



2013 FloodSAFE California Annual Report

Flood Management Planning

Floodplain Risk Management

Flood Risk Reduction Projects

Flood System Operations and Maintenance

Flood Emergency Response

February 2014

FloodSAFE
CALIFORNIA

PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY



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Introduction

FloodSAFE California, established in 2006, is a long-term strategic initiative to reduce the risk and consequences of flooding in California. FloodSAFE includes statewide programs supported by the State’s general fund and bond measures.

FloodSAFE is an important component of the Department of Water Resources’ Integrated Water Management (IWM) strategy, which is designed to achieve a sustainable, robust, and resilient flood and water management system to benefit all Californians. FloodSAFE programs and projects have achieved significant results over the years. However, considerable effort and additional funding will be needed to continue designing and implementing multi-benefit projects that improve public safety, foster environmental stewardship, and contribute to the state’s economic stability.

California’s exposure to flood risk
presents an unacceptable threat to public
safety, infrastructure, and our economy.

More than 7 million people and \$580 billion in assets are exposed to flood hazards in the state.

In the past, lack of sufficient and stable funding for flood management activities has exacerbated our risk. Today, the effects of climate change on storm intensities, runoff patterns, and coastal flooding will magnify these challenges.

Strategic actions by agencies at all levels of government can reduce flood risks and improve response and resiliency when flooding inevitably occurs.

Mud and water remain in homes after flooding in Casitas Springs, January 2005 (Photo: FEMA)



Cover image:
Guadalupe
River Flood
Protection Project,
Santa Clara County

2013 FloodSAFE Annual Report

This report provides an overview of FloodSAFE's progress and significant accomplishments in 2013. It highlights projects that best represent what was completed last year. This report groups similar types of program activities in the following general areas:

– **Flood Management Planning:** formulates strategies, plans, and investment priorities for implementation of flood management projects. It includes the Statewide Flood Management Planning Program and the Central Valley Flood Management Planning Program, which developed the California's Flood Future report and the *2012 Central Valley Flood Protection Plan*, respectively.

– **Floodplain Risk Management:** promotes prudent management of floodplains to reduce flood risks by working closely with local governments and federal agencies, such as the Federal Emergency Management Agency. Policies, guidance documents, and technical products are developed to guide actions taken in floodplains. An important element of successful floodplain risk management includes educating the general public about flood risks, so they can plan, prepare, and take individual actions to reduce flood risk for themselves, their families, and their property.

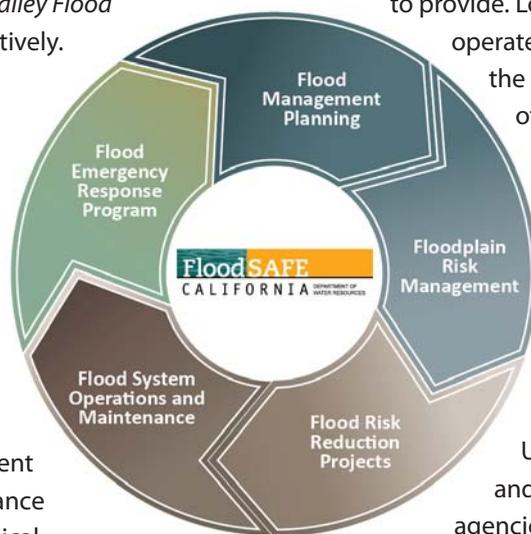
– **Flood Risk Reduction Projects:** works in coordination with local and federal agencies to implement new flood projects; provides funding that enables local agencies to repair and improve levees and other flood management facilities statewide; provides advanced mitigation for the State Plan of Flood Control to

aid project delivery; and enhances ecosystems associated with the flood system. A primary responsibility of this program is to work closely with the U.S. Army Corps of Engineers, Central Valley Flood Protection Board (CVFPB), and local agencies to improve performance of the State Plan of Flood Control facilities, as well as the Folsom Joint Federal Project.

– **Flood System Operations and Maintenance:** focuses on maintaining levees, hydraulic control structures, pumping plants, bridges, and channels to continue to achieve the risk reduction benefits the system was designed to provide. Local maintaining agencies

operate and maintain a majority of the system through management of their individual leveed areas, while the State is required to operate and maintain those portions of the State Plan of Flood Control identified in the California Water Code. Local agencies and the State work closely with the Central Valley Flood Protection Board, U.S. Army Corps of Engineers, and environmental resource agencies to ensure that operation and maintenance activities meet statutory requirements that promote public safety, environmental stewardship and economic stability.

– **Flood Emergency Response:** prepares for and responds to flood threats in close coordination with local, State, and federal entities. Preparing for flood response requires continuous data collection, regular flood system inspections and evaluations, forecasts and information dissemination, annual training and exercises, review and replenishment of supplies and equipment, and preseason coordination.



The Central Valley Flood Protection Board's mission is to reduce the risk of catastrophic flooding to people and property within California's Central Valley. As the non-federal sponsor of the State Plan of Flood Control, the Board partners with DWR and collaborates with federal, State, and local agencies to plan, construct, operate, and maintain flood risk reduction projects.



Flooding in Yuba County, January 1997

Flood Management Planning

In 2013, FloodSAFE continued work on two major planning efforts that will guide State investments in both statewide and regional activities: Statewide Flood Management Planning and Central Valley Flood Management Planning.

Statewide Flood Management Planning

Working closely with the U.S. Army Corps of Engineers and more than 140 public agencies, the Statewide Flood Management Planning Program compiled comprehensive information about exposure to flood risk in each of California's counties and presented recommendations to improve flood management. Titled *California's Flood Future: Recommendations for Managing the State's Flood Risk*, the report captured media and stakeholder attention, and received a 2013 award from the Floodplain Management Association.

FloodSAFE is expanding its dialogue with flood management agencies across the state to deliver an Integrated Water Management Investment Strategy with a focus on flood management.

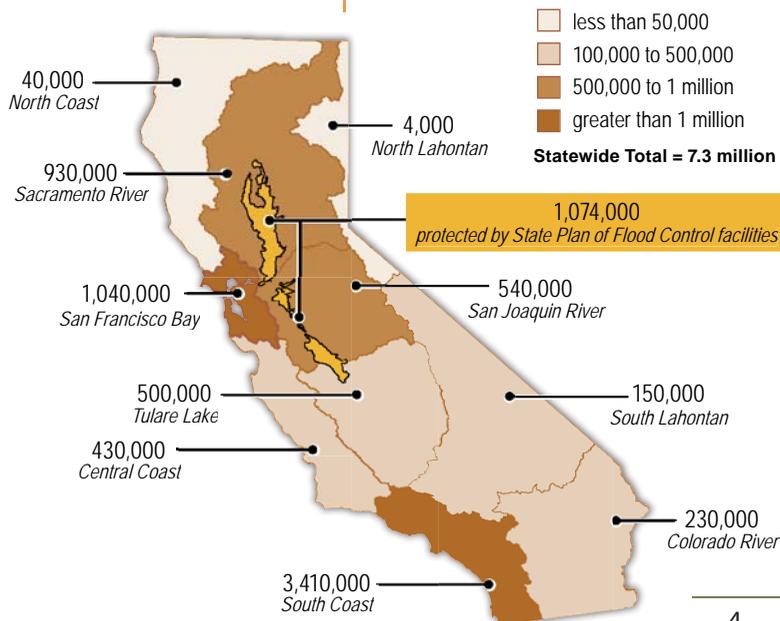
Central Valley Flood Management Planning

This planning program focuses on increasing flood protection and the resiliency of the State Plan of Flood Control by improving State-owned facilities that have system-wide significance. As recommended in the 2012 *Central Valley Flood Protection Plan*, this program is currently implementing major planning efforts: locally-led Regional Flood Management Planning, which is working with more than 180 local entities; State-led Basin-wide Feasibility Studies; and the Central Valley Flood System Conservation Strategy. Each of these planning efforts will inform the 2017 update of the CVFPP.

System Improvements: Basin-Wide Feasibility Studies

DWR began conducting two Basin-Wide Feasibility Studies in 2013—one in the Sacramento River Basin and the other in the San Joaquin River Basin—to refine the system improvements recommended in the CVFPP. Using a multi-benefit approach, these studies evaluate the feasibility of various large-scale flood system improvements and ecosystem enhancements that improve flood system re-

Population exposed to flooding in California by hydrologic region.



The State Plan of Flood Control (SPFC)

Starting in the early twentieth century, the State and U.S. Army Corps of Engineers designed a new and improved system of levees, bypasses, channels, and other structures in California's Central Valley. Today this system is known as the State Plan of Flood Control (SPFC). The SPFC protects a population of over one million people, major freeways, railroads, airports, water supply systems, utilities, and other infrastructure of statewide importance, including \$69 billion in assets. Many of the more than 500 species of native plants and wildlife found in the Central Valley rely to some extent on habitat existing within the SPFC.

The system does not meet the needs of modern society nor can it accommodate future challenges such as climate change and population growth. Major improvements are needed to meet the expectations of California's citizens.

siliency. These studies consider climate change, operations and maintenance, and system effects of regional flood improvements.

Regional Improvements

DWR is working with the CVFPB and six regional groups to strengthen management of the State Plan of Flood Control through development of six regional long-term flood management plans that establish a common vision amongst regional partners, articulate local and regional flood management needs and priorities, describe regional financing strategies, and establish improved regional governance for implementation. Each of the efforts are led by a local agency and include representatives from agencies responsible for flood management, land use, emergency response and permitting, as well as environmental and agricultural interests.

Central Valley Flood System Conservation Strategy

The Conservation Strategy describes how to integrate environmental stewardship with flood management. It compiles data, tools, and other environmental planning information; provides a framework for permitting flood management activities; and recommends approaches that improve both flood and ecosystem management.

Accomplishments

Key accomplishments include:

Statewide Flood Management Planning

- Released *California's Flood Future: Recommendations for Managing the State's Flood Risk*.
- Created maps for every county in the state to describe exposure to flood risk.
- Catalogued the history of flooding for reference by local and regional planning agencies and land use officials.

