be to:

- Plan, design and construct improvements to components of the flood management system in cooperation with DWR and the Corps,
- Lead collaborative efforts between urban, rural and environmental interests to develop integrated regional plans
- Conduct sound levee inspections and maintenance, including repairing erosion sites as they occur
- Establish robust emergency response plans
- Inform residents on flood risks regardless of level of flood protection
- Provide political support to help secure Federal funding
- Establish assessments and provide funds as local cost shares
- Fund and carry out inspections, operations, and maintenance of flood management facilities
- Promote appropriate land use planning to meet FloodSAFE goals and objectives

Other Stakeholders

Many other groups, such as non-governmental organizations and businesses , have strong interests in accomplishing the FloodSAFE objectives and expertise to offer, and will have frequent opportunities to participate in FloodSAFE activities. Some of the key roles for the other stakeholders within FloodSAFE will be to:

- Participate in statewide integrated flood management planning
- Participate in planning to improve the Central Valley Flood Protection System
- Support regional integrated planning efforts
- Help in project formulation to meet multiple objectives
- Provide political support to help secure Federal funding

V. Goals and Objectives

The FloodSAFE Initiative includes a broad range of goals and objectives. Designing and operating integrated flood management systems to provide multiple benefits, such as improved public safety, reduced risk of flood-related damages, enhanced environmental and cultural resources, and opportunities for prudent economic development, requires balancing. Taking action to provide benefits for one goal may simultaneously detract from another. Only with broad understanding of the tradeoffs involved can this balancing act be accomplished—FloodSAFE must help support informed choices between investments based on the associated risks and rewards of those investments. DWR will work with partners to make the decisions and investments necessary to meet the following goals.

Goals

- **Reduce the Chance of Flooding** – Reduce the frequency and size of floods that could damage California communities[3], homes and property, and critical public infrastructure.
- **Reduce the Consequences of Flooding** – Take actions prior to flooding that will help reduce the adverse consequences of floods when they do occur and allow for quicker recovery after flooding.
- **Sustain Economic Growth** – Provide continuing opportunities for prudent economic development that supports robust regional and statewide economies without creating additional flood risk.
- **Protect and Enhance Ecosystems** – Improve flood management systems in ways that protect, restore and where possible enhance ecosystems and other public trust resources.
- **Promote Sustainability** – Take actions that improve compatibility with the natural environment and reduce the expected costs to operate and maintain flood management systems into the future.

These goals represent desirable outcomes that will continue to be important in the future. In order to guide specific actions within specified time periods, a set of FloodSAFE Foundational Objectives have been identified to measure progress in meeting these continuous goals over the next several years.

[3] Water Code section 9602 (added by S.B. 5) requires a minimum level of flood protection for urban areas in the Sacramento-San Joaquin River watersheds that can withstand flooding that has a 1-in-200 chance of occurring in any given year.

Foundational Objectives

A set of Foundational Objectives have been developed to provide specific and measurable outcomes that can be accomplished by a definitive date to contribute toward the broader FloodSAFE goals. The foundational objectives are shown in Table 1 and indicate which goal they support.

Table 1: Foundational Objectives and the Goals the Help Satisfy

Foundational Objectives[4]	FloodSAFE Goals				
	Reduce Chance of Flooding	**Reduce Consequences of Flooding**	**Sustain Economic Growth**	**Protect and Enhance Ecosystems**	**Promote Sustainability**
1. Provide 200-year (or greater) level of flood protection to all urban areas in the Sacramento - San Joaquin Valley by December 31, 2025.	X		X		
2. Provide 200-year (or greater) level of flood protection for all urbanizing areas in the Sacramento - San Joaquin Valley by December 31, 2025.	X		X		
3. Restore flood protection to [TBD] people and [TBD] acres of agricultural land in rural areas in the Sacramento - San Joaquin Valley by December 31, 2025.	X		X		
4. Improve ecosystem processes on [TBD] acres of floodplain by December 31, 2018.	X		X	X	X
5. Establish an interagency mitigation banking program by January 1, 2013 that provides lasting environmental benefits.				X	X
6. Design and implement a computer-assisted decision support system based on advanced forecasts for flood management reservoirs in Sacramento - San Joaquin Valley by December 31, 2014.	X	X			

[4] For objectives that contain *[TBD]*, a specific target will be established during preparation of the Central Valley Flood Protection Plan that will be adopted by July 1, 2012.

Table 1: Foundational Objectives and the Goals the Help Satisfy (continued)

Foundational Objectives	FloodSAFE Goals				
	Reduce Chance of Flooding	**Reduce Consequences of Flooding**	**Sustain Economic Growth**	**Protect and Enhance Ecosystems**	**Promote Sustainability**
7. Develop a comprehensive Central Valley Flood Protection Plan (as described in SB5) with extensive stakeholder input by January 1, 2012.	X	X	X	X	X
8. Identify opportunities and needs to improve integrated flood management statewide and develop a financing strategy by January 1, 2012.	X	X	X	X	X
9. Delineate expected floodplains for 100 and 200-year flood flows for all urban communities in the Sacramento - San Joaquin Valley by December 31, 2012.	X	X			X
10. Achieve 90% annual pass rate for urban levees in the Central Valley when inspected according to Federal and State levee standards (e.g., maintenance, encroachment, etc.) by 2025.	X		X		X
11. Develop and implement financial assistance program by July 31, 2009 that enables disadvantaged communities to adequately represent their interests in FloodSAFE workshops and decision making forum, and compete for funding opportunities.	X	X			X
12. Complete a Delta Emergency Operations Plan by December 31, 2009.	X	X			

Near-Term Objectives

Most of the FloodSAFE Foundational Objectives will require many years to complete. As part of the implementation strategy, DWR will work with its partners to identify and publish near-term objectives annually that will help lead to accomplishing the foundational objectives.

Some examples of near-term objectives:

1. Circulate draft FloodSAFE Strategic Plan by May 31, 2008 for public review and comment.
2. Provide preliminary maps (using existing information) for the 100 and 200-year floodplains protected by project levees within the Sacramento and San-Joaquin Valley by July 1, 2008.
3. Design and initiate stakeholder advisory process for preparation of the Central Valley Flood Protection Plan by August 31, 2008.
4. Complete critical levee repairs for emergency repair sites identified in 2006 by December 31, 2008.
5. Provide levee flood protection zone maps for the State Flood System in the Central Valley by December 31, 2008.
6. Propose for adoption and approval by the California Building Standards Commission updated requirements to the California Building Standards Code for construction in areas protected by the facilities of the Central Valley Flood Protection Plan where levels are anticipated to exceed 3 feet for the 200-year flood event by January 1, 2009.
7. Complete geotechnical levee evaluations for State Flood System levees that protect urban areas in Central Valley by December 31, 2009.
8. Develop cost sharing formulas, as needed, for funds made available by Propositions 1E and 84 by January 1, 2010.
9. Evaluate, select, and provide State cost shares for early implementation projects in Central Valley by January 1, 2010.
10. Identify mitigation needs and restoration opportunities in the Central Valley by October 31, 2011.

VI. Guiding Principles

Most of California's flood management facilities were designed and constructed 50 to 100 years ago. Significant changes have occurred since then; the consequences of flooding are greater, construction techniques have improved, planning has become more sophisticated, and California's climate is warming. Flood management in the 21st century must reflect these changes. Future flood management actions must be guided by principles that are considered with every project or policy decision to ensure that flood management dollars are spent wisely and that flood programs are effective and consistent with other California programs and priorities.

1. *Approach flood risk management on a system-wide basis and prevent adverse impacts.*

Improvements to a flood system made on a project-by-project basis can fail to address system-wide needs. A system-wide (preferably watershed) approach is needed for future investments in flood protection. A system-wide approach that takes into account the natural processes and functions of rivers and matches appropriate flood management actions to conditions and forces that exist within the river system will help deliver effective and sustainable flood management projects.

Today's flood management systems protect lands with varying needs. Some areas, such as densely populated cities, warrant greater protection than floodplains where population density is low and flood damages would be comparatively minor. A minimum of 200-year protection should be sought as quickly as possible for all urban areas. Rural areas, where economically feasible, should be restored to design levels of protection that permit agricultural land uses and open space.

Whatever the level of protection, a system-wide approach is needed to ensure that improved protection in one region does not lead to unanticipated increases in flood risk to other areas. All improvements must be evaluated against criteria for acceptable levels of impact, and if impacts exceed the criteria, appropriate measures must be taken to mitigate the impact. Some improvements to urban areas can be made now in advance of a complete system evaluation where the improvements are not expected to adversely affect other areas.

2. *Integrate land use planning with flood risk management.*

Land use decisions that explicitly consider flood threats will reduce risks and liabilities. Throughout much of the Central Valley, the State government has assumed responsibility for the integrity of levees built by local reclamation districts or the Army Corps of Engineers. In many cases, the Federal Emergency Management Agency has accredited these levees as being capable of withstanding a 100-year flood event based on old engineering certifications, or has merely "grandfathered" these levees into the accredited system. Local agencies make decisions on where to allow urban development, sometimes without the benefit of accurate risk information.

Better information regarding flood risk management must be made available to local officials. Because it is in everyone's interest to prevent catastrophic flooding, all parties, both public and private, must work together to make sound decisions that protect lives and property.

3. Encourage and fund projects that offer multiple or regional benefits.

Precipitation events and the associated runoff that produce floods are an integral part of the entire water system in California. Actions taken related to providing flood protection can also affect water supply, water quality, cultural resource preservation, and ecosystem health. In order to maximize public benefits from State government funds, projects that help satisfy multiple objectives or add to the sustainability of the system need to be given higher priority over single purpose projects.

4. Protect and restore natural floodplain processes and promote environmental stewardship.

Systems of water supply and flood protection are more successful when they accommodate and sustain ecosystem functions. Significant benefits provided through natural floodplain functions include provision of soil fertility, groundwater recharge, filtration of contaminants, and habitat for at-risk species and ecosystems—as well as provision of floodwater storage, reductions of flood velocities and peak flows, and sedimentation.

