



Department of Water Resources



2014 Flood Management Activity Highlights Managing Risk and Protecting the Environment



Contents

California Water Action Plan	2
Flood Management Planning.....	4
Floodplain Risk Management	6
Flood Risk Reduction Projects	10
Flood System Operations and Maintenance.....	17
Flood Emergency Response	19
2014 Flood Management Projects Map.....	23
Investing in Flood Management	24
Moving Forward.....	26
2014 Flood Management Year in Review.....	28

Cover images: Homes damaged by mudslide in Camarillo Springs, CA, December 2014 (photos by Bill Nash, County of Ventura) **and localized flooding in Healdsburg, CA, caused by winter storms** (flooded car photo by Kent Porter, The Press Democrat).

Since 2007, Propositions 1E and 84 have provided essential funding to improve flood management across the state and heighten awareness of California’s flood risks. Funding from these bond laws, leveraged by local and federal resources, has allowed the Department of Water Resources (DWR) to initiate major programs to reduce flood risk in our communities. In addition, the funds have supported foundational work, including data collection, tools development, system evaluations, and engineering studies to identify problem areas and the improvements needed to enhance flood safety. Much work has been done, but much more remains.

This report highlights representative accomplishments made by DWR and our partners in 2014 and, in doing so, provides transparency of the State’s services and return on the public’s investment. The accomplishments also demonstrate progress made in addressing the Governor’s 2014 *California Water Action Plan*.

Comprehensive flood management is a key component of DWR’s Integrated Water Management Strategy, which is designed to achieve a sustainable, robust, and resilient flood and water management system to benefit all Californians. An integrated approach strikes a balance in meeting the goals of improving public safety, fostering environmental stewardship, and supporting economic stability.



2014 Flood Management Activity Highlights

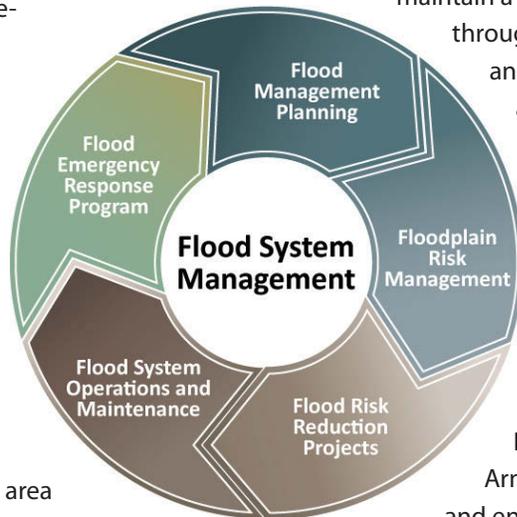
This report provides an overview of flood management progress and highlights activities that best represent 2014 accomplishments. This report groups similar types of program activities in the following general areas:

- **Flood Management Planning:** formulates strategies, plans, and investment priorities for implementing flood management projects. Key deliverables include updates to the *2012 Central Valley Flood Protection Plan (2012 CVFPP)* and the *California's Flood Future: Recommendations for Managing the State's Flood Risk* report (2013).
- **Floodplain Risk Management:** promotes sound floodplain management to reduce flood risks by working closely with local agencies and governments as well as federal agencies. Policies, guidance documents, and technical products – e.g., flood inundation models – are developed to assist communities with their strategies to manage floodplains. This area supports an additional element of successful floodplain risk management: educating the public about flood risks so people 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 (SPFC) to aid project delivery; and enhances

ecosystems associated with the flood system. A primary responsibility of this area is to work closely with the U.S. Army Corps of Engineers, Central Valley Flood Protection Board, and local agencies to improve performance of SPFC facilities, as well as the Folsom Joint Federal Project.

- **Flood System Operations and Maintenance:** focuses on maintaining levees, pumping plants, bridges, channels, and hydraulic structures – e.g., weirs, outfall gates – to continue achieving the risk reduction benefits the SPFC was designed to provide. Local maintaining agencies operate and maintain a majority of the SPFC through managing the levees and facilities for which they are responsible while the State is required to operate and maintain those portions of the SPFC identified in 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 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, pre-season coordination, and replenishing supplies and equipment.