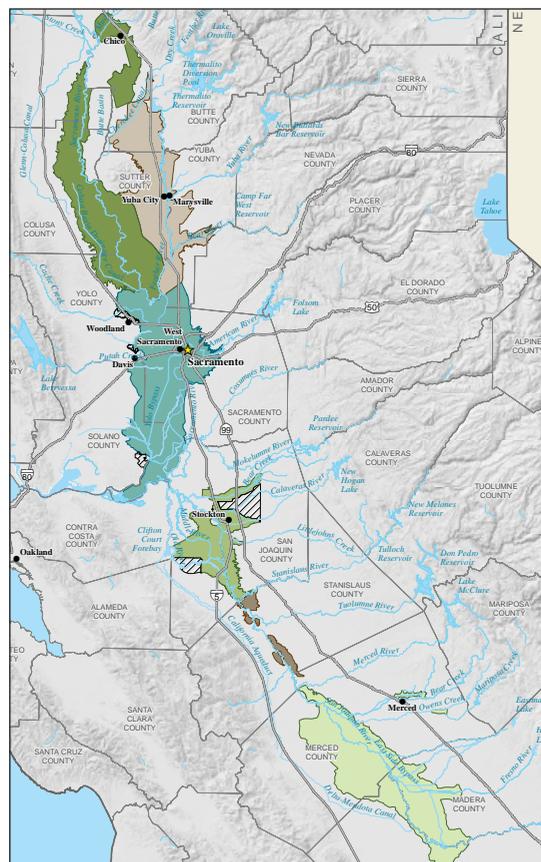
Central Valley Flood Management Planning

- Completed Milestone 1 of the Basin-wide Feasibility Studies, which identified prob-

lems, developed objectives, and completed preliminary technical analysis.

- Provided technical support to regional agencies by sharing data, tools and analyses to inform systemwide and regional flood management planning.
- Improved alignment with federal, State, and local flood management agencies through public workshops and robust communication and engagement efforts.
- Developed comprehensive vegetation data for the Central Valley, identified opportunity areas for floodplain restoration, assessed and updated sensitive species information along floodways, and assessed fish passage solutions in the Sacramento Valley.
- Initiated a regional permitting strategy that includes a pilot habitat conservation plan for the Feather River.

The State Systemwide Investment Approach sets out to overhaul and modernize the flood system through integrated multi-benefit projects that provide resiliency and flexibility to safely pass major flood flows while improving environmental conditions and fostering economic stability.



Improving SPFC Management

The Central Valley Flood Protection Board and DWR are working closely to improve the management of the facilities of the State Plan of Flood Control.

A coordinating committee was established to communicate with stakeholders and work with local entities in preparing six Regional Flood Management Plans.

Central Valley Flood Management Planning Regions

Floodplain Risk Management



Room ripped off a home by a debris flow flood in Southern California, August 2008

Floodplain Risk Management, with the help of government partners, educates the public about flood risk and conducts activities promoting appropriate management of floodplains to reduce the risk of flooding. These activities occur at a regional and statewide level.

Statewide Floodplain Management

In 2013, DWR focused its statewide activity on enhancing locally driven floodplain risk management through flood awareness, flood models, and the Silver Jackets program (*see insert below*).

Central Valley Floodplain Management

Flood risk and land use decisions are inexorably linked. The *Central Valley Flood Protection Act of 2008* tasked DWR with developing criteria that cities and counties in the Sacramento and San Joaquin valleys can use to make findings related to achieving a required level of urban flood protection, which is the protection necessary to withstand a 200-year flood event. The legislation also provides that cities and counties

may develop their own criteria as long as it is consistent with the criteria developed by DWR.

Developing the Urban Level of Flood Protection (ULOP) Criteria involved a significant collaborative effort in 2011 and 2012 among a diverse work group of representatives from cities, counties, State and federal agencies, and professional organizations. In response to public input on the draft and subsequent legislative amendments, DWR convened a second work group in early 2013 and finalized the *ULOP Criteria* in late 2013.

Floodplain Mapping

The program develops new information, tools, and maps to help State, federal, and local partners better understand and respond to the risk of flooding in the Central Valley. This information supports evaluation and design of potential actions and projects to help manage risk.

DWR developed floodplain maps for ten urban communities within the Sacramento and San Joaquin valleys by July 2013 as required by Senate Bill 1278 (SB 1278). These maps provide information about the water surface elevation of flooding if State Plan of Flood Control facilities fail during a 200-year flood event.

Note: The SB 1278 maps are distinct from FEMA

DWR Deputy Director Gary Bardini and Lt. Col. Braden LeMaster sign Silver Jackets memorandum



California Becomes a “Silver Jackets” State

California joined the national Silver Jackets program in November 2013. Silver Jackets is an interagency approach to planning and implementing measures to reduce flood risks. California Silver Jackets members include DWR and other State and federal agencies. California’s flood and emergency management programs benefit from enhanced communication and collaboration among local, State, and federal agencies.

100-Year Flood Insurance Rate Maps and DWR's Levee Flood Protection Zone maps.

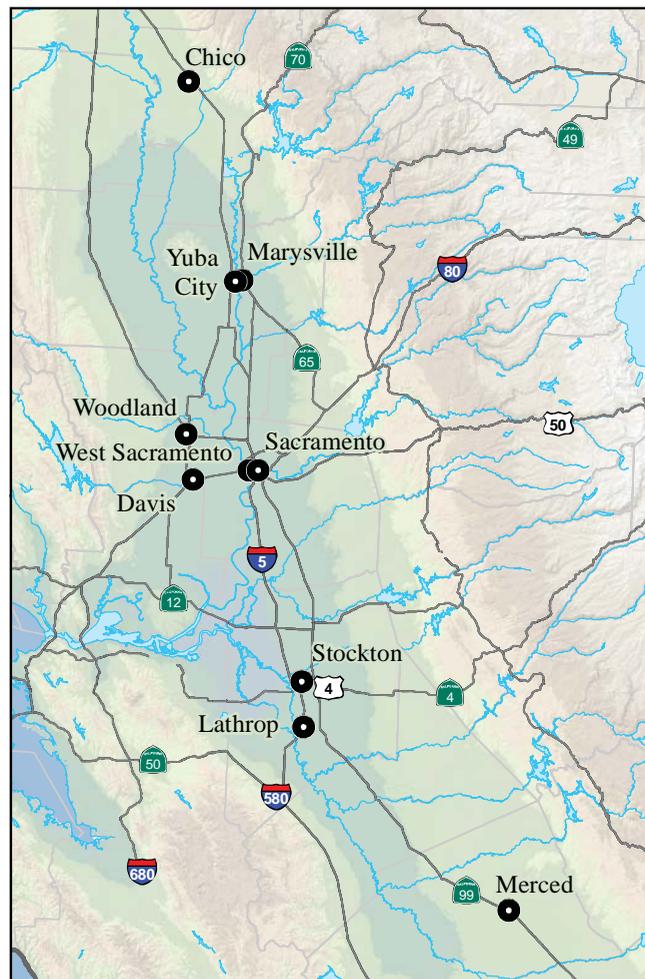
Flood Risk Notification

The Program informs property owners in specified areas of 17 Central Valley counties about their flood risk and encourages them to take action. Annually, more than 273,000 notifications are mailed directly to property owners. Because each notice provides information about all relevant parcels at risk of flooding for each property owner, the annual notification provides risk information about more than 350,000 parcels. These notices direct property owners to an interactive DWR website that utilizes Levee Flood Protection Zone maps to help them find potential flood depths and flood sources for their specific properties. DWR's Flood Risk Notification Program is unique in the nation because the Program utilizes both geographic information systems information and county assessor databases to produce notices that are targeted to each parcel. FEMA continues using it as model of "Best Practices" nationwide.

For the first time, in response to the 2013 Flood Risk Notice, the California Department of Motor Vehicles initiated a statewide assessment of flood risk to their facilities; Pacific Gas and Electric initiated a survey of flood risk to their affected facilities; and, the California State University Chancellor's Office is determining specific levels of flood risk to facilities at CSU Chico and CSU Sacramento. All of the above requested DWR's help with these assessments.

What is a 100-year flood?

"100-year flood" is a shorthand expression for a flood that has a 1-in-100 chance of occurring in any given year. It may also be expressed as the "1% annual chance flood." It does not mean this level of flooding only happens every 100 years. In other words, a 100-year flood can happen several years in a row or more than once in a year, or it may not happen for many years.



Floodplain maps were developed for 10 urban communities in the Senate Bill 1278 Study Areas.

Maps: An Easily Misunderstood Tool

Most flood information maps are intended to delineate something specific, such as flood insurance rates, 100-year floodplains, flood hazards, dam inundation, etc. However, it's easy to misunderstand the intended use and assumptions when looking at a map.

For example, while FEMA flood insurance rate maps often provide the best technical information available to communities, they do not include a full range of flood hazards, such as upstream dams.

DWR recommends contacting your local public works department to find which maps best meet your needs.

Accomplishments

Floodplain Mapping

- Developed informational floodplain maps as required by SB 1278 for Chico, Yuba City, Marysville, Woodland, Davis, Merced, the Sacramento Metropolitan Area (Sacramento and West Sacramento) and the Stockton Metropolitan Area (Stockton and Lathrop).
- Developed the *Urban Level of Flood Protection Criteria* in a manner that satisfies the legislative requirements without interfering with local land use authority. The criteria are designed to provide reasonable details and flexibility, and to promote prudent floodplain management in concert with smart growth and climate change adaptation strategies.

Flood Risk Notification

- Mailed more than 273,000 notifications and developed a second flood risk video, with interviews of local flood survivors, in cooperation with the U.S. Army Corps of Engineers.

Federal Advocacy for California Flood Control

The Federal Advocacy program within DWR's FloodSAFE California initiative strives to maximize federal level of funding for California projects and studies, and to ensure that evolving federal policies do not have a negative impact on California projects and programs. DWR works with Congressional offices and federal agencies in Washington D.C. to educate decision makers about California flood management issues.

DWR's Federal Advocacy work in 2013, along with the National Coalition of Flood Project Partners, contributed language to both the Senate and House versions of *Water Resources Development Act* (WRDA) legislation. Local Joint Powers Authorities and groups such as the California Central Valley Flood Control Association (CCVFCA) and the California State Association of Counties contributed input through this process.