Sustainable systems are also more economical over time. The goal of an environmental stewardship ethic is to create human systems consistent with natural systems, where each is ultimately sustainable.

DWR fosters the environmental stewardship ethic by embracing broad concepts of impact avoidance and protection of natural resources, as well as minimization, mitigation, restoration and enhancement of natural ecosystem functions and values. DWR will incorporate ecosystem restoration as an objective in water and flood management projects, including partnering with restoration efforts of others to achieve net environmental benefit. (Ecosystem restoration is the process of reestablishing, to the extent possible, the structure, function and composition of the natural environment.)

DWR will focus on non-structural solutions that reduce susceptibility to flooding, aim for watershed-based solutions, and use traditional structural approaches where appropriate.

5. Design and build flood protection facilities to avoid catastrophic or unexpected failures.

All flood protection structures (such as a levee) should be designed and built to avoid unexpected failures. In other words, new flood protection facilities will be designed and constructed to minimize failures (such as from seepage) while flows are at or below the design level.

6. Promote and fund regional planning.

The State government should encourage a regional approach to flood management. Floods are not constrained by political boundaries. Achieving adequate flood protection will require neighboring communities, tribal governments or districts to pool resources, cooperate on land use decisions, coordinate on projects and communicate flood risk and flood preparedness to residents.

7. Adapt flood management to cope with climate change.

Today, evidence exists that suggests climate change is influencing the size and frequency of flood flows. More winter precipitation is falling in the mountains as rain and less is being stored in the snowpack. Storms are becoming more severe and runoff events are larger and more frequent than previously expected. California will face larger floods in the future, and flood management systems must accommodate the larger expected flows. Sea level rise may also reduce levee stability in the Delta.

8. Provide accurate information about flood risks to help residents and communities make safer decisions.

Californians deserve to know about the flood risks they face, the actions they can take to reduce that risk, and how to respond when a flood occurs. No matter how much a flood protection system is improved, some risk of flooding always remains. This risk, called residual risk, exists due to the chance that a larger flood will occur than the one the system was designed to manage and that undetected deficiencies in the flood protection system may lead to unexpected failures.

Timely and accurate flood information and emergency preparedness at local and individual levels can help make people safer. Accurate information on flood risks is also essential to help inform individual choices, local land use decisions and development of effective emergency response plans.

9. Leverage State investments to provide maximum public benefits.

Always attempt to leverage available State funding by obtaining local and federal cost sharing to the maximum extent possible.

Give preference to actions that provide desired multiple benefits at the minimum net cost to the taxpayers when selecting projects or policies for implementation, and when considering initial capital costs and expected future costs for operation and maintenance.

10. Provide Equitable Access to Decision Process.

All communities should be provided access and opportunity to participate in the decision making processes that affect them. Whenever possible, offer assistance to disadvantaged communities to help them participate in relevant public processes and funding decisions.

VII. Implementation Framework

FloodSAFE is the first statewide initiative designed to improve flood management throughout California. Many difficult decisions must be made over the next several years related to how DWR and its partners will invest available funds to help meet the goals of FloodSAFE. This chapter describes a framework for identifying, discussing, and managing the many actions required to accomplish the FloodSAFE foundational objectives.

Integrated flood management requires more than building new levees or other physical changes to the flood management system. Flood management facilities must be operated and maintained. Procedures for forecasting storms, managing the floodplain, educating the public and conducting emergency response operations during the unfortunate times when floods occur are all essential parts of flood management. The FloodSAFE Program includes significant actions designed to improve existing facilities, processes, and preparedness that are outside the recurring flood management activities of DWR and others.

The FloodSAFE Program will be organized and managed as a series of projects. A project is "…a temporary endeavor undertaken to create a unique product, service, or result," as defined in *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide). FloodSAFE will include projects of many different scales, duration, complexity and risk. Some of the projects will be particularly challenging, and warrant special attention and will be referred to as "special projects." Special projects within DWR are unique and beyond the scope and capacity of regular operations. They can be extraordinarily complex, high-risk, politically sensitive or require extensive collaboration across DWR divisions.

This framework will guide development of a more detailed Program Implementation Plan that will describe all FloodSAFE work in terms of projects. The Program Implementation Plan will be built from a collection of Project Management Plans. Each project will be described within individual project management plans that define the scope of the project, describe the link between the project and the foundational objectives, and include sub-objectives, key milestones and decision points, schedules, budgets and performance measures.

Implementation Activities

As described earlier, FloodSAFE Program activities can be described within four major categories:

- Improve Flood Management Systems
- Improve Emergency Response Systems
- Improve Flood Management System Maintenance
- Inform and Assist Public

Within each of these categories of activity, work occurs through taking a series of iterative steps. These steps form cycles as shown in Figure 4. Depending on the specific conditions within different geographic areas, parts of the cycle will be

appropriate at different times. Given the variability within California, FloodSAFE activities will likely be occurring in all steps within the cycles concurrently.

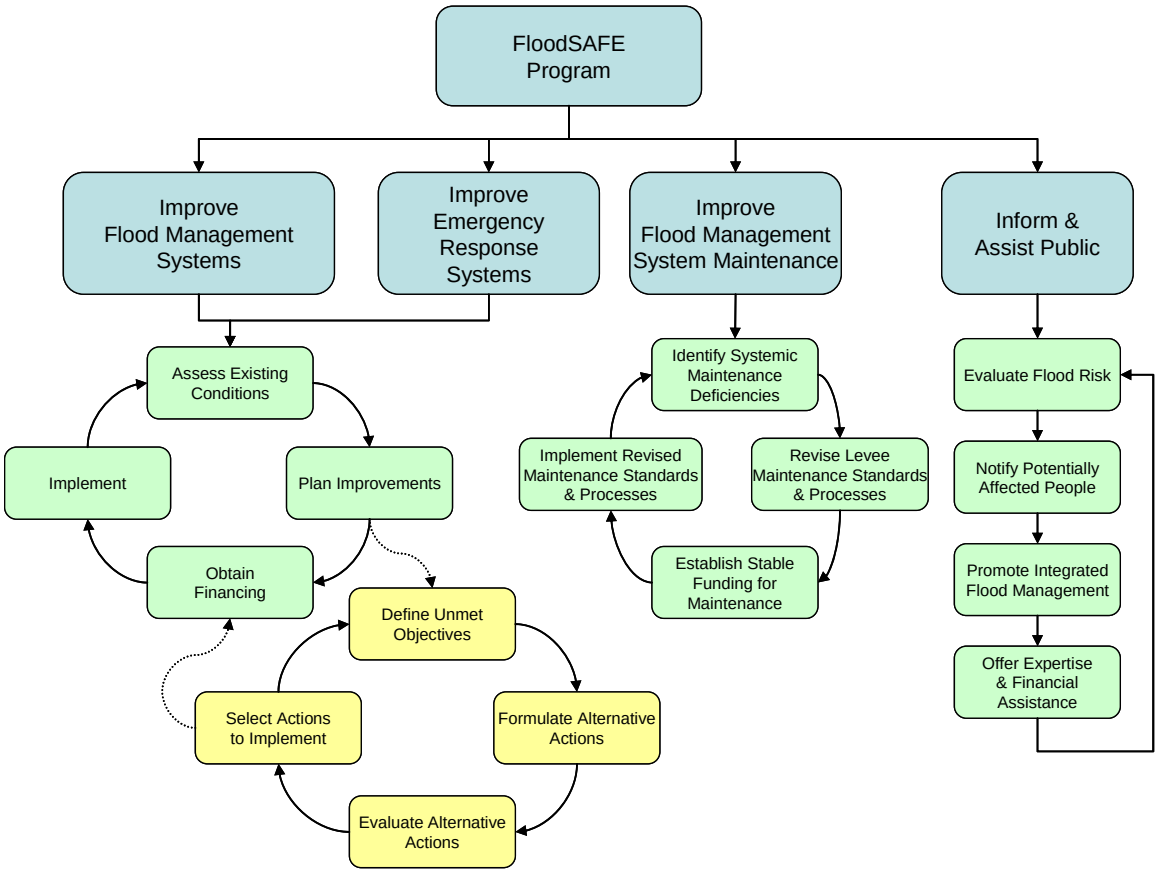


Figure 4 FloodSAFE Program Implementation Activities with ongoing cycles of Implementation

Geographic Focus

All efforts and activities conducted within FloodSAFE are designed to provide benefits to taxpayers throughout California. However, some of the funding is focused primarily, or sometimes exclusively, within certain geographic areas (Figure 5).

Statewide

When activities are designated as "Statewide" then those activities can be conducted anywhere within the state.

Central Valley

A significant portion of the flood management bond funds (about 80 %) provided by Propositions 1E and 84 will be used within the Central Valley[5]. The majority

[5]As used within SB5 (Section 65007. (g)), where Central Valley is synonymous to the "Sacramento-San Joaquin Valley" that means any lands in the bed or along or near the banks of the Sacramento River or San Joaquin River, or any of their tributaries or connected therewith, or upon any land adjacent thereto, or within any of the overflow basins thereof, or upon any land susceptible to overflow therefrom. The

of these funds are for repair and improvement of the State Flood System[6] and other facilities within the Delta.

The Central Valley is subdivided into three key distinctions:

- State Flood System – areas that influence or are influenced by the State-federal portions of the Central Valley Flood Protection System, including project levees within the Delta
- Delta – areas within the legal limits of the Delta as defined by Section 12220 of the Water Code
- Other – areas within the Central Valley not included in the State Flood System or the Delta

[Insert map showing bounds of Sacramento-San Joaquin Valley, bounds of legal limits of Delta, overview of State Plan of Flood Control Facilities, and State Flood System Area.]