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.

The Division of Flood Management Supports Implementation of the California Water Action Plan

The State of California supports managing water resources using an integrated approach. This approach combines water supply, flood management, and ecosystem actions to deliver the highest value for the investment made. An integrated approach can make it possible to deliver multiple benefits for each project.

Managing water resources using an integrated approach promotes system flexibility and resiliency to accommodate changing conditions such as regional preferences, ecosystem needs, climate change, flood or drought events, and financing capabilities.

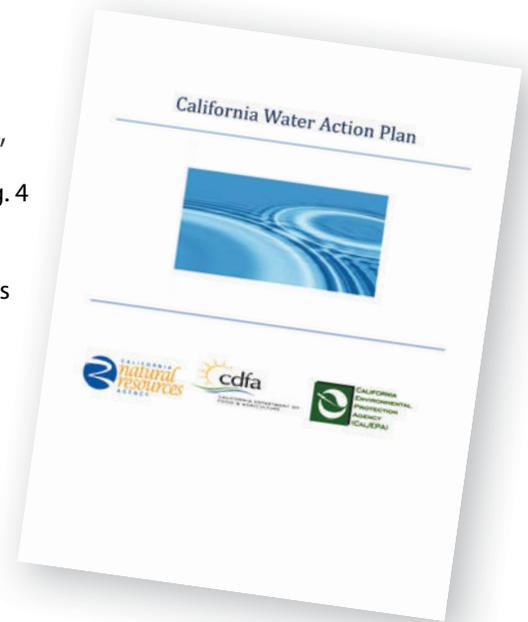
An integrated approach to water management is not a one-time activity. Long-term commitments and alignment with agencies across all levels of government is necessary to create sustainable water management.

		California Water Action Plan's 10 Essential Actions			
		Action 1 Make water conservation a California way of life.	Action 2 Increase regional self-reliance and integrated water management across all levels of government.	Action 3 Achieve the co-equal goals for the Delta.	Action 4 Protect and restore important ecosystems.
Flood Management Programs	Flood Management Planning		② ②	③	④ ④
	Floodplain Risk Management		② ②	③	④
	Flood Risk Reduction Projects		② ②	③ ③	④ ④
	Flood System Operations & Maintenance		②		④
	Flood Emergency Response				

“The State’s role is to lead, help others, and remove barriers to action.”
 –California Water Action Plan, pg. 4

The Department of Water Resources’ activities broadly support the goals articulated in the *California Water Action Plan*:

- Make water resources management systems more reliable.
- Make water management resilient and sustainable.
- Protect and restore important species and habitat.



Action 5 Manage and prepare for dry periods.	Action 6 Expand water storage capacity and improve groundwater management.	Action 7 Provide safe water for all communities.	Action 8 Increase flood protection.	Action 9 Increase operational and regulatory efficiency.	Action 10 Identify sustainable and integrated financing opportunities.
		⑦	⑧	⑨ ⑨	⑩
	⑥	⑦	⑧ ⑧	⑨	⑩
⑤	⑥ ⑥	⑦	⑧ ⑧	⑨ ⑨	⑩ ⑩
		⑦	⑧	⑨	
⑤	⑥	⑦	⑧	⑨ ⑨	

● Direct support ○ Indirect support

Flood Management Planning

In 2014, work continued on two major planning efforts that will guide State investments in both regional and statewide activities: Central Valley Flood Management Planning and Statewide Flood Management Planning.

Central Valley Flood Management Planning [2](#) [4](#) [8](#) [9](#) [10](#) [2](#) [3](#) [4](#) [7](#) [9](#)

This planning program focuses on reducing flood risk, increasing system resiliency, and improving operations and maintenance of the SPFC. As recommended in the *2012 CVFPP*, this program is currently implementing three major planning efforts: State-led Basin-Wide Feasibility Studies; locally-led Regional Flood Management Planning, which includes working with more than 180 local entities; and, the Central Valley Flood System Conservation Strategy. Each of these planning efforts will inform the 2017 update of the *CVFPP*.