In 2013, the National Coalition of Flood Project Partners, which was founded by DWR and CCVFCA representatives, received a Communication and Outreach award from the California/Nevada/Hawaii Floodplain Management Association.



State agencies use “Muscle Wall” to form a 100-foot barrier during exercise on Twitchell Island



“Be Aware, Be Prepared, and Take Action”

The California Department of Water Resources worked closely with the U.S. Army Corps of Engineers and other public agencies to lead the second annual California Flood Preparedness Week in November 2013. This week-long series of activities was designed to increase public awareness about flood risk throughout the State, and to encourage those who live or work in floodplains to have a plan of action should flooding occur.

California Flood Awareness Week activities included:

- Safety fairs in Orange and Colusa counties
- A flood history retrospective in Sutter County
- Flood fight training and functional exercises in Merced, Sacramento, Yolo and Ventura counties
- Webinars aimed at helping public officials communicate flood risk
- Public outreach events, including the High Water Mark event for the cities of Sacramento and Roseville
- California Flood Preparedness Week proclamations or resolutions were issued in seven counties



Sandbag construction at flood fight training, November 2013



The American River Common Features Project currently focuses on strengthening 24 miles of levees along the American River.

When the American River Watershed Project is complete, the greater Sacramento urban area, including approximately 400,000 people, will have at least a 200-year level of flood protection.

Flood Risk Reduction Projects

The Flood Risk Reduction Projects Program provides funding, direction, and oversight for repairing and improving flood management facilities to reduce flood risk, using both structural and non-structural measures. Major activities include planning, design, and construction of flood management projects sponsored by the CVFPB, local agencies, and the U.S.

Army Corps of Engineers for elements of the State Plan of Flood Control in the Central Valley, as well as other flood management projects statewide. The program includes projects that provide advance mitigation for the State Plan of Flood Control to aid project delivery and enhance ecosystems associated with the flood system.

Some key projects are included in the following programs:

- American River Watershed Project
- Flood Control Subventions
- Delta Levees System Integrity
- Urban Flood Risk Reduction
- Flood Corridor
- Local Levee Assistance
- South Sacramento County Streams Project
- Yuba Feather Flood Protection
- Urban Streams Restoration
- Fish Passage Improvement

American River Watershed Project

The American River Watershed Project consists of the Folsom Joint Federal Project (JFP) and the American River Common Features Project (levee improvements on the American and Sacramento rivers).

Folsom Joint Federal Project

Flood events in 1986 highlighted the vulnerability of the Greater Sacramento Metropolitan Area to flooding from the American River. In response, State, federal, and local partners actively began addressing the flood release limitations of Folsom Dam.

Following authorization from Congress and a careful planning process, the JFP was initiated and construction of the new auxiliary spillway began (*see insert, page 15*).

American River Common Features Project

The American River Common Features Project is part of the American River Watershed Project that includes strengthening levees along the American and Sacramento rivers. The project reduces the risk of levee failure due to seepage and instability while increasing flood conveyance capacity.

Flood Control Subventions

The legislature created the Flood Control Subventions Program in 1945 because most non-federal local partners could not shoulder the financial burden of partnering with the federal government on flood management projects and the State recognized the public safety and economic benefits associated with these projects for the entire state. The program is mandated to provide cost-share financial assistance to non-federal partners of federally authorized projects located outside of the Central Valley. In 2013, the program reimbursed local agencies improving flood protection along approximately 100 miles of rivers and streams. These projects are increasing flood protection for approximately 3.4 million people living in urban and rural areas.

Delta Levees System Integrity

The Delta Levees System Integrity Program focuses on levee repair, maintenance and improvement within the Sacramento-San Joaquin Delta. Funding from this program has also been made available for planning, research, and habitat enhancement. The program includes the Delta Levees Special Flood Control Projects Program and the Delta Levees Maintenance Subventions Program.

The Delta Levees Special Flood Control Projects Program is designed to reduce flood risk in areas where levees help protect the State's water supply and other significant assets – e.g., public and utility infrastructure, urban and urbanizing areas – by providing funding for levee and habitat improvement projects.

The Delta Levees Maintenance Subventions Program is a reimbursement cost-share program that provides financial assistance to local agencies in the Sacramento-San Joaquin Delta for the maintenance, rehabilitation, and improvement of levees. The primary focus of the program is non-federal levees, though work on some eligible federal project levees can be reimbursed.

Urban Flood Risk Reduction

The Urban Flood Risk Reduction Program is designed to reduce the flood risk that impacts urban or urbanizing areas located in the Central Valley. The Urban Flood Risk Reduction Program provides cost-share funding to local agencies to repair and improve levees and facilities of the State Plan of Flood Control. Levees are repaired or improved to current design levels or up to the 200-year level of protection.

Flood Corridor

The Flood Corridor Program provides cost-share grants to local agencies throughout the state for multi-benefit projects that reduce flood risk to rural, small community, and urban areas by restoring natural floodways and reconnecting rivers and streams to their historic floodplains.

Local Levee Assistance

The Local Levee Assistance Program was created to help fund projects implemented by flood management agencies throughout California. To promote multi-benefit projects, State cost-shares for projects may increase by 20 percent for projects that incorporate habitat, open space, or recreational enhancements.

Yuba Feather Flood Protection

The primary objective of the Yuba Feather Flood Protection Program is to provide support to local agencies to reduce flooding and improve public safety. The Program does this by offering financial assistance to flood projects within the areas of the Yuba, Feather, and Bear Rivers, as well as the Colusa Basin Drain. The Program supports a wide array of feasibility, design, and construction projects, and it provides support for environmental stewardship activities, which include major setback levees on the Bear and Feather rivers. The program also supports non-structural projects such as the Forecast-Coordinated Operations of Lake Oroville and the New Bullards Bar Reservoir to reduce peak flows downstream.

Multi-benefit flood management projects can include combinations of the following benefits: public safety, water quality, water supply, wildlife habitat restoration and conservation, protection of agricultural land, recreation and public access.

The Flood Control Subventions Program helped projects like the Guadalupe River Project increase protection for approximately 3.4 million people living in urban and rural areas.



Delta Levees Maintenance Subventions Projects approved for reimbursement in 2013 include work on more than 500 miles of non-project levees and approximately 200 miles of federal project levees that are maintained by local agencies.

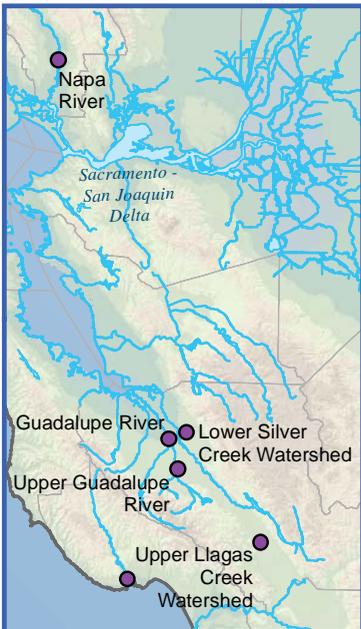
Urban Streams Restoration

The program provides communities with technical support and matching grants to create effective urban creek protection, restoration, and enhancement projects. The program introduces communities to the concept of integrating flood risk reduction and ecosystem protection and enhancements. Focused on urban and urbanizing areas, the program requires partnerships between community groups and local agencies, creating broad public exposure for the projects.

Fish Passage Improvement

Using a team of biologists and engineers, the program identifies and evaluates options to modify or remove structures that impede the migration of anadromous fish within the Central Valley. Where appropriate, project designs meet flood management requirements.

The State released \$36 million in funding to seven local Flood Control Subventions project sponsors for 10 projects in 2013.



Accomplishments

American River Watershed Project

Folsom Joint Federal Project

A series of significant milestones for the JFP auxiliary project were met in 2013, including:

- The control structure construction is approximately 70% complete.
- The temporary dam embankment construction for the approach channel is 50% complete.
- A half-mile long "curtain" was temporarily placed on the waterside of the construction site to protect the reservoir during construction.

American River Common Features

- Completed work on two of the eight remaining sites of American River Common Features project in 2013, with the remaining six sites expected to be completed by the end of 2016.

Flood Control Subventions

- Completed State cost-share reimbursement requests to release \$36 million in funding to seven local Flood Control Subventions project sponsors for 10 projects. These projects are scheduled for completion between December 2014 and December 2021.

Delta Levees System Integrity

- Completed 19 projects in 2013, with a State cost-share of approximately \$47 million. The 19 completed levee construction projects include a total of 48 levee miles and potential enhancement of 6,400 linear feet of shaded riverine aquatic and tidal marsh habitat.
- Implemented the Delta Levees Bulk Credit Mitigation Program, expediting permitting and project delivery for levee rehabilitation and improvement.

Urban Flood Risk Reduction

- Thirteen miles of SPFC urban levees were improved in 2013, which provided increased flood protection to 60,000 residents near Yuba City and 80,000 residents in Sacramento. Financed jointly by DWR and local agencies, 12 miles were completed along the Sacramento River and 1 mile was completed along the Feather River.

Flood Corridor

- **Santa Clara River Flood Protection Project:** Acquired one of three targeted floodplain properties, which helps create a continuous corridor of protected floodplain for future restoration.
- **River Ranch Conservation Easement Acquisition Project:** Acquired a 2,962-acre agricultural easement, which precludes development and preserves the ability for the Elkhorn Basin to flood.
- **Hidden Valley Ranch Project:** Acquired a 497-acre parcel, adjacent to Dos Rios Ranch to provide transitory floodwater storage, improve river-floodplain connectivity, and ultimately advance mitigation for the SPFC.
- **Middle Creek Project:** Acquired three parcels, relocated former property owners, and demolished structures in flood-prone parcels.
- **Hamilton City Project:** Acquired three properties for future construction of a 6.8-mile setback levee and reconnection of 1,450 acres of floodplain.
- **San Joaquin River Ecosystem Restoration and Floodplain Restoration Project:** Installed irrigation for 511 acres of habitat.

Local Levee Assistance

- Executed agreements with 11 agencies to fund 30 Local Levee Assistance projects.
- Completed the Las Gallinas Creek Local

Levee Evaluation, which is necessary to replace a levee and wooden floodwall currently protecting the small community of Santa Venetia.