Outside the Central Valley

California watersheds outside the Central Valley are smaller than those within the Central Valley and flood management systems are typically less extensive and complex. Historically, the State's primary role for flood management improvements outside the Central Valley has been to provide financial assistance through the Statewide Subventions Program and several other statewide grant programs.

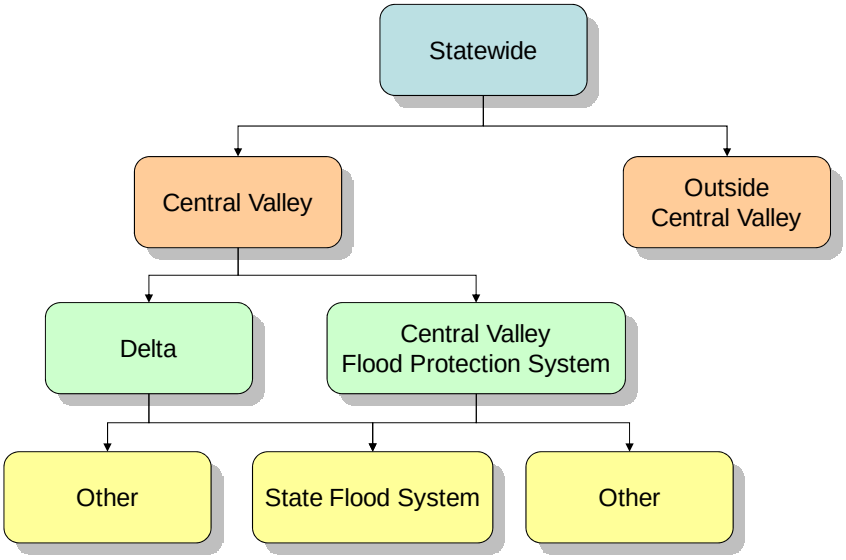


Figure 5 FloodSAFE Geographic Areas

Sacramento-San Joaquin Valley does not include lands lying within the Tulare Lake basin, including the Kings River.

[6] The State-federal portions of the Central Valley Flood Management System defined as the *State Plan of Flood Control* in Public Resources Code Section 5096.805.

Land Use Category

The type of land use within each geographic area also influences the need for flood management and the preferred methods. Within this report, the Land Use Category[7] is divided into four categories that represent different interests and perspectives:

- **Urban Area** – means a developed area in which there are 10,000 residents or more
- **Urbanizing Area** – means a developed area or an area outside a developed area that is planned or anticipated to have 10,000 residents or more within the next 10 years
- **Non-urbanized Area** – means a developed area or an area outside developed area in which there are less than 10,000 residents
- **System-wide / Environmental** – a broad perspective that considers explicit linkages between the first three categories and environmental health

Investment of Bond Funds by Area

One of the key components of the FloodSAFE Implementation Framework is the money required to accomplish the foundational objectives. The State has funded flood management activities for years through the State General Fund and occasional bonds. For the first time in recent history, the State has provided a large influx of funds to improve statewide integrated flood management.

Unfortunately, even with only partial information about the current conditions of flood management systems statewide, it is clear that the currently available State funds will not be sufficient to accomplish all FloodSAFE foundational objectives.

Table 2 describes the amount of State funds available to invest for improving flood management. The strategies recommended later in this section include a spending plan designed to maximize the return on these investments by leveraging other investments from federal and local sponsor participation.

Specific authorized purposes, including limits, for use of the bond funds are included in Appendix B.

[7] Urban Area, Urbanizing Area, and Non-urbanized Area are based on definitions provided in SB 5, Sections 65007. (i), (j), and (e) respectively.

Table 2: Identified Uses of Bond Funds

	Funding ($million)		
	Prop. 1E	**Prop. 84**	**Total**
Central Valley			**3,275**
Evaluation, repair, improving State Flood System	3,000		
Local assistance and special flood projects in Delta		275	
Outside Central Valley			**680**
State contributions (subventions)	500	180	
Statewide			**935**
Stormwater projects	300		
Flood corridors (including mapping)	290	40	
Floodplain mapping		30	
Evaluation, emergency response, improvement, mitigation, etc.		275	
Total	**4,090**	**800**	**4,890**

1. Funds provided by Proposition 1E are only available for appropriation until July 1, 2016.
2. The flood protection provisions of Proposition 84 are intended to provide the funding needed to address short-term flood protection needs. It is also intended to provide a framework to support long-term strategies.

Important Considerations

System Conditions

Many important details about flood management systems in California (and the resources the flood management systems are meant to support) are not readily available or are outdated. FloodSAFE includes projects that provide new data collection and engineering evaluations to provide useful information about the current conditions of flood management systems statewide. Many of the more detailed data collection and analysis efforts are focused within the Central Valley and will take three to four years to complete.

While gathering this new information is a high priority and is proceeding, some areas have already developed feasible plans to implement actions consistent with the FloodSAFE goals and objectives based on available data. Several of these areas that are ready to proceed with system improvements are facing high likelihood of inundation during flood events with potentially catastrophic consequences.

Spending Decisions

One of the most challenging set of decisions to be made while implementing FloodSAFE will be how to spend the bond funds currently available to produce lasting benefits consistent with the FloodSAFE goals and objectives. Time is of the essence since many people currently face high likelihoods of catastrophic harm from floods. Recognizing the need for urgent action, the $4.09 billion provided through Proposition 1E is only available for appropriation until July 1, 2016. Current, rough cost estimates to complete feasible system improvements statewide far exceed the available funds that can be used as State cost shares.

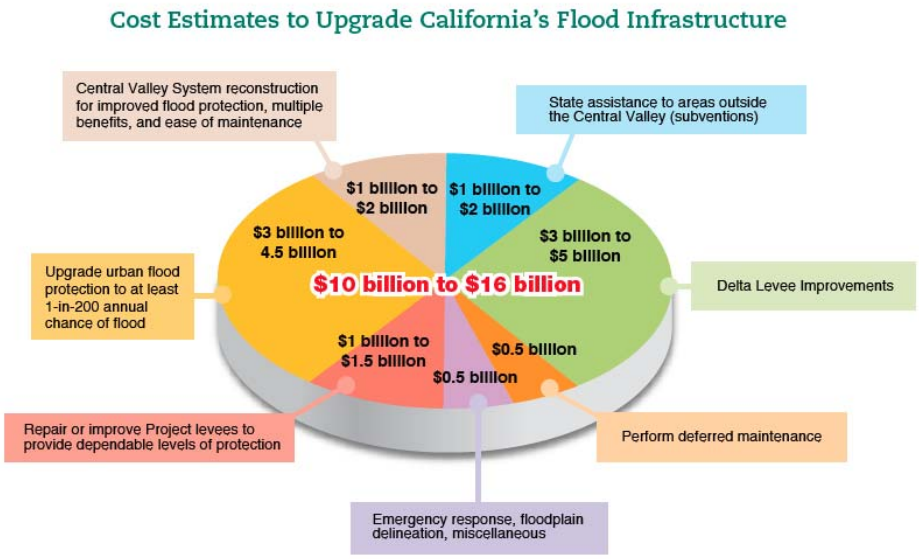


Figure 6 Infrastructure Cost Estimates

Some key spending decisions that must be made soon include:

- How to allocate available funds between competing needs by geographic area and land use category?
- How much additional information must be gathered to recommend future system improvements?
- How to invest State funds to maximize associated federal cost shares?

Some key factors that can help inform these decisions include: level of flood risk faced by various areas, local project readiness to proceed, the need for new information to make prudent investments, and a strategy to secure the maximum feasible amounts of federal and local matching funds.

Federal Funding

The California Legislature has emphasized the need to make "all feasible efforts to obtain funding from the federal government in advance or by arranging to perform work which is a federal responsibility prior to the availability of federal appropriations with the intention that the costs will be reimbursed or eligible for credit by the federal government" (Budget Act of 2008). As a result, all proposed system improvements that may be eligible to receive federal funds must be developed to federal standards.

Historically, the State has provided 50% of the non-federal capital costs for flood management projects in which the State agrees to participate. The State and local sponsors must decide what to do if federal cost sharing is not yet available for projects that are ready to proceed. A few options include:

- Waiting to implement the project until federal cost shares are available
- Proceeding with the project using funds from the traditional State cost share and the local sponsor covering the costs of the normal federal share ahead of federal funds. The local sponsor would work out conditions for federal reimbursements or credits when federal appropriations are made available.
- Reformulating the original project into phases such that the first phase of the project can be accomplished using only the State and local cost shares for the total project. The remaining phases of the original project would wait until federal cost sharing or additional funding from local assessments is available. This approach would require arrangements for federal reimbursements or credits when federal appropriations are made available.

Finance Plan

Since state, federal and local funds currently available are not sufficient to complete the FloodSAFE Foundational Objectives, an economically viable plan must be developed to provide additional funding for flood management improvements.

Interim Benefits

Given the uncertain availability and timing of future funding, the State wants to minimize the risk of stranded investments. In every case, even when funding early phases of work that will rely on future investments, the State will give preference to projects that provide measurable benefits even if the future funding is never obtained. For example, suppose an urban community that currently has a 60-year level of protection develops a plan to provide 200-year level of protection for its citizens by 2022. Also suppose that the cost to provide the 200-year level of protection exceeds currently available funds. In this case, early phases of the work should be designed to provide tangible benefits through increased levels of protection through incremental steps. For instance, the first phase may be designed to provide 120 year level of protection throughout the community upon completion of Phase 1, with features included that will allow future modification or additions to provide 200-year level of protection when future funds become available.

Implementation Strategies

DWR recognizes the urgent need to make on-the-ground improvements to the flood management system as soon as possible. DWR believes this can only occur with broad participation from all of the partners listed above. The following implementation strategies provide broad guidance for development of the Implementation Plan.