Basin-Wide Feasibility Studies

The program is conducting two State-led basin-wide feasibility studies: one in the Sacramento River Basin and one in the San Joaquin River Basin. The studies will evaluate the practicality of different alternatives for improving the flood management system by examining system flexibility and resiliency through expansion and extension of the flood bypass system, integrating ecosystem enhancements, and combining regional

improvements with systemwide improvements. The evaluations take into account physical improvements needed to improve SPFC performance to meet current and future needs – e.g., the impacts of climate change. The studies are expected to be completed by mid-2016.

Regional Flood Management Planning (RFMP)

In 2013, DWR launched the RFMP program to fund local agencies in developing long-term regional flood management plans that address local needs, articulate local and regional flood management priorities, and establish a common vision for regional partners. The regional working groups are each led by a local agency, with 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 (*Conservation Strategy*)

The *Conservation Strategy* describes how to integrate environmental stewardship and flood management by providing data, tools, and other environmental planning information, and improved approaches for permitting flood management activities.

Downtown Healdsburg after winter storm caused localized flooding, December 2014. (Photo: Kent Porter, *The Press Democrat*)



Statewide Flood Management Planning

Now in its fourth year, the program continues to work closely with the U.S. Army Corps of Engineers and local agencies to identify statewide flood risks, propose solutions, and develop an investment strategy for future flood spending based on California's integrated water management investment needs. Following-up on the *California's Flood Future: Recommendations for Managing the State's Flood Risk* report, which was released in 2013, the program has been developing a strategy to guide California's investment in flood risk management projects statewide.

Accomplishments

Central Valley Flood Management Planning

- Basin-Wide Feasibility Studies completed initial evaluations of large-scale SPFC improvement projects –e.g., weir and bypass expansions – that are consistent with the 2012 CVFPP. The evaluations take into account physical improvements needed to improve SPFC performance to meet current and future needs.
- RFMP working groups have provided their completed plans to DWR for review. The Lower San Joaquin River-Delta South RFMP group submitted the first final plan in November.
- Completed internal review of the draft *Central Valley Flood System Conservation Strategy*, and the draft document is expected to be released for public review in 2015.
- Launched the Feather River Regional Environmental Permitting Program, a pilot project to develop coordinated regional permits for State and local projects and maintenance. Unlike the traditionally inefficient “project-by-project” permitting process, this regional approach will reduce

overall project implementation time and costs for local maintaining agencies while continuing to improve public safety, preserve existing agriculture, and support the restoration of threatened species.

Statewide Flood Management Planning

- Strengthened and expanded the inclusion of flood management in the context of integrated water management in the *California Water Plan 2013*.
- Interviewed 240 local flood and water management agencies as part of developing the report *Investing in California's Flood Future: A Value-Driven Approach to Flood Management* because local input and participation are critical for articulating and achieving a value-driven approach to flood management statewide.



Tisdale Weir flowing, December 2014.

Note: Sacramento River channel is at far right in photo; weir “shelf” is center right; weir stilling basin delineated by depression in water at center left of photo; Garmire Road bridge is at far left in photo; beginning of Tisdale Bypass is between stilling basin and bridge (*Photo: Z. Sarah*)

Floodplain Risk Management

Increased NFIP-CRS Uniform Minimum Credits

The CRS program encourages communities to exceed the minimum NFIP standards through their floodplain management activities. As a result of its flood management activities, DWR provides approximately 20 percent of the 506 Uniform Minimum Credit points available to California communities that participate in CRS. There is a 5 percent reduction in flood insurance premiums in CRS communities for every 500 credit points. For those CRS communities falling short of the 500 credit points, DWR's contribution (of nearly 100 points) can augment the difference.

Floodplain Risk Management, with the help of government partners, develops guidance and technical tools that promote sound floodplain management to reduce the risk of flooding and educates the public about flood risk. These activities occur at a regional and statewide level.