- Secured surveys and permits to allow the Wildcat-San Pablo Creek Project to move forward with levee repairs in 2014.

South Sacramento County Streams Project

- Completed the Morrison Creek floodwall project, including a 2,800-foot-long, 15-foot-high reinforced concrete wall, which closed the gap between two existing levees along the east side of Morrison Creek.
- With the completion of the floodwalls on Morrison Creek and its tributaries and the widening of Unionhouse Creek, the City and County of Sacramento have submitted a request to re-map approximately 3,500 homes out of the flood area (FEMA Zone-A99), reducing the requirement and cost of flood insurance for the community. This will become effective in May 2014.

Yuba Feather Flood Protection

- Completed preliminary designs for an additional outlet on the New Bullards Bar Dam. When completed, the outlet will enable releases in advance of a storm event, resulting in more storage capacity remaining in the reservoir to hold back the peak inflow when it arrives later. Smaller, earlier releases will also help reduce pressure on levees downstream for communities on the Yuba River during high water events.



Local Levee Assistance Program repair at San Juan Creek

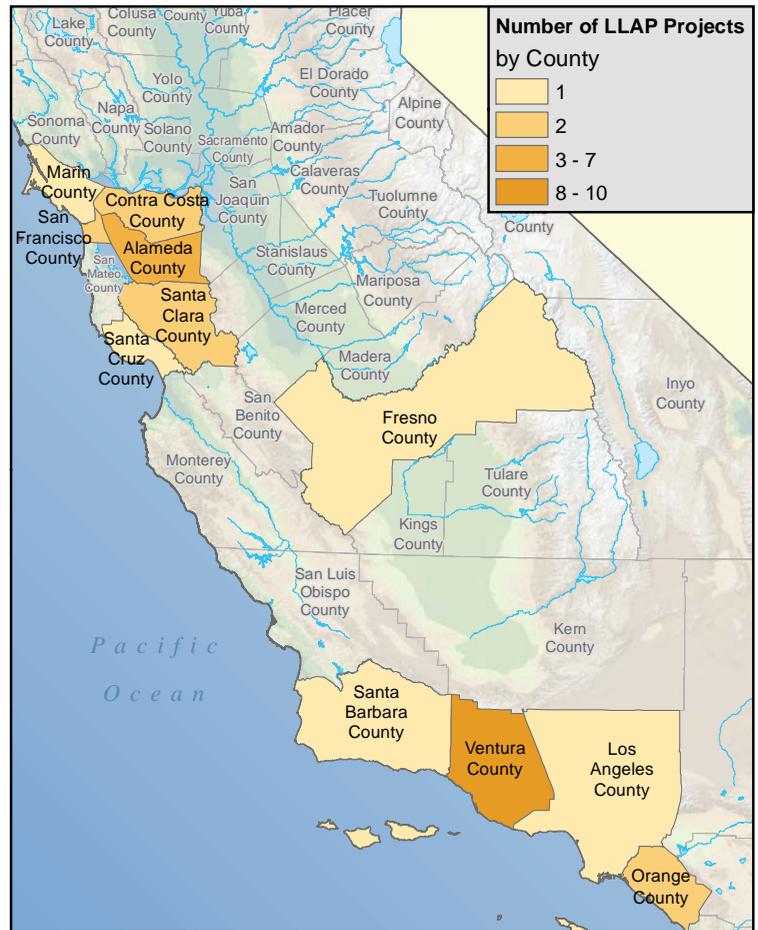
Urban Streams Restoration

– Grants awarded in 2013 will provide nearly 14,000 feet of stream channel restoration covering 141 acres of habitat restoration and 28 acres of land conservation while improving urban runoff and helping resolve local flooding or channel stability issues.

Fish Passage Improvement

– Improved anadromous salmonid passage and flood conveyance in the Calaveras River system by replacing the Caprini Low-flow Crossing in Mormon Slough, upstream of the City of Stockton. Program provided preliminary and final design, hydraulic modeling, and construction oversight for the project.

The Local Levee Assistance Program executed agreements with 11 agencies to fund 30 local projects in 10 counties.



Before the Caprini Low-flow Crossing in Mormon Slough was replaced (photo, left), water and fish passage was poor. After replacement (photo, right), fish passage and flood conveyance are improved in the Calaveras River.

Folsom Joint Federal Project

Unlike most rivers that can take days to reach flood stage, the American River can reach flood stage in a matter of hours. With eighteen significant flood events on the American River since 1850, Folsom Dam is critical for protecting the greater Sacramento area. When the dam was completed in 1956, the U.S. Army Corps of Engineers expected it would take two years to fill the reservoir; however, the reservoir was completely filled in just over a week from a series of five storms that winter.

Flood events in 1986 once again highlighted the Greater Sacramento Metropolitan Area's vulnerability to flooding from the American River. Following the 1986 flood, State, federal and local partners began actively addressing the problem of being able to make flood releases from the reservoir while reducing or eliminating pressure placed on levees downstream during flood events.

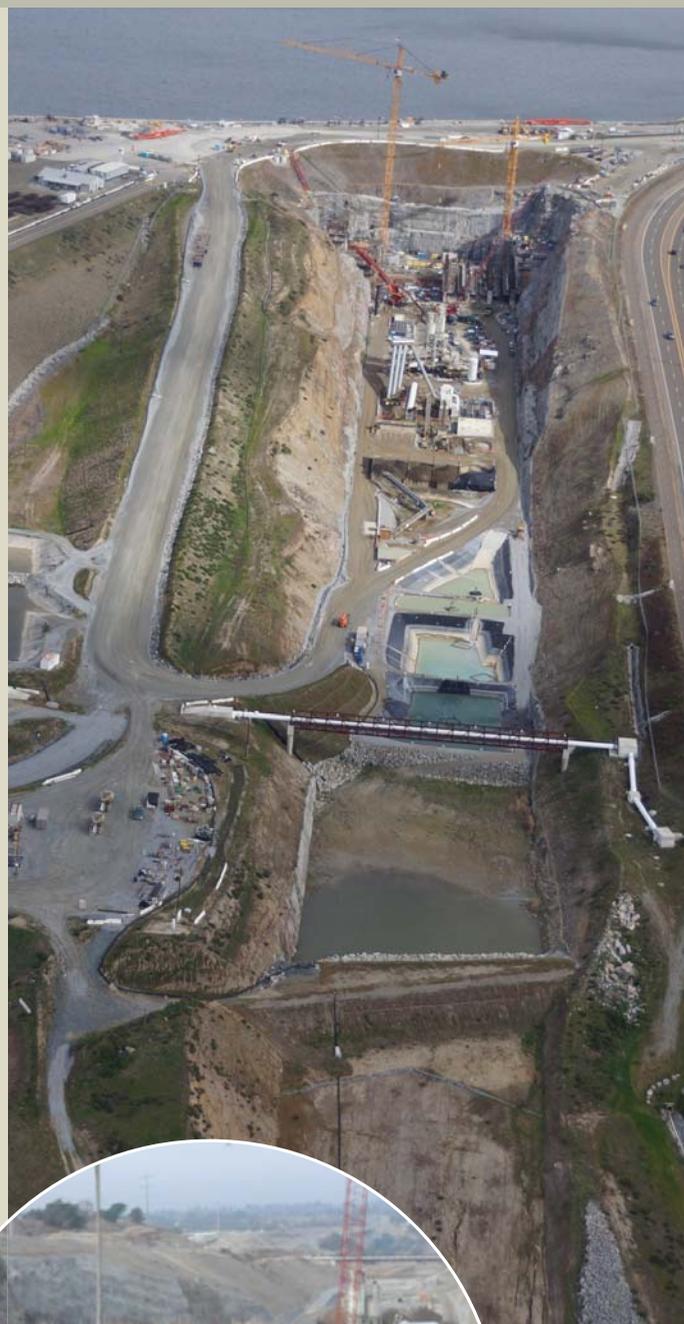
After Congressional authorization and a careful planning process, the Folsom Joint Federal Project (JFP) was initiated. The JFP will improve the ability of Folsom Dam to manage large flood events by allowing more water to be safely released in advance of a major storm event, resulting in more storage capacity remaining in the reservoir to hold back the peak inflow when it arrives later. The new auxiliary spillway project includes a control structure to manage releases.

In 2013, the spillway project made significant progress with over 51,000 cubic yards of concrete placed for the control structure. Installing gates for the control structure is expected to start in early 2014. The scheduled completion for the auxiliary spillway is 2017.

The State is contributing \$204 million of the total estimated project cost of \$833 million. Thus far, the State has contributed \$13.7 million from the General Fund and \$115.2 million in Proposition 1E funds, including \$31.1 million in 2013.

As part of the American River Watershed Project (ARWP), the JFP will help achieve the goal of a 200-year level of flood protection for the greater Sacramento urban area, which includes approximately 400,000 people and in excess of 110,000 buildings valued at \$58 billion. Future elements of the ARWP project include raising the dam 3.5 feet, which will provide additional safety resiliency and freeboard.

The Joint Federal Project will improve the ability of Folsom Dam to manage large flood events by allowing more water to be safely released in advance of a major storm event.



Construction on the new auxiliary spillway control structure at Folsom Dam, January 2014
(Photo: USACE)

Flood System Operations and Maintenance



Rock was added to the toe of this rural levee to minimize erosion during high water.

The Flood System Operations and Maintenance Program operates, maintains and repairs levees, channels, hydraulic control structures, pumping plants and bridges that are considered facilities of the State Plan of Flood Control. Operation and maintenance of the SPFC is a joint responsibility of DWR and local maintaining agencies. DWR is responsible for maintenance of approximately 300 miles of SPFC levees and all Sacramento River SPFC channels, and local maintaining agencies are responsible for the remaining levees. Routine operation and maintenance of State-maintained areas, as defined in the California Water Code, is

primarily supported by the State's General Fund. Bond funding is used for non-routine repairs, rehabilitation, and replacement of both State-maintained and locally-maintained facilities of the SPFC.