Manage FloodSAFE Activities as Projects

DWR will manage all of their activities related to FloodSAFE as projects (using standard project management procedures) under the guidance of a DWR

FloodSAFE Program Management Team. Each project will have a defined scope, schedule, budget, and resources assigned. Each project will have a project manager responsible to deliver the project as defined. Individual projects will be grouped according to their need for coordination and will be managed as portfolios.

Support Collaborative Participation

DWR is committed to fostering broad participation among the partners identified in this Strategic Plan. DWR plans to establish and provide multiple opportunities for effective interaction according to interest:

- *Interagency Project Teams* – many of the FloodSAFE projects will require very close participation between DWR and other agencies (e.g., the Central Valley Flood Protection Board, the Corps of Engineers, etc.). Whenever appropriate, project teams will include members assigned to work on the project from other agencies and team members will be located together when feasible.
- *Strategic Plan Review* – The FloodSAFE Strategic Plan will serve as the guiding document for all FloodSAFE Activities. The plan contained in this report reflects a shared vision for a prudent approach for FloodSAFE among major partners. This plan was reviewed and discussed by major partners and through a series of public workshops held in the 2nd quarter of 2008.
- *Program Implementation Plan Review* – The Program Implementation Plan provides more specific information about the activities of FloodSAFE including detailed objectives, schedules, budgets, etc. Drafts of the Implementation Plan will be provided for review and comment to partners and the public before adoption in 2008. The Program Implementation Plan will be updated annually with partner and public input prior to each update.
- *Program Status Reports* – DWR will publish semi-annual reports that include progress review of all FloodSAFE projects. These reports will be published on the FloodSAFE website.
- *Periodic Partnership Symposium to discuss Entire FloodSAFE Program* – DWR will host, along with its key partners, a public workshop once per year to discuss the entire FloodSAFE Program with all interested parties. These annual symposiums will provide summaries of project status, actions taken on significant policy items, and near-term objectives. The symposium will include time for discussion about progress toward fulfilling the FloodSAFE vision, problems encountered, and any adjustments needed.
- *Statewide Flood Management Planning* – DWR has decided to enhance the California Water Plan (a strategic document addressing statewide water management needs that is updated every five years) by including more detailed consideration of statewide integrated flood management.

The California Water Plan Update process includes extensive stakeholder involvement as described at www.waterplan.water.ca.gov.

- *Public Participation to Develop a Central Valley Flood Protection Plan* – DWR plans to host workshops with partners and stakeholders affected by the newly required Central Valley Flood Protection Plan (CVFPP)[8] beginning in early 2008. This public participation process will provide significant guidance to development of the CVFPP and will influence investment decisions for improvements made in the Central Valley. The public process will be continued at least until the first CVFPP is completed.
- *Regional Coordinators for Integrated Water Management* – a DWR team of regional coordinators is being formed to work closely with regional representatives relating to water management system improvements (including flood protection improvements).
- *Development of guidelines or regulations for specific program actions* – as DWR designs and implements grant and other programs to contribute toward accomplishing specific FloodSAFE objectives, official guidelines or regulations will be developed and circulated for public review and comment. As new guidelines or regulations are proposed, they will be posted to the FloodSAFE website. A voluntary e-mail distribution list will be maintained to provide notice of important dates.
- *Integrated Regional Water Management Plans* – DWR will work with regions to enhance integrated flood management content within Integrated Regional Water Management Plans.
- *Status Report for Statewide Subventions* – DWR will prepare a status report, to be updated periodically, for the subvention program for flood management projects outside the Central Valley.
- *Specific Topic Workshops* – DWR will continue to host and participate in workshops addressing specific topics (e.g., establishing standards for meeting 200-year level of protection; or setting cost share formulas for various projects) as needed. All such workshops will be posted on the FloodSAFE website. A voluntary e-mail distribution list will be maintained to provide notice of important dates.

Promote Regional Focus

While DWR serves as leader of the FloodSAFE Program, DWR believes all new formulations for local and regional projects should begin with proposals from the local entities. These local entities know the needs of their communities and are in the best position to propose solutions to meet FloodSAFE objectives in their

[8] According to SB5, The Central Valley Flood Protection Plan (CVFPP) must be prepared by DWR and submitted to the Central Valley Flood Protection Board by January 1, 2012. The CVFPP will include the required preparation of a State Plan of Flood Control – a detailed plan describing the facilities and operation of the State-federal Flood Protection System in the Sacramento and San Joaquin Valleys.

region. Actions in the Program Implementation Plan will encourage and support local involvement in all aspects of improving regional and local flood management systems. In order to qualify for State funds, regions must consider system-wide opportunities and potential effects of proposed actions. The State will encourage sound integrated flood management planning techniques. In cases where local entities are unable to form regional alliances to propose projects for their areas, the State may lead efforts to initiate planning for that region.

Water Code Section 12585.7
For Nonfederal Capital Costs of Flood Management

The State normally pays 50%, but will pay up to 20% more if the project makes significant contributions to other objectives:

- Endangered species
- Important habitats
- Open space
- Recreational opportunities
- Flood control for communities with median household income less than 120 percent of the poverty level
- Flood control for state transportation or water supply facilities

Investment Strategy

Describe high-level budget for FloodSAFE. Show table of available fund source by project.

Include simple high level schedule.

Methods for Distributing Funds

Describe options for distributing funds being considered and indicate which approaches we plan to use according to project.

Competitive Grant Programs

Capital Outlay by DWR

Other forms of funding arrangements

Proposed Cost Sharing Strategy

Describe planned cost sharing approach. Address state / federal funding strategy (crediting, timing of investments).

Requirements for Successful FloodSAFE Delivery

If successfully delivered, the FloodSAFE Program will establish a new era of integrated flood management throughout California that will benefit citizens for generations to come. As described in this report, FloodSAFE is being managed as a collection of projects. The foundational objectives proposed in this plan represent an unprecedented level of commitment to actions and investments that will improve flood management in California tremendously over the next several years. Accomplishing these objectives will require extraordinary efforts by many people and institutions. DWR has begun creating a FloodSAFE delivery system that can support the required efforts by all FloodSAFE partners to successfully accomplish all FloodSAFE foundational objectives. This FloodSAFE delivery system will require major adjustments within DWR processes, business services and organization to support these extraordinary efforts.

Critical Success Factors

DWR has determined 14 critical success factors to implement FloodSAFE effectively. These critical success factors must guide development of the FloodSAFE implementation infrastructure.

1. Be ready to provide swift and effective emergency response services during all potential flood seasons beginning in 2007.
2. Establish and carry out a Program Implementation Plan with clearly defined authorities, responsibilities, timelines, budgets, priorities, and expected outcomes.
3. Develop and carry out project implementation plans for each FloodSAFE project.
4. Make environmental stewardship a key element of planning and implementing improvements to flood management systems.
5. Provide clear direction, support and feedback to empower project teams and support them in accomplishing objectives.
6. Develop and operate a comprehensive outreach and communication program that provides ample opportunities for partners and other stakeholders to participate with DWR during FloodSAFE implementation.
7. Establish cooperative working relationships with federal, state and local partners to leverage resources for FloodSAFE initiatives while effectively and efficiently meeting regulatory intent.
8. Locate, hire, and train appropriate personnel to provide leadership, expertise, and program oversight.
9. Renovate human resource, contracting, and procurement processes to meet DWR business needs (e.g., to provide required consultant and other support services, and to provide State cost shares for locally-sponsored projects).
10. Track and manage financial resources in a manner that builds public trust and meets bond accountability expectations.
11. Demonstrate performance by ongoing and timely reporting on how we are meeting goals and objectives consistent with our guiding principles.
12. Improve analytical tools and data management systems to develop, archive and share new information as it becomes available.
13. Develop and apply a business risk management strategy for implementing FloodSAFE that reduces unnecessary legal and financial liabilities for the people of California.
14. Meet with tribal governments that could be impacted from floods to enhance mitigation and public safety.

VIII. Next Steps

The FloodSAFE Strategic Plan was developed with input from state, federal, tribal, and local agencies. The public had an opportunity to comment on the plan at X meetings and workshops throughout California. Drafts of the plan have been shared with the Administration and with the Legislature. Based on interaction and feedback, this working version of the Strategic Plan has been prepared to guide future flood investments, policy, and preparation of the detailed implementation plan.

The FloodSAFE Program Management Team will use the guidance contained in this Strategic Plan to prepare a detailed Program Implementation Plan.

IX. FloodSAFE Project Portfolios

[Insert list of FloodSAFE projects grouped by portfolio]

X. Glossary

Integrated Flood Management –an approach to dealing with flood risk that recognizes the interconnection of flood management actions within broader water resources management and land use planning; the value of coordinating across geographic and agency boundaries; the need to evaluate opportunities and potential impacts from a system perspective; and the importance of environmental stewardship and sustainability

Central Valley – valley that dominates the central portion of the California which is home to many of California's most productive agricultural land. The northern half is referred to as the Sacramento Valley, and its southern half as the San Joaquin Valley. The two halves are joined by the shared delta of the Sacramento and San Joaquin Rivers.

Central Valley Flood Protection Plan – The CVFPP will be a system-wide plan for improving integrated flood management in the Central Valley.

Delta – an expansive inland river delta and estuary formed by the Sacramento and San Joaquin Rivers that includes a large expanse of interconnected canals, streambeds, sloughs, marshes and peat islands.

Environmental Restoration – the process of reestablishing, to the extent possible, the structure, function and composition of the natural environment.

Environmental Stewardship – a concept and commitment of responsibility to manage and protect natural resources (water, air, land, plants and animals) and ecosystems in a sustainable manner that ensures they are available for future generations.

Facilities of the State Plan of Flood Control – the levees, weirs, channels, and other features of the federally and state-authorized flood control facilities located in the Sacramento River and San Joaquin River drainage basin for which the board or the department has given the assurances of nonfederal cooperation to the United States required for the project, and those facilities identified in Section 8361 of the Water Code. (California Public Resources Code Section 5096.805)

Flood Control – measures taken to reduce damage caused by floods by capturing and controlling large flows and routing those flows away from people and property as quickly as possible.