Central Valley Floodplain Evaluation and Delineation

8 2 3 4 7 9

This program develops, maintains, and refines foundational data, models, and tools to support DWR programs and other State, federal, and local flood management efforts. Specifically, the program provides riverine hydraulic analyses, floodplain hydraulic evaluations, and mapping for areas protected by the SPFC.

Risk Assessment and Risk Mapping

8 2 7 9

The program collects, assesses, organizes, exchanges, and disseminates basic flood hazard information needed to advance sound floodplain management practices statewide.

Community Assistance

2 8 2 6 7 8 9 10

This program provides statewide technical support to federal, State, and local agencies, as well as the public. This technical support includes: flood hazard maps, levee data, and National Flood Insurance Program (NFIP) activities, including the Community Rating System (CRS). In partnership with FEMA, program staff train local officials and audit communities for NFIP compliance. The program also includes Silver Jackets and Flood Risk Notification – both engage in flood risk outreach and education to the public.

Home heavily damaged by mudslide in Camarillo Springs, CA, December 2014. Ten houses were "red tagged" as structurally unsound after being hit by the mudslide.
(Photo: Bill Nash, County of Ventura)



Coastal Flood Management Planning ⑧⑨②④

The program provides technical assistance and responds to inquiries from the public and local, State, and federal entities regarding efforts to remap coastal floodplains in the state. Impacts from climate change, including sea level rise, are also being studied and modeled. Results from these studies and modeling will be used to provide State and local floodplain managers with a more comprehensive understanding of coastal floodplain hazards.

Accomplishments

Central Valley Floodplain Evaluation and Delineation

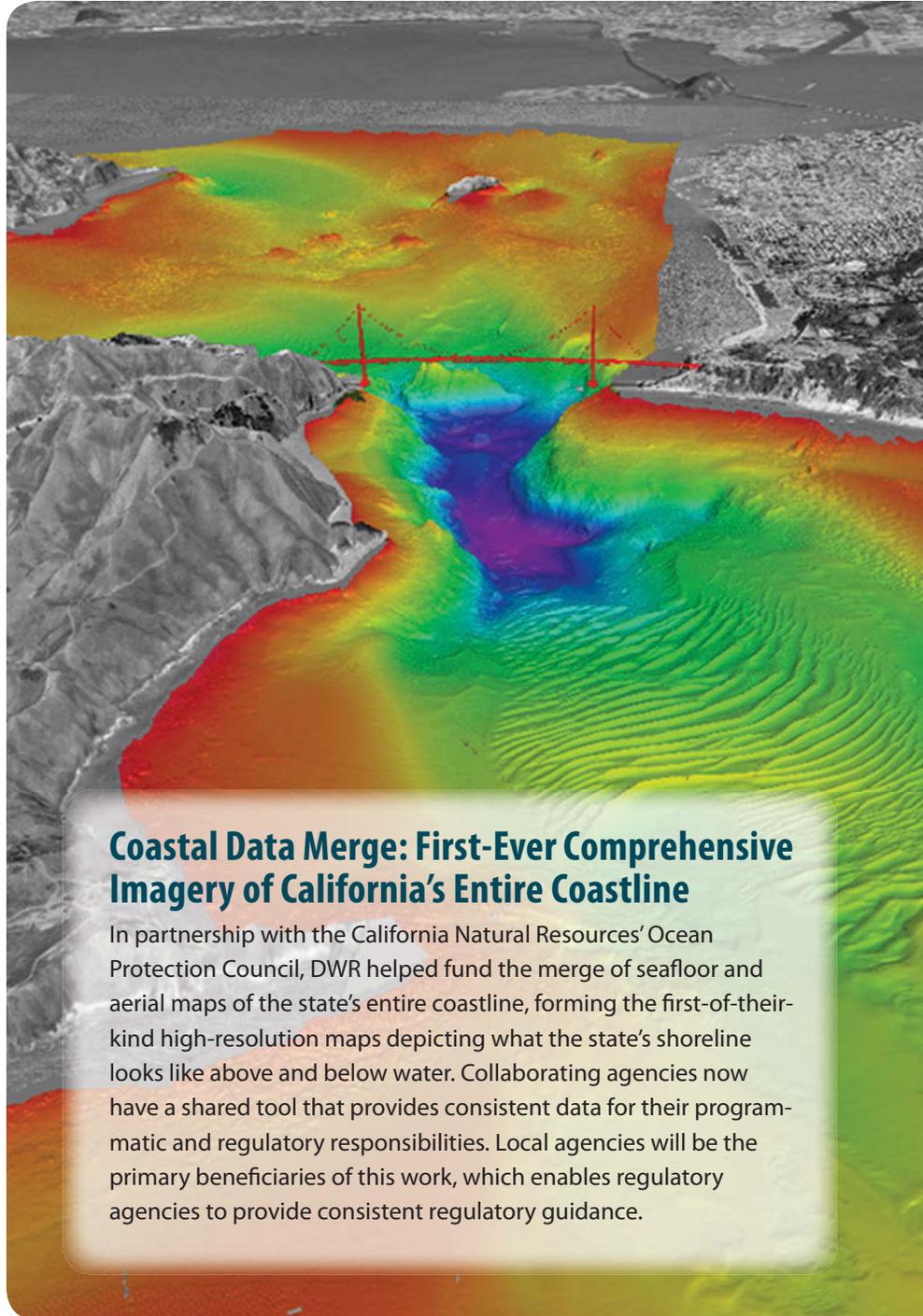
- Comprehensive hydrology and mapping study of the SPFC – *See pg. 9.*