Small Erosion Repair Program

The Small Erosion Repair Program (SERP) brings a streamlined programmatic approach to repair multiple erosion sites in a single construction season along the Sacramento River. It integrates the needs of public safety, environmental stewardship, and economic stability into projects.

Before SERP, the time required to obtain permits for the repair of individual sites limited DWR to completing one or two repairs annually. With SERP in place and by coordinating with the resource agencies to obtain permits

upfront, DWR will be authorized to repair up to 15 sites annually if the small erosion site meets the SERP criteria and the work can be done according to the SERP guidelines.

Accomplishments

Sutter Bypass Water Control Structures

Willow Slough Weir and Weir No. 2 impound water in the East Borrow Canal and allow water to be diverted for beneficial use as needed. However, these weirs also present barriers to migrating salmon because existing fish ladders were poorly designed and did not provide good passage for fish. In the early 1990s, Willow Slough Weir and Weir No. 2 were identified by a consortium of stakeholders as the last major remaining impediments to

fish passage in the Lower Butte Creek system. In 2013, Weir No. 2 was removed and replaced, improving water management and fish passage in the Sutter Bypass.

Flood System Repair Efforts

In 2013, DWR finalized its Flood System Repair Project (FSRP) Guidelines that establish the process and criteria DWR will use

to help Local Maintaining Agencies repair documented critical problems on State Plan of Flood Control facilities. FSRP primarily focuses on repairs to rural levees to prevent problems from becoming critical, reducing repair costs, and making the operations and maintenance programs sustainable. DWR developed these Guidelines with input from local maintaining agencies and local engineering consultant groups.

The Small Erosion Repair Program repairs multiple sites at one time for efficiency, reducing flood risk by preventing small erosion sites from becoming large erosion sites and preventing a larger loss of riparian vegetation.

Cache Creek North Levee Setback Project

Located on Cache Creek east of the Town of Yolo, the project constructed two setback levees that are approximately 1,300 feet and 900 feet long, relocated PG&E power poles, and rerouted a portion of a county road. Construction of the Cache Creek North Levee Setback project was completed in December 2013. At these two locations, channel erosion was compromising the existing levees. Setback levees were determined to be the most appropriate solution to maintain flood protection. With the completion of this project, the last of the 146 sites identified under the Governor's 2006 Emergency Declaration has been repaired.

Flood System Repair Project

The program developed a list of critical problems and proposed rural non-routine levee repairs for 150 problem areas on SPFC levees in concurrence with the Levee Maintaining Agencies (LMAs).

Flood Project Integrity

The program identified locations and characteristics of 7,500 pipes penetrating SPFC levees by reviewing historical information such as CVFPB encroachment permits, DWR levee logs, Local Maintaining Agency's records, and USACE operation and maintenance manuals.

Program staff assessed more than 4,500 SPFC levee crossings based on visual evidence of deterioration of the pipe, inlet or outlet structures, and identified maintenance needs. This will allow local agencies to rectify utility crossing issues that pose a threat to the integrity of the flood control system.

The program performed field surveys to verify the location and document the existing condition of the pipes and levee embankment for 1,000 miles of SPFC levees.

With the completion of the Cache Creek North Levee Setback Project, the last of the 146 sites identified under the Governor's 2006 Emergency Declaration has been repaired.

Some of the oldest levees in the Central Valley were built with poor levee materials on top of seepage-prone foundations.

Major high water events expose existing levee issues. Adequate repairs often have been deferred due to lack of funding at various agency levels.

A renewed focus on the condition of California's levee system began after Hurricane Katrina, and federal and State funds became available to document and address the critical problems facing the levee systems of the Central Valley.



Flood Emergency Response



Houses submerged on Jones Tract in the Delta, June 2004

The Flood Emergency Response Program is implemented in close coordination with other local, State, and federal agencies with responsibility for flood management. Collaboration, coordination, and integrated operation of emergency response are the core tenets of the program and culture.

Maintaining a high degree of readiness requires a disciplined approach involving annual training, proactive preseason coordination with cooperating agencies, annual review and replenishment of supplies and equipment, thorough documentation, dedicated data collection and information dissemination, and continued efforts to improve all aspects of program performance. To enable flood emergency responders to perform at the highest level, DWR conducts functional exercises within the agency and joint exercises with local, State, and federal agencies.

DWR provides real-time information on the integrity of the SPFC levees, channels, and structures through coordination and collaboration with Local Maintaining Agencies (LMAs) and the CVFPB. The information improves DWR's ability to assess the integrity of the flood system for about 1,600 miles of SPFC levees each year. This data provides valuable information to emergency responders and local flood maintaining agencies, as well as for flood system repair and enhancement.

Delta Flood Emergency Preparedness and Response Project

Through the Delta Flood Emergency Facilities Improvement Project, DWR began leasing and purchasing sites in 2007 to help emergency response agencies transfer and store material for

flood fights. This Project enables the construction of facilities within the Delta to improve emergency response time and increase responders' ability to react to emergencies.

Local Flood Emergency Response Grants

The Flood Emergency Response Project Program provides assistance for local agencies to update their flood emergency response plans. The local assistance fund is used by local agencies to update communication equipment that facilitates the sharing of flood information among multiple agencies, and to purchase new electrical generators for some county Emergency Operations Centers (EOC) to keep them functioning during an emergency. In Southern California, updating the stream gauges will improve the ability to monitor the stream flow, which is critical to predicting floods. Overall public safety will be improved for more than 21 million people in the state by improved preparedness and effective response to future floods.

Flood Forecast and Warning: Improving Observations

In an effort to bolster California's pre-eminent data collection, forecasting, and warning efforts, DWR teamed with two partners—the National Oceanic and Atmospheric Administration's Earth System's Research Laboratory and Scripps Institute of Oceanography—to deploy approximately 100 new sensors to provide new information on atmospheric river conditions for California. One of the key elements of this new observing system is a series of four atmospheric river observatories on the coast of California that can quantify how much moisture is moving into the state and at what elevation the rain

changes to snow. This system will also enable State and federal agencies to inform the public about potentially dangerous and destructive storms.

Forecast-Coordinated Operations

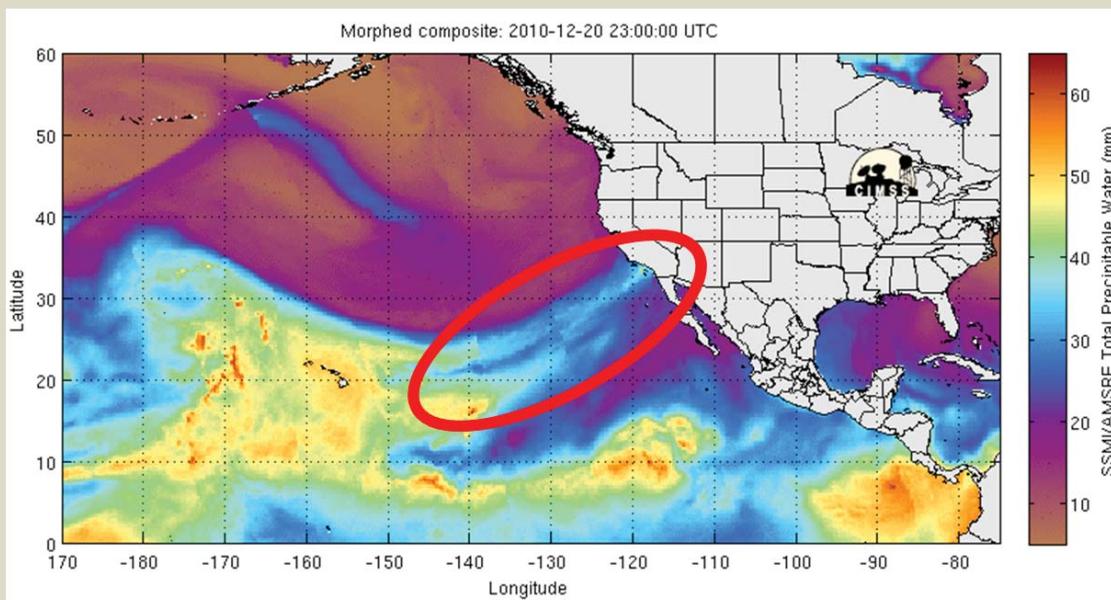
The multi-agency Forecast-Coordinated Operations (F-CO) Program for the Feather and Yuba rivers has successfully demonstrated how State, federal, and local agencies can work together during major floods to reduce peak flood flows downstream from reservoirs. The program expanded the Forecast-Coordinated Operations to reservoirs with flood control space on the San Joaquin River System in 2013.

Accomplishments

- Conducted the Twitchell Island functional exercise to support DWR's emergency preparedness efforts during California Flood Preparedness Week.
- Participated in the Golden Guardian 2013 exercise in May, which focused on a Bay Area earthquake scenario.

Delta Flood Emergency Preparedness and Response Project

- Conducted the Delta Emergency Response Project workshop to discuss how to anticipate an emergency in the Delta and review plans and protocols for such an event.
- Completed multiple improvements to the State's flood emergency material storage



Atmospheric river that brought drenching rains and flooding to southern California, 2010 (Graphic: NOAA)

Atmospheric river observatories like the one installed at Bodega Bay Marine Laboratory quantify how much moisture is moving into the state and at what elevation the rain changes to snow.

and transfer facilities, including construction of a ramp at Rio Vista to provide easy access to the material.

- Developed the Delta Flood Emergency Facilities Improvement Project document to address California Environmental Quality Act requirements for the project.
- In 2013, DWR acquired the Stockton West Weber Avenue site to create a Delta Flood emergency transfer facility and a potential Incident Command Post that would be used during flood emergencies. DWR closed escrow on the southern portion of the same Stockton facility and anticipates closing escrow on the northern balance of the 22.6-acre Stockton facility during the first quarter of 2014. DWR developed site plans and utility site assessments in 2013 for the Stockton West Weber site, as well as for the transfer facility site in Rio Vista that is owned by the CVFPB.