Flood Damages – all damages caused by a flood including physical damage, loss of life, and economic damage.

Flood Flows – the amount of water that flows through a system during flooding.

Flood Management – the use of comprehensive methods to manage flood flows, providing multiple benefits in addition to protecting people and property.

Flood Risk – the magnitude and probability of consequences that would occur as a result of flood-induced infrastructure damage under a given study plan.

Flooding – an overflow of an expanse of water that submerges land.

Floodplain – A flat or nearly flat area adjacent to a stream or river that experiences occasional or periodic flooding.

Floodplain Management – Actions designed to reduce risks to life, property, and the environment due to flooding. Actions can include watershed management, infrastructure construction and operation, variations in land use practices, floodway designations, etc.

Foundational Objectives – Specific and measurable outcomes that can be accomplished by a definitive date to contribute toward the broader FloodSAFE goals.

Integrated Water Resources Management – According to the Global Water Partnership (GWP): "Integrated Water Resources Management is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems." Sustainable and effective management of water resources demands a holistic approach, linking social and economic development with the protection of natural ecosystems and appropriate management links between land and water uses. (The Associated Programme on Flood Management, 2004)

Level of Protection –a designation of the ability to withstand a flood event of a certain magnitude and frequency of occurrence.

Non-urban – An area in which there are less than 10,000 residents.

Preparedness – Efforts to help reduce the adverse consequences of floods and to allow for quicker recovery after flooding.

Public Trust Resources – public rights in the beds, banks, and waters of navigable waterways that the State supervises as trustee for the benefit of the people.

Recovery – Efforts taken after flooding has occurred to return an area to pre-flood conditions.

SMART Objectives

Stakeholder – individuals or groups who can affect or be affected by an organization's activities or individuals or groups with an interest or "stake" in what happens as a result of any decision or action. Stakeholders do not necessarily use the products or receive the services of a program.

State Flood System – The State-federal portions of the flood management system in the Central Valley.

State Plan of Flood Control – means the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project described in Section 8350, and of flood control projects in the Sacramento River and San Joaquin River watersheds authorized pursuant to Article 2 (commencing with Section

12648) of Chapter 2 of Part 6 of Division 6 for which the board or the department has provided the assurances of nonfederal cooperation to the United States, and those facilities identified in Section 8361. (California Public Resources Code Section 5096.805)

Sustainability – A specific resource that avoids complete depletion over a specified time horizon. The continued feasibility of a specified economic activity over a specified time horizon, usually influenced by management and policy actions.

Urban – A developed area in which there are 10,000 residents or more.

Urbanizing – Developing an area that is planned or anticipated to have 10,000 residents or more within the next 10 years

XI. Background and Context

Flood Awareness

Awareness of the consequences of flooding has dramatically increased since Governor Schwarzenegger drew attention to the state's flood problem in January 2005. Since that time, Hurricane Katrina and the resulting flooding in New Orleans provided a vivid reminder of levee vulnerability and consequences of flooding urban areas. California's own flooding in 2006 produced by storms with recurrence intervals of as little as five to ten years highlighted that the system is fragile and deteriorating. Emergency appropriations and the repair of critical levee erosion sites necessary before the winter of 2006 contributed to furthering public awareness of potential flooding.

The unprecedented funding through Propositions 1E and 84 in November 2006 demonstrated the public's willingness to invest in flood management. These propositions and other emergency appropriations (Assembly Bill 142) place California flood funding at an all time high. At the same time, the Administration has made it clear that the current funding is only a substantial down payment on flood improvements that will require additional public support for future bond measures.

The need for adequate flood management is more critical now than ever before. Over the years, major storms and flooding have taken many lives, caused significant property losses, and resulted in extensive damage to public infrastructure. However, a combination of recent factors has put public safety and the financial stability of State government at risk. California's flood protection system, comprised of aging infrastructure with major design deficiencies, has been further weakened by deferred maintenance. Escalating development in floodplains has increased the potential for flood damage to homes, businesses, and communities and court decisions have resulted in greater State government liability for flood damages.

Recent Events

In 2003*, Paterno v. State of California,* the court held the State of California (State) liable for flood-related damages caused by a levee failure. In the *Arreola v. Monterey County* decision of July 2002, local agencies were held liable for the 1995 flood damages that resulted from a failure to properly maintain the Pajaro River project. The maintaining agencies had not been able to use standard mechanical clearing methods to remove vegetation in the channel because of environmental requirements to protect riparian habitat.

Due to funding and environmental concerns, both the State and local agencies in all regions of the state have found it increasingly difficult to carry out adequate maintenance programs using previous methods. Environmental regulations are requiring development of new approaches for local and State agencies to deal with the backlog of maintenance activities.

In addition to the challenges of maintaining a sustainable and integrated flood management system in the Central Valley, great challenges also exist in the Sacramento-San Joaquin Delta (Delta). Levee failures in the Delta can affect farmland, small communities, the ecosystem, and the largest water supply projects in California. The Delta includes nearly 60 major islands and tracts lying below sea level that are kept dry by more than 600 miles of marginal levees, many founded on peat soils. During the last century there have been more than 160 levee failures and island inundations, most of which occurred during flood seasons. Most of these levees have problems associated with long-term levee settlement and island subsidence.

Recent Events and Progress

Greater Taxpayer Liabilities. The November 2003 *Paterno vs. State of California* legal decision found that when a public entity accepts a flood control system built by someone else, it accepts liability as if it had planned and built the system. The Paterno ruling held the State responsible for defects in a Yuba County levee foundation that existed when the levee was constructed by local agricultural interests in the 1930s.

Expanded Flood Programs. After years of reduced budgets for State flood programs, substantial funding increases are now available for system repair and improvement, emergency response, and Delta levee programs.

Reminders from Hurricane Katrina. Hurricane Katrina and the resulting flooding in New Orleans provided a vivid reminder of levee vulnerability and long-lasting consequences of flooding urban areas.

Federal Programs. Since late 2005, the U.S. Army Corps of Engineers and the Federal Emergency Management Agency have cooperated to develop fully coordinated federal flood management programs and policies through the Interagency Flood Risk Management Committee. The resulting efforts, partly resulting from reviews of practices and policies in the aftermath of the flooding of New Orleans, are resulting in stricter standards for levee design, construction, operations and maintenance – linked to floodplain mapping and stricter levee accreditation requirements under FEMA's Map Modernization Program.

California Flooding 2006. Many regions of California experienced dangerous and costly flooding in early 2006 from flood events that were neither powerful nor rare.

Critical Levee Repair. In February 2006, Governor Schwarzenegger declared a State of Emergency for California levee system, resulting in expenditure of $190 million to repair critically eroded levees.

Climate Change. In July 2006, DWR released *Progress on Incorporating Climate Change into Management of California's Water Resources* that highlights rising sea level, earlier spring snowmelt, and increasing flood peaks as conditions that will impact the flood management system.

Delta Investigations. Several investigations including the Delta Risk Management Strategy identified the high risk of Delta levee failure and estimated that the risk will increase in the future.

Flood Management Reform Legislation. In 2007, new flood bills were passed focusing on responsible floodplain land use planning, proactive cost sharing rules, shared responsibility for flood safety, and ensuring that adequate maintenance is performed.

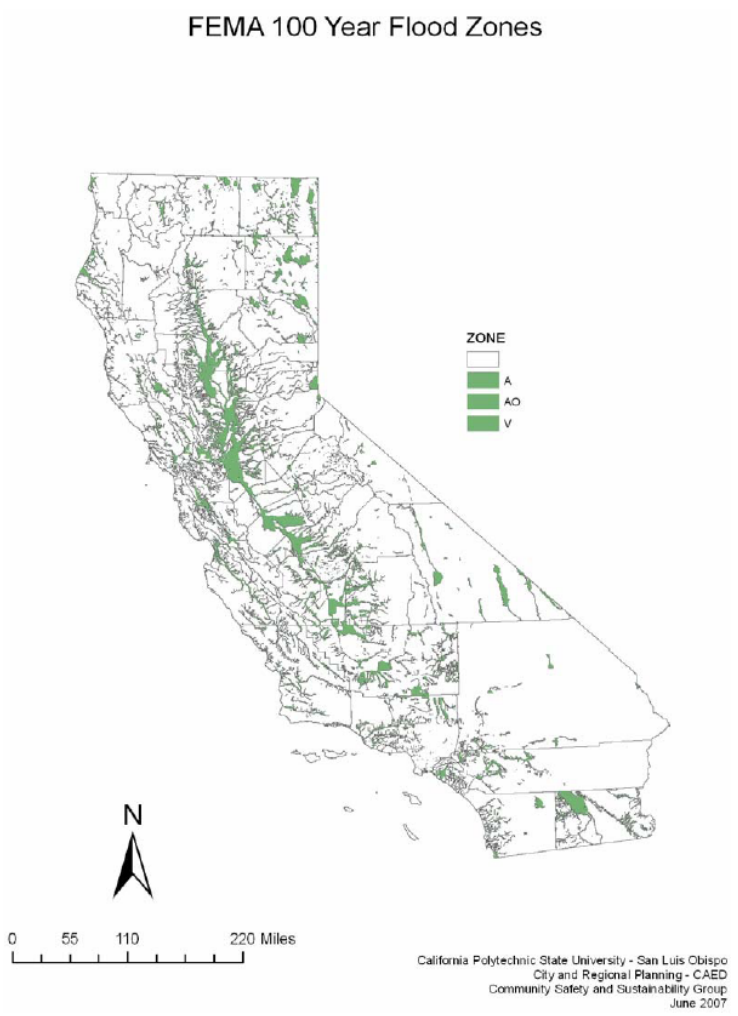
Funding. Emergency appropriations in May 2006 and ballot propositions in November 2006 provided over $5 billion to enhance flood safety statewide – a record amount, but far less than needed.