Risk Assessment and Risk Mapping

- Updated the online directory of flood maps for all 58 counties to include latest FEMA Flood Insurance Rate Maps.
- Completed “Assessment of Post-Fire Runoff Hazards for Pre-Fire Hazard Mitigation Planning – Southern California,” which applies the latest science and engineering to determine how much debris can safely flow into flood detention basins in post-fire conditions.
- Coastal Data Merge – *See sidebar.*

Community Assistance

- Received the 2014 “Silver Jackets Team of the Year” award. Voted on by peers, this award was given to the DWR- and U.S. Army Corps of Engineers-led California team.
- Silver Jackets developed three flood risk videos focused on the northern, southern and coastal areas of California, respec-



Coastal Data Merge: First-Ever Comprehensive Imagery of California’s Entire Coastline

In partnership with the California Natural Resources’ Ocean Protection Council, DWR helped fund the merge of seafloor and aerial maps of the state’s entire coastline, forming the first-of-their-kind high-resolution maps depicting what the state’s shoreline looks like above and below water. Collaborating agencies now have a shared tool that provides consistent data for their programmatic and regulatory responsibilities. Local agencies will be the primary beneficiaries of this work, which enables regulatory agencies to provide consistent regulatory guidance.

Image shows underwater topography near the Golden Gate Bridge.

Note: Golden Gate Bridge can be seen in upper center of image
(Image: Ocean Protection Council)

tively. The videos feature interviews with regional flood experts, and local officials have been encouraged to use the videos for their flood outreach efforts.

- Flood Risk Notification team completed mailout of more than 273,000 notices to owners of more than 360,000 properties.
- Following the August 2014 Napa earthquake, the program conducted workshops and provided technical assistance to Bay Area officials and property owners to help them understand FEMA requirements for rebuilding and repairing damaged structures in floodplains.

- Conducted 14 NFIP workshops/classes: 11 Elevation Certification workshops that helped local entities with a variety of floodplain management issues; 1 Substantial Damage/Substantial Improvement workshop; and 2 week-long classes that provided NFIP program regulations and pertinent job-related information.
- Conducted 30 community assistance visits in Special Flood Hazard Areas and provided more than 1,800 hours of technical assistance to help community officials and private citizens with specific NFIP-related inquiries related to the 2012 National Flood Insurance Program Reform Act, remapping, and elevation certificate requirements.