Atmospheric river observatory construction (*doppler profiler installation, February 2013*)



Flood Forecast and Warning: Improving Observations

- Developed a local assistance program to help reservoir operators implement F-CO.
- Prepared a detailed work plan for implementation of F-CO in the Merced River Watershed.
- Installed an atmospheric river observatory at Bodega Bay Marine Laboratory. It is the first of four planned coastal observatories, with construction of the rest to be completed in 2014.
- Developed a web-based dashboard with input from the F-CO program participants to help reservoir operators visualize and discuss potential coordinated releases and their effects downstream during major floods.
- Developed unique hydraulic models for 10 urban areas in the Sacramento-San Joaquin Valley that are protected by SPFC levees.
- Populated the Library of Models with more than 100 hydrologic and hydraulic engineering models to preserve the FloodSAFE investment in model development. The models are used in planning and study efforts.

Local Flood Emergency Response Grants

- Awarded \$5 million for 14 projects across the state to improve flood emergency response capability by updating emergency plans and other critical emergency prediction information. Solicited for and received six applications for further Flood Emergency Response projects in the Delta primarily focused on flood emergency plan updates.

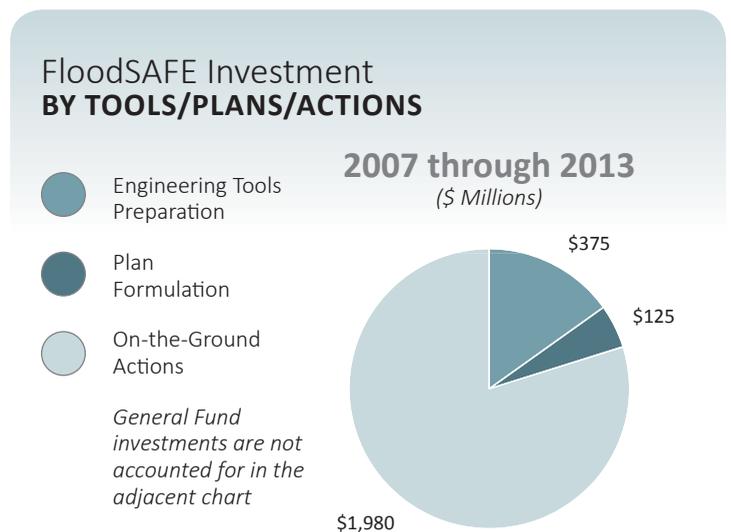
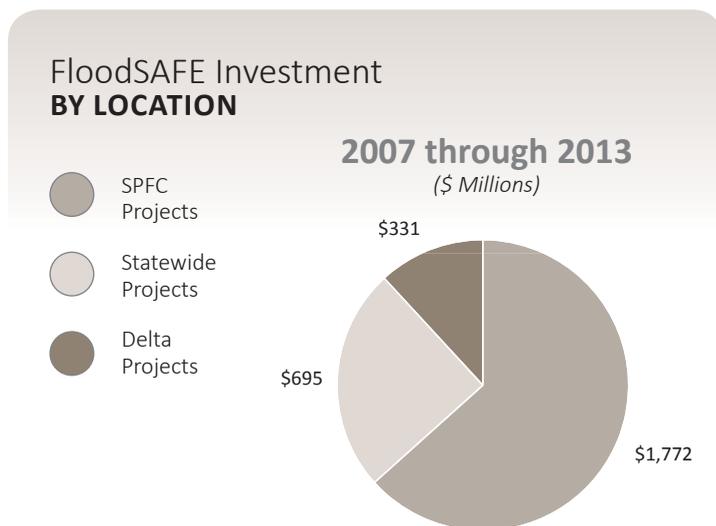
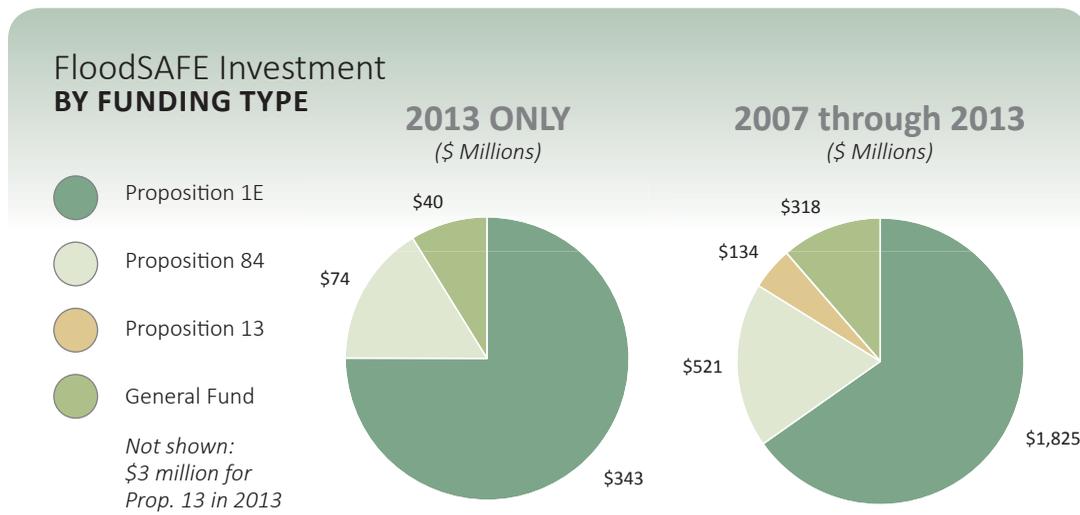
FloodSAFE Financing

Propositions 1E and 84 provided much-needed funding to improve flood management and reduce flood risk throughout the state. Funding from these bond laws, combined with additional Proposition 13 and General Funds have been instrumental in initiating major programs to reduce flood risk in our communities.

The next phase of FloodSAFE implementation will emphasize investing in:

- State Systemwide Investment Approach (SSIA) to improve flood system resiliency,

- Expansion of the flood management system, enabling the system to carry larger floods,
- Incorporation of important fish and wildlife habitat,
- Management of larger runoff resulting from future climate change, and
- Reduction of flood risk in areas with highest flood risk and associated losses.



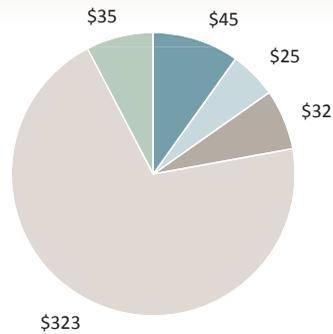
DWR has implemented on-the-ground projects to reduce the flood risks to communities throughout the state. During the first five years of FloodSAFE, considerable time and resources were allocated to data collection, tools development, system evalu-

ations and engineering work to identify problem areas and the improvements needed to have a flood-safe California. Much work has been done on the ground, but much more remains.

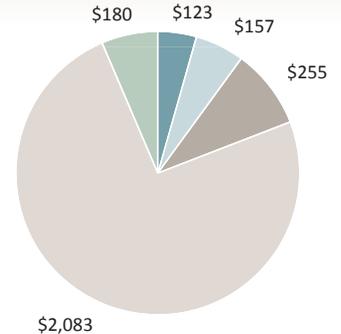
FloodSAFE Investment BY PROGRAM

-  Flood Management Planning
-  Floodplain Risk Management
-  Flood Risk Reduction Projects
-  Flood System Operations and Maintenance
-  Flood Emergency Response Program

2013 ONLY
(\$ Millions)



2007 through 2013
(\$ Millions)



FloodSAFE Annual Investments BY PROGRAM (General Fund and Bond Funds in \$ Millions)

Program	2007	2008	2009	2010	2011	2012	2013	Total
Flood Management Planning	\$0	\$10	\$6	\$27	\$18	\$17	\$45	\$123
Floodplain Risk Management	\$7	\$31	\$18	\$44	\$20	\$12	\$25	\$157
Flood Risk Reduction Projects	\$269	\$366	\$455	\$397	\$110	\$163	\$323	\$2,083
Flood System Operations and Maintenance	\$35	\$36	\$27	\$48	\$29	\$48	\$32	\$255
Flood Emergency Response Program	\$24	\$28	\$20	\$26	\$28	\$19	\$35	\$180
Total	\$335	\$471	\$526	\$542	\$205	\$259	\$460	\$2,798

Moving Forward

In the second phase of FloodSAFE implementation, the State is focusing on more expedited implementation of projects which improve performance of the SPFC facilities as outlined in the State Systemwide Investment Approach of the CVFPP, including investment in small, rural projects and large-scale system projects. These investments will be designed to improve flood system resiliency, expand flood management system, enable the system to carry larger floods, incorporate important fish and wildlife habitat, and manage larger runoff resulting from future climate change.

Systemwide investment will focus on the first phase of the Yolo Bypass features, which includes modifying the Sacramento and Fremont weirs, the Sacramento Bypass, the Yolo Bypass from the Fremont Weir to the Sacramento Weir, as well as implementing ecosystem restoration planned within the Bypass.

While continuing to invest in urban protection by cost-sharing urban flood risk reduction projects with local agencies to meet their 200-year flood protection objective, the State will also invest in improving rural flood management. This includes investment in rural flood structures and levee repairs, flood emergency response, and operation and maintenance of flood management facilities.

Implementing Multi-Benefit System Improvements

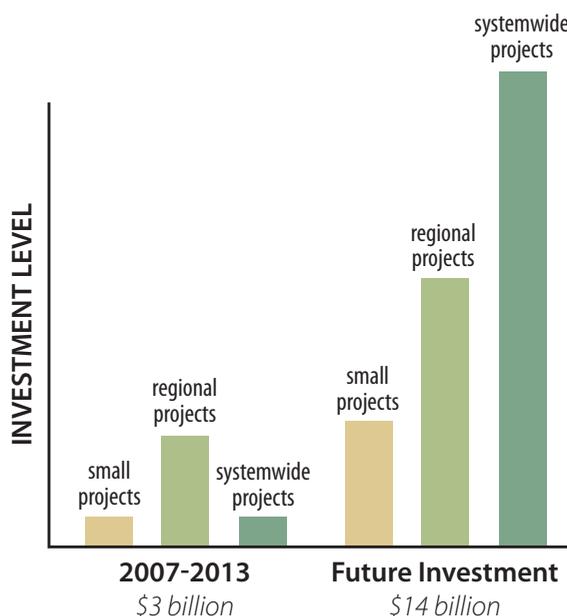
The State is committed to implementing projects that achieve the objectives of public safety, environmental stewardship, and economic stability. This commitment is realized through integrating various resources and programs that provide multiple benefits. To that end, implementation of the Yolo Bypass features will be integrated with other resource management efforts in the Bypass, including the Bay Delta Conservation Plan.