California Floodplains

[May replace map with Awareness Flood Plains.]

Every region of California faces flood risks. The Central Valley is a floodplain that historically was inundated at regular intervals. Coastal streams can overflow their banks during winter storms. Southern California is vulnerable to infrequent but devastating flooding. Development on alluvial fans faces unpredictable and changing paths of flood flows. Our water supplies and economy are threatened when Delta islands flood, and every part of California is exposed to the financial liability when levees of the Central Valley flood management system fail.

In 2000, experts estimated that nearly 2 million people in California lived in the 100-yr floodplain (5.8% of total population). This means that, on average, approximately 20,000 people per year can expect to be affected by floods.



The largest areas of FEMA Flood Zones in the state are in Central Valley and the Delta.

Two-thirds of the bond funds approved by voters in 2006 are specifically for improvements within the Central Valley and Delta. Several reasons for this focus include the following:

- The largest and most complex flood management in California occurs within the Central Valley. The Sacramento and San Joaquin River watersheds form the Central Valley and cover approximately 40 percent of the land area within California. The Central Valley includes 1,600 miles of State/federal levees, and [X] miles of other levees.
- The Central Valley's growing population is placing new housing developments and job centers into areas that are particularly vulnerable to flooding.

- The Central Valley contains some particularly deep floodplains. In some areas (including urban communities), flooding can produce depths up to 25 feet. These types of deep water floods are much more dangerous than ones that occur on shallow floodplains.
- Unlike flood facilities in other parts of California, the state has direct responsibility for the continued performance, including operation and maintenance, of the State Flood System[9].

Table 3 shows estimated population and other factors within the 200-year floodplain of the State Flood System.

Several documents prepared in recent years describe challenges that must be overcome to improve flood management in California.

State Flood System (SFS)

Federal flood control work began in the Central Valley with Congressional authorization in 1917. The Army Corps of Engineers (beginning in the mid-1930s), the state, and local interests designed and built an extensive collection of levees, channels and related flood control structures in the Central Valley to prevent large land areas from being inundated by frequent storm flows. The flood system on the Sacramento River and tributaries was substantially complete by the late 1960s and on the San Joaquin River and tributaries by the mid-1970s. This collection of federally and state-authorized flood control facilities has been defined in the Public Resources Code Section 5096.805 as the *Facilities of the State Plan of Flood Control*, and includes 1,600 miles of levees and associated facilities.

For simplicity within this report, the Facilities of the State Plan of Flood Control will be called the *State Flood System,* and is located within the Central Valley and Delta.

Recent California Flood Documents

[list with web links starting with FEAT, Comp Study, Floodplain Task Force, 2005 White Paper, etc.]

[9] The State Flood System refers to the legally defined State Plan of Flood Control which is defined in Public Resources Code Section 5096.805 as" the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project described in Section 8350, and of flood control projects in the Sacramento River and San Joaquin River watersheds authorized pursuant to Article 2 (commencing with Section 12648) of Chapter 2 of Part 6 of Division 6 for which the board or the department has provided the assurances of nonfederal cooperation to the United States, and those facilities identified in Section 8361".

Table 3 Estimated 200-Year Floodplain State Flood System

Area	Population Year 2000	Population Year 2030	Value of Structures & Contents	Acres of Irrigated Agriculture
Sacramento Valley[1]	589,000	1,112,000	$40-80 billion	1,224,000
Urban	560,000	1,070,000		
Sacramento	452,000	823,000		
Yuba City	54,000	78,000		
Marysville	12,000	13,000		
Plumas Lake	1,000	28,000		
West Sacramento	32,000	95,000		
Small Communities	14,000	20,000		
Rural	14,000	30,000		
San Joaquin Valley[1]	69,000	137,000	$3-10 billion	640,000
Urban	29,000	63,000		
Lathrop	10,000	23,000		
Stockton[2]	19,000	40,000		
Small Communities	20,000	35,000		
Rural	20,000	40,000		
Additional Rural Delta	26,000	67,000	$6 billion	560,000
Total	684,000	1,316,000		

[1] Both Sacramento and San Joaquin Valley population numbers based on 200-year floodplain from *Sacramento and San Joaquin River Basins Comprehensive Study* and include portions of the Delta.

[2] Portions of Stockton not covered by *Sacramento-San Joaquin River Basins Comprehensive Study*; additional flooding potential is not covered in this table; [Total Stockton 2000 population = 244,000 and estimated 2030 population = 439,000].

Integrated Resources Planning

Until recently, flood management systems have often been designed and constructed with public safety as the sole purpose. Their design has frequently had the objective of "capturing and controlling" large flows and routing those flows away from people and property as quickly as possible. These types of systems are referred to as flood *control* systems. Unfortunately, some of the fundamental design approaches used in the past to provide flood protection have caused unintended consequences such as larger peak flood flows, conflicts with environmental functions, and higher than expected maintenance costs. These experiences have prompted research and promoted deeper understanding of the systems where flood flows occur.

Today, public safety remains a top priority, and better understanding of floodplains, related water supply and environmental systems allows the use of more comprehensive methods that manage flood flows to provide multiple benefits. Systems designed to provide public safety through managing large flows for multiple benefits are called flood *management* systems. Furthermore, multiple benefits typically are produced through integration. The FloodSAFE Strategic Plan focuses on providing integrated flood management.

Integration can occur from several perspectives. First, large water flows that create the risk of flood related damages occur within naturally complex and constructed systems. On one hand, high flows can be hazardous to property and people, but on the other, they are often necessary to sustain natural habitats and provide water supplies. Second, factors that contribute to flood related damages often span multiple geographic and political boundaries. Integrating flood management with other resource management considerations across appropriate geographic regions can reduce the risk of damages caused by flood flows while simultaneously contributing to water supply, habitat, agriculture, water quality, recreation and open space objectives.

Integrated regional planning—whether for flood management, water management, or other resource stewardship—offers many advantages over single-purpose or entirely localized planning approaches. Integrated regional plans promote cooperation and collaboration among neighboring jurisdictions and can help achieve multiple benefits with limited resources. Many of the flood management facilities in California are essential to managing water supplies, providing fish and wildlife habitat, and managing water quality. Due to this undeniable interconnection, flood management planning should be integrated with other water management planning, restoration and resource stewardship efforts, regional blueprint efforts, and hazard mitigation planning in the region under consideration.

The Associated Programme on Flood Management describes Integrated Flood Management (IFM) as follows:

> The defining characteristic of IFM is integration, expressed simultaneously in different forms: an appropriate mix of strategies, points of interventions, types of interventions (i.e. structural or non-structural), short or long-term, and a participatory and transparent approach to decision making – particularly in terms of institutional

integration and how decisions are made and implemented within the given institutional structure.

Therefore, an integrated flood management plan should address the following five key elements that would seem to follow logically for managing floods in the context of an integrated water resources management approach:

- Manage the water cycle as a whole;
- Integrate land and water management;
- Adopt a best mix of strategies;
- Ensure a participatory approach;
- Adopt integrated hazard management approaches.

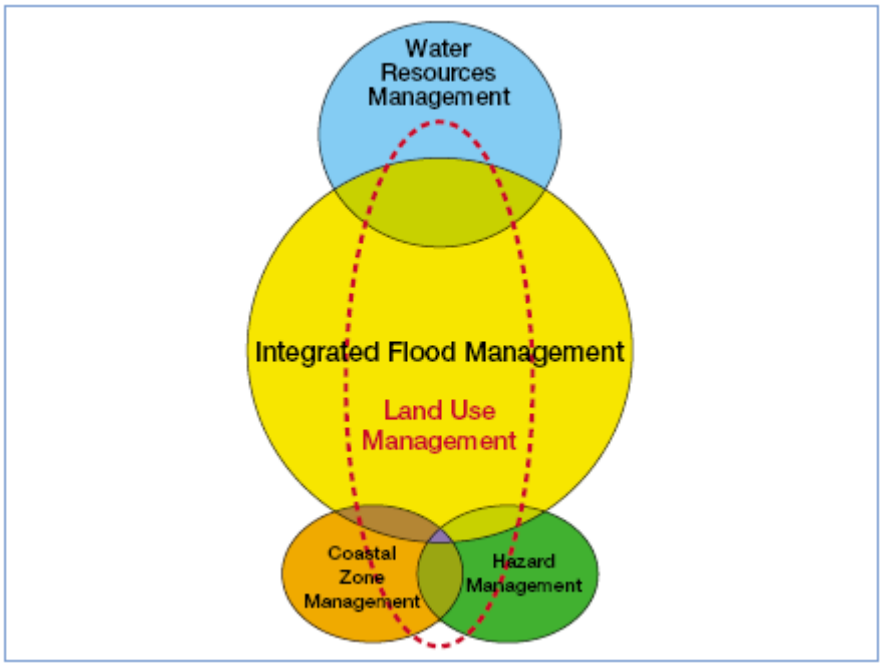


Figure 7 Integrated Flood Management Model by the Associated Programme on Flood Management

Environmental Stewardship

Environmental stewardship is a commitment to the responsibility of managing and protecting natural resources (water, air, land, plants and animals) and ecosystems in a sustainable manner that ensures they are available for future generations.

The value of the State's natural resources, including plants, animals and ecosystems, is reflected in State codes and laws[10]. DWR has a role and responsibility to protect and restore the environment, as reflected in its mission statement. Environmental stewardship is an ethic that DWR embraces as it makes and carries out decisions that deal with future demands on water resources and flood protection throughout California. DWR shall work towards the sustainability of public trust resources related to water resources projects and the environment.

The goal of environmental stewardship is to create human systems consistent with natural systems, where each is ultimately sustainable. Systems of water supply and flood protection are more successful when they accommodate and sustain ecosystem functions. Sustainable systems are also more economical over time.