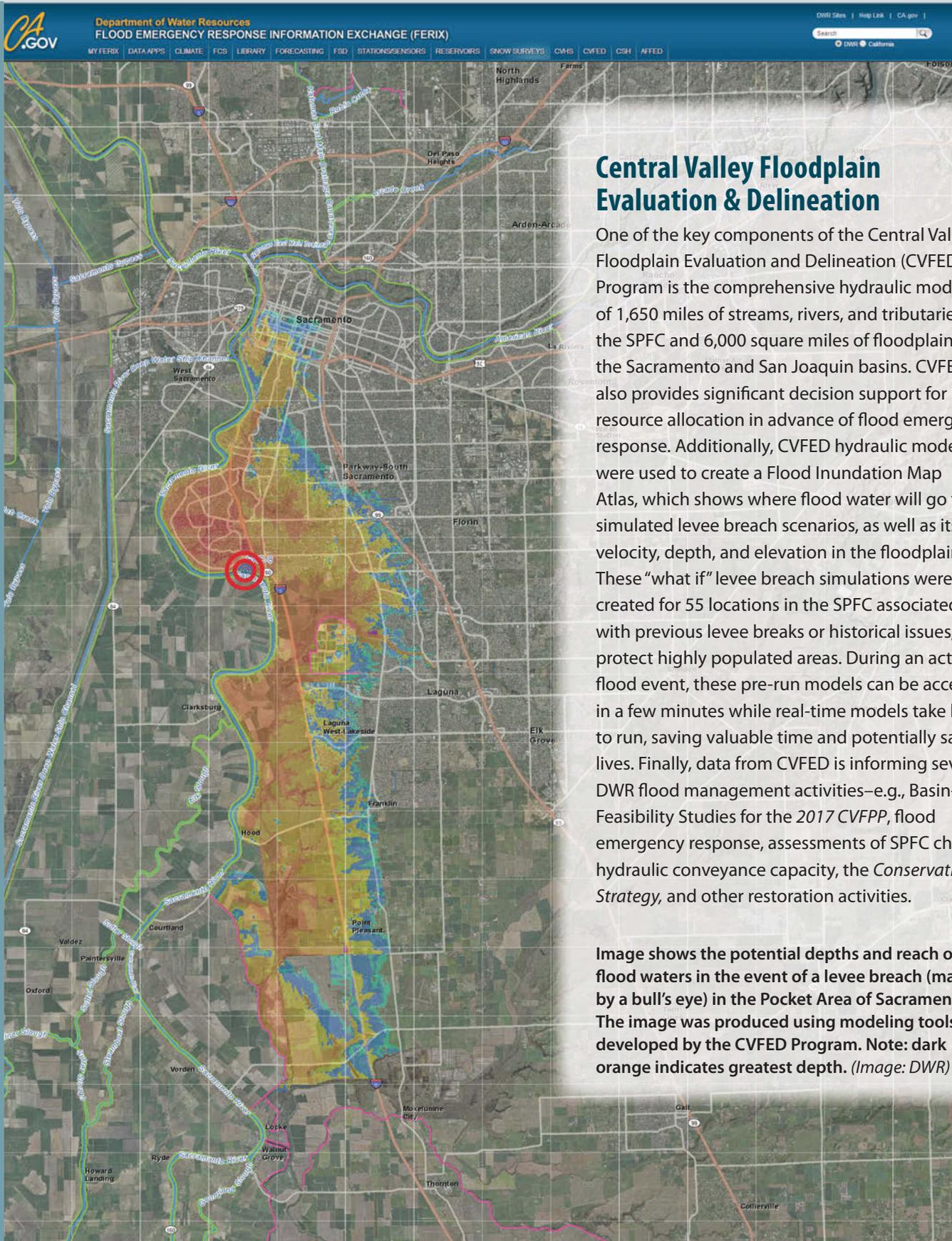
SF Bay Regional Coastal Hazard and Resiliency Group (CHARG)

In 2014, DWR became a Steering Team member of the newly formed San Francisco Bay Regional CHARG. This group is made up of more than 100 engineers, planners, scientists, and policy makers, most of whom are from local agencies within the San Francisco Bay Area. DWR, in collaboration with other State and federal agencies, has engaged with local communities as they develop regional flood protection solutions to deal with sea-level rise and extreme tides. Efforts in this group are centered on empowering local communities to find solutions to their regional flood management issues by creating connections among adjacent agencies; exchanging technical knowledge and expertise; and identifying unified funding strategies.