DWR and CVFPB will develop a collaborative program for implementing this initiative with the U.S. Army Corps of Engineers and local agencies.



Multi-benefit projects such as the Bear River Setback Levee are being implemented (above, new setback levee and restoration planting).

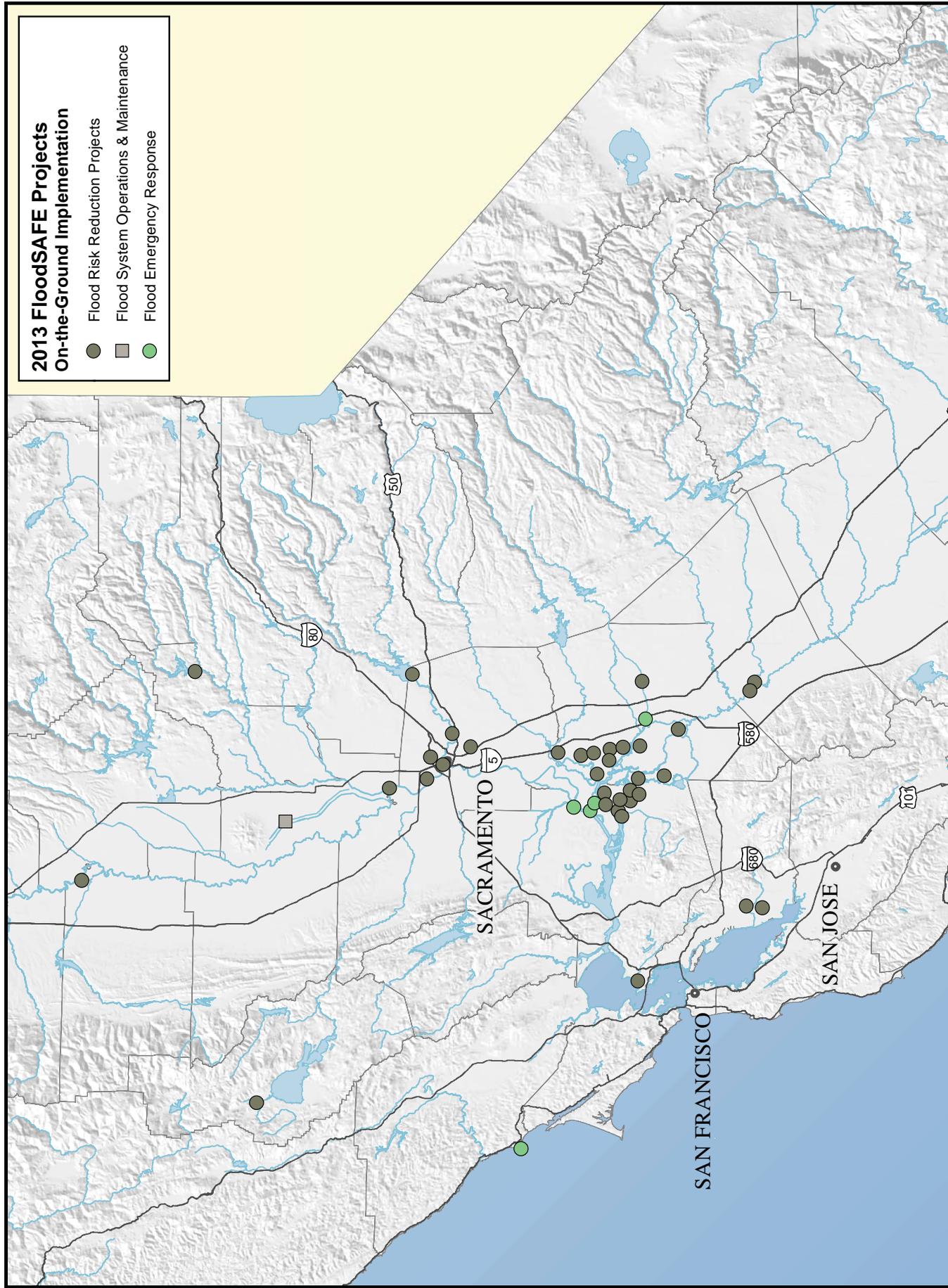
State Systemwide Investment Approach STRATEGY

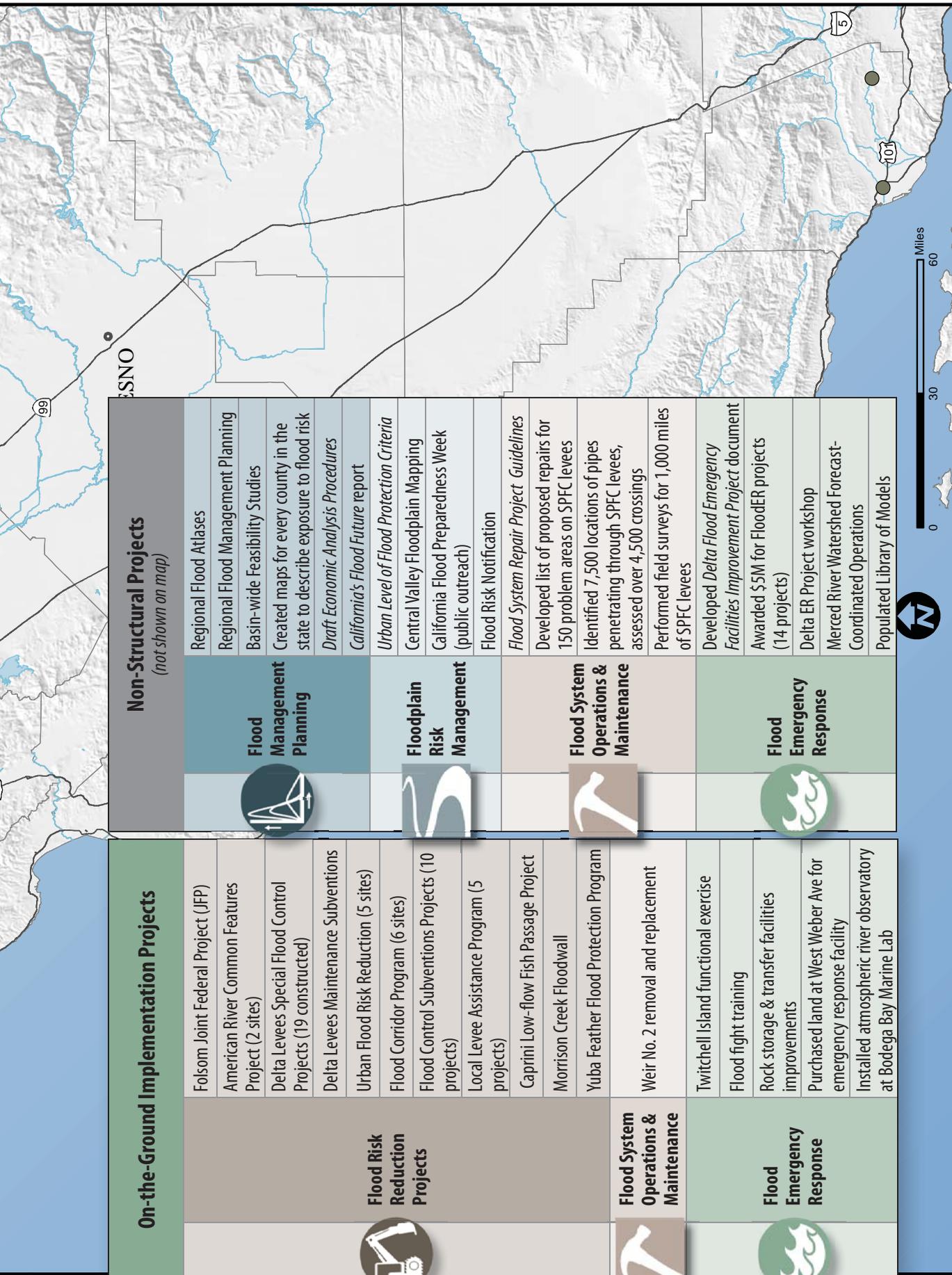


DWR is planning to expedite project implementation using an integrated water management approach in which investment priorities will be given to multi-benefit projects.

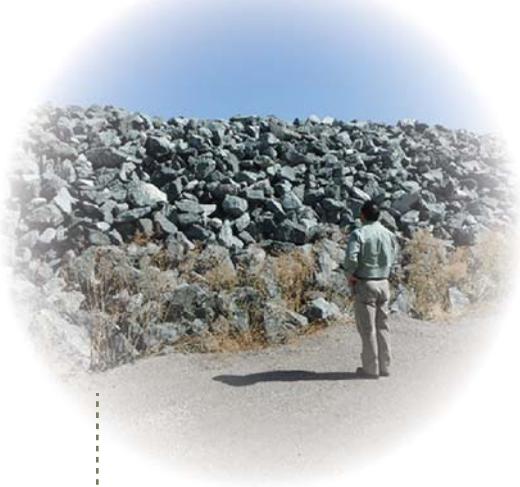
FloodSAFE 2013 Projects

This map highlights the projects described in this report, but it does not include all of the projects that FloodSAFE completed in 2013. The non-structural projects listed in the table are not shown on the map.