DWR fosters environmental stewardship by embracing broad concepts of impact avoidance and protection of natural resources, minimization, mitigation and restoration and enhancement of natural functions and values. DWR will incorporate ecosystem restoration as an objective in water and flood management projects, including partnering with restoration efforts of others, to achieve net environmental benefit. Ecosystem restoration is the process of reestablishing, to the extent possible, the structure, function and composition of the natural environment.

DWR will use science to understand the functions of natural biological and physical systems, so as to help plan and design water supply storage and conveyance systems and flood management systems that also benefit native plants, and fish and wildlife resources.

California Water Plan

DWR prepares an update to the California Water Plan periodically, last published in 2005. The California Water Plan Updates provide a strategic view of statewide water management in California. DWR is currently preparing an update for 2008 and is addressing statewide and regional flood management planning much more thoroughly than in past updates.

[10] Fish and Game Code 1600. The Legislature finds and declares that the protection and conservation of the fish and wildlife resources of this state are of utmost public interest. Fish and wildlife are the property of the people and provide a major contribution to the economy of the state, as well as providing a significant part of the people's food supply; therefore their conservation is a proper responsibility of the state.

Land Use

Local communities are responsible for land use decisions, but generally have not been found liable for failure of the flood protection system. Continued development within the floodplains can increase flood risk, even if levees and other flood protection works are improved. Recent 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.

Interconnection with Ecosystem

Successful project implementation requires thorough attention to environmental considerations. Flood managers must support environmental stewardship as part of their management responsibilities.

In California, allowing flooding of natural floodplains can improve flood protection and provide other benefits. A principal opportunity to restore riparian habitats related to flood management projects is by utilizing levee setbacks and flood bypasses. Opening up a floodway provides lower river stages, slower water velocities, and the opportunity to restore riparian forest or wetlands. This change can also increase the area available for public uses such as hiking, birding, and hunting. In certain cases, additional riparian growth will provide improved connectivity with existing riparian areas that benefit wildlife.

System Changes

Recent and expected events are causing significant changes within flood management systems in California and will influence their design, operation and maintenance.

FEMA Accreditation

The Federal Emergency Management Agency (FEMA) is responsible for accrediting levees in floodplain areas. Throughout much of the Central Valley, the State has assumed responsibility for the integrity of levees built by local reclamation districts or the Army Corps of Engineers with design plans dating back to the 1911 Jackson Report. In many cases, FEMA has accredited these levees as being capable of withstanding a 100-year flood event based on old engineering certifications, essentially “grandfathering” these levees into the accredited system.

Several processes now underway may lead to decertification of many levees:

- **Procedure Memorandum 34 – Interim Guidance for Studies Including Levees.** FEMA acknowledges that information on levee location, structural integrity, and certification is often outdated or missing. Memorandum 34 provides guidance to minimize delays in near-term mapping studies while a new policy to protect citizens and property is developed.
- **Procedure Memorandum 43 –** [Add specifics]

- **Levee Evaluations.** DWR and many entities throughout the Central Valley are conducting engineering evaluations for their levees. Subsurface geotechnical investigations are providing better information on underseepage and other foundation stability issues that could demonstrate levees do not meet 100-year level of protection.
- **Vegetation Encroachment Management.** Since Hurricane Katrina, the Corps has been reevaluating national flood protection policies and is notifying levee owners of their intent to enforce a long-standing policy allowing only grass on levees and to remove undesirable encroachments. DWR and the Corps are discussing strategies to address this complex topic for those levees in California that have well-established, significant vegetation.

Over the next several years, the total miles of certified levees in the Central Valley are expected to decrease significantly. As new flood protection projects are implemented, the number of miles of certified levees will rise (see figure). However, due to the expected high cost of restoring or improving levees to modern standards, many areas may find the improvements required in order to be certified will not be economically feasible. As a result, the total length of certified levees may not return to current levels.

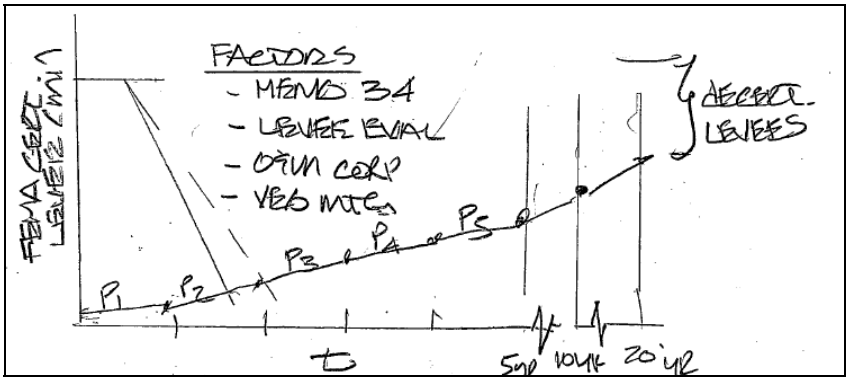


Figure 8 Factors affecting levees

Sea Level Rise

Over the last 100 years, the sea level at California's Golden Gate has been rising by an average rate of about 0.08 inches per year and now averages about 7 inches higher than it did in 1920. Recent evidence predicts the trend to warmer global temperatures will accelerate melting of glaciers, which will release more water into the oceans. In addition, warmer ocean temperatures cause the water to expand, further raising the sea level. Current estimates by the Intergovernmental Panel on Climate Change indicate that sea level will rise by about 0.6 foot to 1.9 [or about 3 feet (DHF) ; see ISB Letter to Delta Vision (KG)] feet over the next 100 years, with a possible added 0.5 foot if the rate of Greenland ice melt increases. Some scientists believe that the sea level rise

could be significantly more. Sea level rise has major implications for the Sacramento – San Joaquin Rivers Delta and other coastal areas of California.

More Winter Flooding

California's climate is expected to become warmer during this century. By the end of the century, depending on future heat trapping emissions, statewide average temperatures are expected to rise between 3.0 and 10.5°F (California Climate Change Center, 2006). Storm runoff is likely to become more intense with higher snow levels causing more winter precipitation to fall in the mountains as rain rather than snow. Average winter flows in the Central Valley are likely to become larger in the future which can cause more flooding (Knowles, et. al., 2004 and EPRI, 2003).

Seismic Activity

Project facilities within the Central Valley could be subjected to moderate ground shaking from earthquakes. Although many of the levees in the Central Valley do not have water impounded against them most of the time, they could be damaged during an earthquake.

The Delta and Suisun Marsh lie in proximity to major faults that are capable of generating moderate to strong ground shaking, particularly in the western Delta (USGS, 2003). Liquifaction of foundation sands under some levees during a moderate to strong earthquake has the potential to cause failures of miles of Delta levees, none of which were designed or constructed to current seismic standards. Data indicates a high probability exists that an earthquake leading to multi-island flooding will occur during this century (URS, 2007).

Subsidence

Land subsidence, primarily through microbial oxidation of organic soils, has placed most of the Delta land below sea level, some as much as 15 feet or more. The dramatic reduction of land elevation on Delta islands has increased the differential between land and water surface elevations in the channels. Over the next 200 years, some areas, especially in the central Delta, could subside by another 18 feet from existing land levels if current land use practices continue (URS, 2007). The potential consequence of levee failures and catastrophic island flooding has major implications for management of the Delta. The lower land surface provides more room for inflowing salt water from Suisun Bay when a levee failure occurs, and the Delta peat soils leach organic material into Delta waters. Land subsidence in other areas of the state has also lowered the effective carrying capacity of levees.

Population Growth and Urbanization

Population forecasts indicate that California's population may reach 90 million residents by 2100. If population growth occurs within floodplains, more people and property will be at risk from flooding when levees fail, when storm runoff exceeds the design capacity of the system, or from undetected deficiencies in or under the levees. If more urban development replaces agricultural lands and

open space near rivers and streams, options for flood management improvements become more restricted.

XII. References

XIII. Available Bond Funds

Proposition 1E **Disaster Preparedness and Flood Prevention Bond**

Section	Authorized Uses	Authorized Amount	Available After B	Notes / Restrictions
5096.821	Three billion dollars shall be available, upon appropriation to the department, for the following purposes:	$ 3,000,000,000	$ 2,895,000,000	
(a)	Evaluation, repair, rehabilitation, reconstruction, or replacement of levees, weirs, bypasses, and facilities of the State Plan of Flood Control by all of the following actions:			
(a) (1)	Repairing erosion sites and removing sediment from channels or bypasses.			
(a) (2)	Evaluating and repairing levees and any other facilities of the State Plan of Flood Control.			
(a) (3)	Implementing mitigation measures for a project undertaken pursuant to this subdivision. The department may fund participation in a natural community conservation plan pursuant to Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code to facilitate projects authorized by this subdivision.			
(b)	Improving or adding facilities to the State Plan of Flood Control to increase levels of flood prevention for urban areas, including all related costs for mitigation and infrastructure relocation. Funds made available by this subdivision may be expended for state financial participation in federal and state authorized flood control projects, feasibility studies and design of federal food damage reduction and related projects, and reservoir reoperation and groundwater flood storage projects. Not more than $200 million may be expended on a single project, excluding authorized flood control improvements to Folsom Dam.			<= $200 million per project except Folsom Dam modifications.
(c) (1)	To reduce the risk of levee failure in the delta.			