More than 122 entities across local, State, and federal government participate in CHARG: 87 local entities* – e.g., public works departments, Offices of Emergency Services; 19 regional entities that have jurisdictions encompassing multiple counties and cities in the San Francisco Bay Area; and 16 State and federal agencies.

**Numbers on map indicate how many local entities in each county are members of CHARG.*





Central Valley Floodplain Evaluation & Delineation

One of the key components of the Central Valley Floodplain Evaluation and Delineation (CVFED) Program is the comprehensive hydraulic modeling of 1,650 miles of streams, rivers, and tributaries of the SPFC and 6,000 square miles of floodplain in the Sacramento and San Joaquin basins. CVFED also provides significant decision support for resource allocation in advance of flood emergency response. Additionally, CVFED hydraulic models were used to create a Flood Inundation Map Atlas, which shows where flood water will go for simulated levee breach scenarios, as well as its velocity, depth, and elevation in the floodplain. These “what if” levee breach simulations were created for 55 locations in the SPFC associated with previous levee breaks or historical issues, or protect highly populated areas. During an actual flood event, these pre-run models can be accessed in a few minutes while real-time models take hours to run, saving valuable time and potentially saving lives. Finally, data from CVFED is informing several DWR flood management activities—e.g., Basin-Wide Feasibility Studies for the 2017 CVFPP, flood emergency response, assessments of SPFC channel hydraulic conveyance capacity, the *Conservation Strategy*, and other restoration activities.

Image shows the potential depths and reach of flood waters in the event of a levee breach (marked by a bull’s eye) in the Pocket Area of Sacramento. The image was produced using modeling tools developed by the CVFED Program. Note: dark orange indicates greatest depth. (Image: DWR)

Flood Risk Reduction Projects

Flood Risk Reduction Projects provide funding, direction, and oversight for repairing and improving flood management facilities to reduce flood risk, using both structural and non-structural methods. Major activities include: planning, design, and overseeing construction of flood management projects sponsored by the Central Valley Flood Protection Board, local agencies, and the U.S. Army Corps of Engineers for the SPFC, as well as flood management projects statewide and in the Delta. The program includes projects that provide advance environmental mitigation for the SPFC to aid project delivery and enhance ecosystems associated with the flood system.

SPFC Focus:

U.S. Army Corps of Engineers Projects ⑥ ⑧ ⑨ ② ⑦

Under this program, the Central Valley Flood Protection Board partners with the U.S. Army Corps of Engineers to provide non-federal cost-share funding and technical assistance to improve SPFC facilities and help urban areas associated with the SPFC achieve a 200-year

level of flood protection. DWR activities include: participating in project development team meetings, making payments to U.S. Army Corps of Engineers and receiving funds from local agencies in accordance with cost-sharing agreements, and acquiring land easements and rights-of-way for projects.

Key projects include:

- **American River Common Features Project:** 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 slope instability while increasing flood conveyance capacity.
- **Folsom Dam Modification Joint Federal Project (JFP):** as part of the American River Watershed Project, the JFP will help achieve the goal of a 200-year level of protection for the greater Sacramento area by allowing earlier releases of flood flows at Folsom Dam, which provides more time to manage and monitor incoming flood flows. This project will provide additional flood protection to approximately 400,000 people and more than 110,000 structures valued at approximately \$58 billion.

Levee Repairs ② ⑧ ⑨ ⑦

The program provides cost-share funding for SPFC facilities (primarily levees) through several projects, including:

- **Flood System Repair Project:** a bond-funded program that repairs rural SPFC facilities under a State-local cost share.
- **Sacramento River Bank Protection Project:** a U.S. Army Corps of Engineers-led program that repairs critical, urban SPFC erosion sites along the Sacramento River and its tributaries.

1,800 linear feet of cutoff wall being placed in a levee on the American River to prevent seepage through and under the levee that helps protect the Natomas Basin. Seepage can increase the risk of levee failure. (Photo: DWR)



– **Federal Public Law 84-99 Emergency Repair Project:** a U.S. Army Corps of Engineers-led program that helps with repairing damages caused by flooding.