On-the-Ground Implementation Projects		Non-Structural Projects <i>(not shown on map)</i>		
	Folsom Joint Federal Project (JFP)		Regional Flood Atlases	
	American River Common Features Project (2 sites)		Regional Flood Management Planning	
	Delta Levees Special Flood Control Projects (19 constructed)		Basin-wide Feasibility Studies	
	Delta Levees Maintenance Subventions		Created maps for every county in the state to describe exposure to flood risk	
		Urban Flood Risk Reduction (5 sites)		<i>Draft Economic Analysis Procedures</i>
		Flood Corridor Program (6 sites)		<i>California's Flood Future</i> report
		Flood Control Subventions Projects (10 projects)		<i>Urban Level of Flood Protection Criteria</i>
		Local Levee Assistance Program (5 projects)		Central Valley Floodplain Mapping
		Caprini Low-flow Fish Passage Project		California Flood Preparedness Week (public outreach)
		Morrison Creek Floodwall		Flood Risk Notification
	Yuba Feather Flood Protection Program		<i>Flood System Repair Project Guidelines</i>	
	Weir No. 2 removal and replacement		Developed list of proposed repairs for 150 problem areas on SPFC levees	
	Twitchell Island functional exercise		Identified 7,500 locations of pipes penetrating through SPFC levees, assessed over 4,500 crossings	
	Flood fight training		Performed field surveys for 1,000 miles of SPFC levees	
	Rock storage & transfer facilities improvements		Developed <i>Delta Flood Emergency Facilities Improvement Project</i> document	
	Purchased land at West Weber Ave for emergency response facility		Awarded \$5M for FloodER projects (14 projects)	
	Installed atmospheric river observatory at Bodega Bay Marine Lab		Delta ER Project workshop	
			Merced River Watershed Forecast-Coordinated Operations	
			Populated Library of Models	



Delta Emergency Rock and Transfer Facilities at Rio Vista

DWR completed an access ramp and improved part of the roadway at the emergency rock and transfer facility. These improvements make emergency flood response in the Delta more effective.



Atmospheric Observatories

DWR helped establish the first of four atmospheric river observatories on the California coast. Atmospheric rivers are narrow, intense bands of moisture that can lead to heavy precipitation and flooding. The new observatories can quantify how much moisture is moving into the state, helping agencies prepare for and manage potential flooding.

San Joaquin Forecast-Coordinated Operations

The F-CO program was expanded to coordinate flood management releases from reservoirs of participating agencies on the San Joaquin River. When snowpack in the southern Sierra is above normal, runoff can easily exceed the channel capacity for the river, so managing and coordinating reservoir releases are critical.

January

February

March

2013



April

Flood Corridor Program

DWR funded the acquisition of a floodplain property for the Santa Clara River Project to help create a continuous corridor of protected floodplain for future restoration and to significantly reduce overall flood risk to nearby infrastructure, including a sewer treatment plant.

May/June

Delta Levee System Integrity

On Woodward Island, more than 4 miles of levees were improved to reinforce flood protection for water supply aqueducts, a high-pressure petroleum pipeline, recreation facilities, agricultural land, and crops. This project also provides 1,000 linear feet of levee modification for shaded riverine aquatic and tidal marsh habitat.

July

200-year Informational Maps Completed and Released

DWR released 200-year informational floodplain maps for 10 urban areas in the Sacramento-San Joaquin Valley. The maps were provided to communities that are both protected by SPFC levees and must make findings about an urban level of flood protection.



FloodSAFE 2013— Year in Review



Morrison Creek Floodwall Completion

With the completion of the floodwalls on Morrison Creek and its tributaries and the widening of Unionhouse Creek, approximately 3,500 homes are designated outside of a 100-year floodplain. Flood insurance rates are expected to go from \$1,770 to \$415 annually when the change goes into effect in May 2014.

Flood Risk Notification

In response to the 2013 Flood Risk Notification DWR mailed to property owners in specified areas of 17 Central Valley counties, three agencies— the Department of Motor Vehicles, Pacific Gas & Electric, and California State University, Sacramento—initiated further analysis of flood risk to facilities.

Delta Flood Emergency Transfer Facility in Stockton

DWR purchased the first of two parcels on West Weber Avenue in Stockton for a major flood emergency rock and material transfer facility in the South Delta, which will facilitate effective response to major flood events in the Delta.

August

September

October

A

S

O

N

D

November

December

Folsom Dam Auxiliary Spillway

Almost 52,000 cubic yards of concrete was placed for the spillway control structure (enough concrete for a 2-foot-wide sidewalk from San Diego to the Oregon border). The new spillway will allow for early releases from the reservoir and help provide a 200-year level of flood protection for the greater Sacramento area.

Urban Level of Flood Protection Finalized

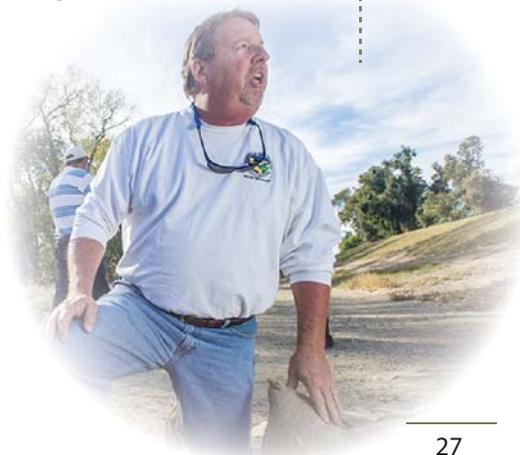
DWR completed the Urban Level of Flood Protection Criteria. The criteria are designed to provide reasonable details and flexibility for making findings in regards to a 200-year level of flood protection and to promote prudent floodplain management.

Flood Fight Training at Cal Expo

As part of California Flood Preparedness Week, DWR held a flood fight training class at Cal Expo for local first responders.

American River Common Features Project

Work was completed on two of the eight remaining sites on the American River levees.



Edmund G. Brown Jr.

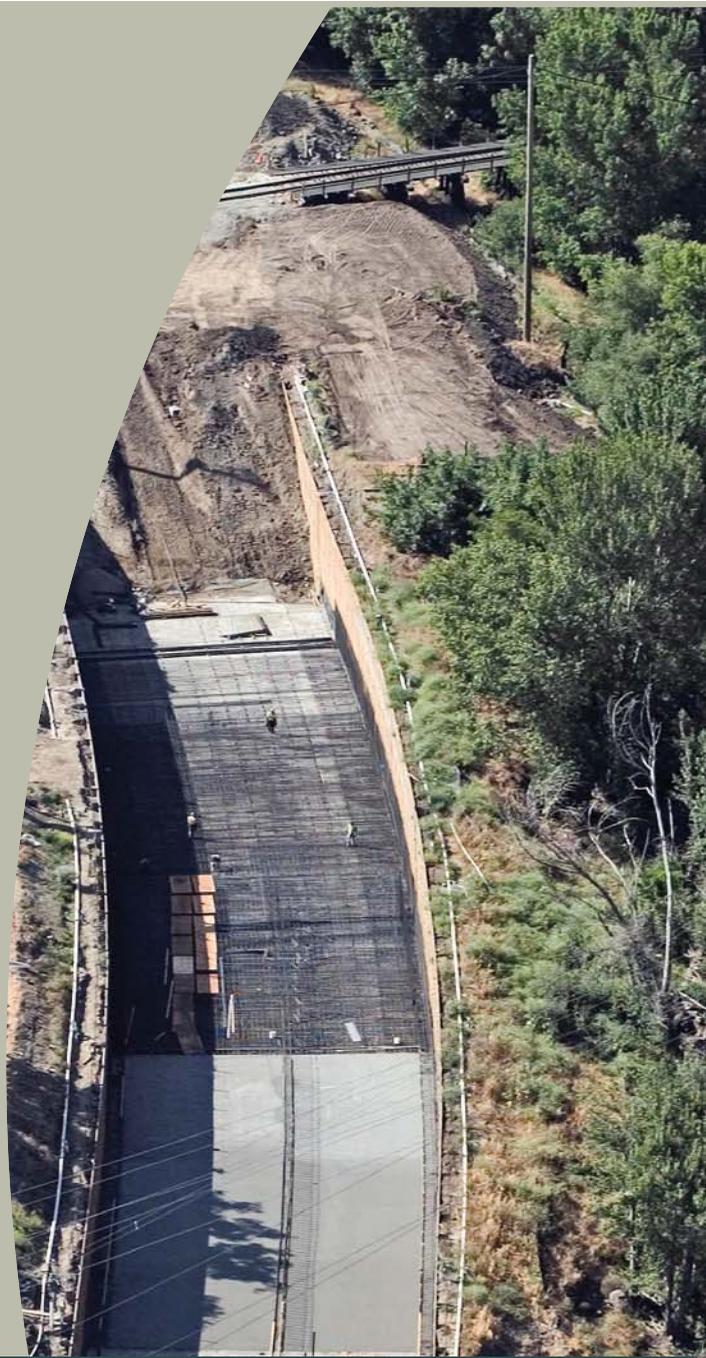
Governor
State of California

John Laird

Secretary
California Natural Resources Agency

Mark Cowin

Director
California Department of Water Resources



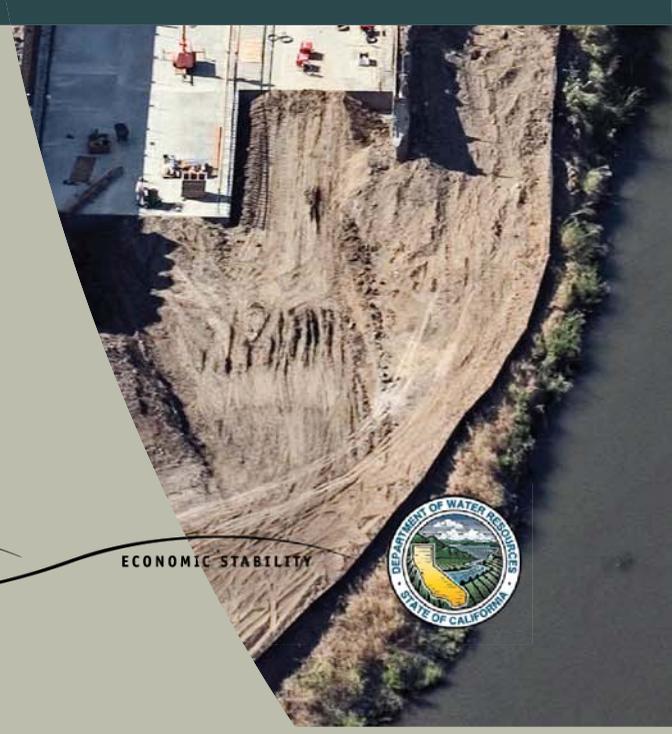
2013 FloodSAFE California Annual Report

Keith E. Swanson, Chief
Division of Flood Management

February 27, 2014

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