(c) (2)	The funds made available for the purpose specified in paragraph (1) shall be expended for both of the following purposes:		
(c) (2) (A)	Local assistance under the delta levee maintenance subventions program under Part 9 (commencing with Section 12980) of Division 6 of the Water Code, as that part may be amended.		
(c) (2) (B)	Special flood protection projects under Chapter 2 (commencing with Section 12310) of Part 4.8 of Division 6 of the Water Code, as that chapter may be amended		
5096.824			
(a)	Five hundred million dollars shall be available, upon appropriation to the department, for payment for the state's share of the nonfederal costs, and related costs, of flood control and flood prevention projects authorized under any of the following:	$ 500,000,000	$ 482,500,000
(a) (1)	The State Water Resources Law of 1945 (Chapter 1 (commencing with Section 12570) and Chapter 2 (commencing with Section 12639) of Part 6 of Division 6 of the Water Code).		
(a) (2)	The Flood Control Law of 1946 (Chapter 3 (commencing with Section 12800) of Part 6 of Division 6 of the Water Code).		
(a) (3)	The California Watershed Protection and Flood Prevention Law (Chapter 4 (commencing with Section 12850) of Part 6 of Division 6 of the Water Code.		
(b)	The costs described in subdivision (a) include costs incurred in connection with either of the following:		
(b) (1)	The granting of credits or loans to local agencies, as applicable pursuant to Sections 1285.3, 1285.4 of, subdivision (d) of Section 1285.5 of, and Sections 12866.3 and 12866.4 of, the Water Code.		
(b) (2)	The implementation of Chapter 3.5 (commencing with Section 12840) of Part 6 of Division 6 of the Water Code.		

	(c) The funds made available by this section shall be allocated only to projects that are not part of the State Plan of Flood Control.			Must use outside SPFC.
5096.825	Two hundred ninety million dollars shall be available, upon appropriation, for the protection, creation, and enhancement of flood protection corridors and bypasses through any of the following actions:	$ 290,000,000	$ 279,850,000	
	(a) Acquiring easements and other interests in real property to protect or enhance flood protection corridors and bypasses while preserving or enhancing the agricultural use of the real property.			
	(b) Constructing new levees necessary for the establishment of a flood protection corridor or bypass.			
	(c) Setting back existing flood control levees, and in conjunction with undertaking those setbacks, strengthening or modifying existing levees and weirs.			
	(d) Relocating or flood proofing structures necessary for the establishment of a flood protection corridor.			
	(e) Acquiring interests in, or providing incentives for maintaining agricultural uses of, real property that is located in a flood plain that cannot reasonably be made safe from future flooding.			
	(f) Acquiring easements and other interests in real property to protect or enhance flood protection corridors while preserving or enhancing the wildlife value of the real property.			
	(g) Flood plain mapping and related activities, including both of the following:			
	(g) (1) The development of flood hazard maps, including all necessary studies and surveys.			
	(g) (2) Alluvial fan flood plain mapping.			

5096.827	Three hundred million dollars shall be available, upon appropriation to the department, for grants for stormwater flood management projects that meet all of the following requirements:	$ 300,000,000	$ 289,500,000	
(a)	Have a nonstate cost share of not less than 50 percent.			Nonstate cost share >= 50%
(b)	Are not part of the State Plan of Flood Control			Must be outside SPFC
(c)	Are designed to manage stormwater runoff to reduce flood damage and where feasible, provide other benefits, including groundwater recharge, water quality improvement, and ecosystem restoration.			
(d)	Comply with applicable regional water quality control plans.			
(e)	Are consistent with any applicable integrated regional water management plan.			
5096.828	Funds provided by this article are only available for appropriation until July 1, 2016, and at that time the amount of indebtedness authorized by this chapter shall be reduced by the amount of funds provided by this article that have not been appropriated.			Appropriate by July 1, 2016 or lose the remaining funds.
Subtotal for Proposition 1E funds		$ 4,090,000,000	$ 3,946,850,000	

Proposition 84	**Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006**

75003				
(b)	Protect the public from catastrophic floods by identifying and mapping the areas most at risk, inspecting and repairing levees and flood control facilities, and reducing the long-term costs of flood management, reducing future flood risk and maximizing public benefits by planning, designing and implementing multi-objective flood corridor projects.			

75003.5 The people of California further find and declare that the growth in population of the state and the impacts of climate change pose significant challenges. These challenges must be addressed through careful planning and through improvements in land use and water management that both reduce contributions to global warming and improve the adaptability of our water and flood control systems. Improvements include better integration of water supply, water quality, flood control and ecosystem protection, as well greater water use efficiency and conservation to reduce energy consumption.

Chapter 3. Flood Control

75030 This chapter is intended to provide the funding needed to address short term flood control needs such as levee inspection and evaluation, floodplain mapping and improving the effectiveness of emergency response, and providing funding for critical immediate flood control needs throughout the state. It is also intended to provide a framework to support long term strategies that will require the establishment of more effective levee maintenance programs, better floodplain management and more balanced allocation of liability and responsibility between the federal, state and local governments.

75031	The sum of thirty million dollars shall be available to the department for the purposes of floodplain mapping, assisting local land-use planning, and to avoid or reduce future flood risks and damages. Eligible project include, but are not limited to: (a) Mapping floodplains. (b) Mapping rural areas with potential for urbanization. (c) Mapping and identification of flood risk in high density urban areas. (d) Mapping flood hazard areas.	$	30,000,000	$	28,950,000	Continuously appropriated per section 75032.4.

(e) Updating outdated floodplain maps.
(f) Mapping of riverine floodplains, alluvial fans, and coastal flood hazard areas.
(g) Collecting topographic and hydrographic survey data.

75032	The sum of two hundred seventy five million dollars shall be available to the department for the following flood control projects: (a) The inspection and evaluation of the integrity and capability of existing flood control project facilities and the development of an economically viable flood control rehabilitation plan. (b) Improvement, construction, modification, and relocation of flood control levees, weirs, or bypasses including repair of critical bank and levee erosion. (c) Projects to improve the department's emergency response capability. (d) Environmental mitigation and infrastructure relocation costs related to projects under this section. (e) To the extent feasible, the department shall implement a multiobjective management approach for floodplains that would include, but not be limited to, increased flood protection, ecosystem restoration, and farmland protection.	$ 275,000,000	$ 265,375,000	Continuously appropriated per section 75032.4.
75032.5	The sum of forty million dollars shall be available to the department for Flood Protection Corridor projects that are consistent with Water Code Section 79037.	$ 40,000,000	$ 38,600,000	
75033	The sum of two hundred seventy five million dollars shall be available to the department for flood control projects in the Delta designed to increase the department's ability to respond to levee breaches and to reduce the potential for levee failures. The funds provided by this section shall be available for the following purposes: (a) Projects to improve emergency response	$ 275,000,000	$ 265,375,000	

	preparedness.			
	(b) Local assistance under the delta levee maintenance subventions program under Part 9 (commencing with Section 12980) of Division 6 of the Water Code. (c) Special flood protection projects under Chapter 2 (commencing with Section 12310) of Part 4.8 of Division 6 of the Water Code, including projects for the acquisition, preservation, protection and restoration of Delta lands for the purpose of flood control and to meet multiple objectives such as drinking water quality ecosystem restoration and water supply reliability. (d) All projects shall be subject to the provisions of Water Code Section 79050.			Requires written F&G determination before funds can be expended.
75034	The sum of one hundred eighty million dollars shall be available to the department for the purposes of funding the state's share of the nonfederal costs of flood control and flood prevention projects for which assurances required by the federal government have been provided by a local agency and which have been authorized under the State Water Resources Law of 1945 (Chapter 1 (commencing with Section 12570) and Chapter 2 (commencing with Section 12639) of Part 6 of Division 6 of the Water Code), the Flood Control Law of 1946 (Chapter 3 (commencing with Section 12800) of Part 6 of Division 6 of the Water Code), and the California Watershed Protection and Flood Prevention Law (Chapter 4 (commencing with Section 12850) of Part 6 of Division 6 of the Water Code), including the credits and loans to local agencies pursuant to Section 12585.4, subdivision (d) of Section 12585.5, and Sections 12866.3 and 12866.4 of the Water Code, and to implement Chapter 3.5 (commencing with Section 12840) of Part 6 of Division 6 of the Water Code.	$ 180,000,000	$ 173,700,000	Flood Control Subventions Projects

	Projects eligible for funding pursuant to this section shall comply with the requirements of AB 1147 (Statues of 2000, Chapter 1071).			
Subtotal of Proposition 84 Chapter 4 Funds		$ 800,000,000	$ 772,000,000	
Total Bond Funds previously listed for FloodSAFE		$ 4,890,000,000	$ 4,718,850,000	

Other Proposition 84 Funds that can provide benefits to Integrated Flood Management Goals

Chapter 2. Safe Drinking Water and Water Quality Projects

75026 (a)		$ 1,000,000,000	$ 965,000,000	
(a) (2)	Storm water capture, storage, clean-up, treatment, and management.			
(a) (8)	Planning and implementation of multipurpose flood management programs.			
(c)	Not more than 5% of the funds provided by this section may be used for grants or direct expenditures for the development, updating or improvement of integrated regional water management plans.			<= $50,000,000 for developing or improving IRWMP's
75027. (a)				Allocates funds in Section 75026 by hydrologic region
(b)	The interregional and unallocated funds provided in subdivision (a) [$100,000,000] may be expended directly or granted by the department to address multi-regional needs or issues of statewide significance.			

Chapter 4. Statewide Water Planning and Design

75041	The sum of sixty five million dollars shall be available to the department for planning and feasibility studies related to the existing and potential future needs for California's water supply, conveyance and flood control systems. The studies shall be designed to promote integrated, multi-benefit approaches that maximize public benefits of the overall system including protection of the public from floods, water supply reliability, water quality, and fish, wildlife and habitat protection and restoration. Projects to be funded include: (a) Evaluation of climate change impacts on the state's water supply and flood control systems and the development of system redesign alternatives to improve adaptability and public benefits. (b) Surface water storage planning and feasibility studies pursuant to the CALFED Bay-Delta Program. (c) Modeling and feasibility studies to evaluate the potential for improving flood protection and water supply through coordinating groundwater storage and reservoir operations. (d) Other planning and feasibility studies necessary to improve the integration of flood control and water supply systems.	$	65,000,000	$	62,725,000

3.5% BAF = Bond Administration Fee