Urban Flood Risk Reduction

2 8 4 7 9 10

The program is designed to reduce flood risks that impact urban areas associated with the SPFC by providing cost-share funding to local agencies to repair and improve levees and facilities of the SPFC. Levees are repaired to provide original design protection or improved to provide 200-year level of protection.

Urban and Non-Urban Levee Evaluations 8 7 9

The program includes urban and non-urban levee evaluations. Urban levees protect developed areas with populations of at least 10,000 people; non-urban levees protect agricultural and developed areas with populations of less than 10,000 people. The program evaluates current levels of performance for SPFC levees and associated non-SPFC levees (if these non-SPFC levees fail, areas protected by SPFC levees would flood). Information, analysis, cost estimate tools, and levee performance models developed by the program are being used by local, State, and federal agencies to better manage flood risks for areas of the Central Valley protected by the SPFC.

Yuba Feather Flood Protection

8 7 8 9

The primary objective of the 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.

Statewide Focus:

Flood Control Subventions

8 2 4 7 9

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.

Flood Corridor 2 4 8 4 6 7 9 10

The program provides cost-share grants to local agencies and nonprofit organizations throughout the state for non-structural, 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. Funding under this program is intended to be used for acquisition, restoration, enhancement, and protection of property while preserving sustainable agriculture and enhancing wildlife habitat in and near flood corridors.

Local Levee Assistance 2 8 4 7 9

This cost-share program was created to assist flood management agencies throughout California. The program funds evaluations and critical repairs of flood projects at a cost-share of up to 90 percent for multi-benefit projects that protect disadvantaged communities.

Carmel River Getting Reconnected to Its Historic Floodplain

The Flood Corridor Program is helping fund a project that will remove a constriction point on the Carmel River at Highway 1, and the river will be reconnected to its historic floodplain. The constriction is impeding the river and increasing flood risk to the community on the developed side of the river. The project will break down a levee on the undeveloped side of the river to create a continuous corridor to a lagoon adjacent to the Pacific Ocean.

Delta Focus:

Delta Levee System Integrity

2 4 5 8 9 ③ ⑦

This program focuses on levee repair, maintenance and improvement, and habitat enhancement within the Sacramento-San Joaquin Delta (Delta). 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** helps reduce flood risk in areas where levees help protect the state's water supply and other important assets – e.g., water quality, transportation corridors, utility infrastructure – 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 Delta for 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.

Delta Special Investigations

2 3 4 8 9 10 ② ③ ⑥ ⑦ ⑧

This program focuses on levee repair, maintenance, and improvement within the Delta. Funding is also available for planning, research, and habitat enhancement. The program includes the following projects: Delta Knowledge Improvement, North Delta, and West Delta.

Delta Risk Management Study (DRMS)/Delta Knowledge Improvement Project (DKIP)

DRMS was created in response to AB 1200, which required DWR to provide a risk analysis of the Delta and Suisun Marsh and develop improvement strategies to manage those risks. A critical number of data gaps were identified during this process and DKIP was developed

to close these data gaps. The project includes the following components: Delta Stewardship Council Interagency Agreement and Delta Protection Commission Interagency Agreement.

North Delta Project

This project is increasing flood protection by improving habitat and ecological processes on McCormack-Williamson Tract and in Grizzly Slough. Creating floodplain habitat and reducing sudden levee failure events reduces potential damages to agricultural land, infrastructure, and ecosystems in adjacent areas – e.g., Point Pleasant and communities downstream.

The project is also identified in the *Bay Delta Conservation Plan* and the *Delta Plan* as a priority, early implementation project because it supports the coequal goals of water supply reliability and ecosystem restoration articulated in both plans.

Accomplishments

U.S. Army Corps of Engineers Projects

– American River Common Features

Project: Design for this component of the project is now 65 percent complete for seepage cut-off improvements along one mile of Garden Highway near Truxel Road. This particular stretch of levee is crucial because a levee breach could flood over 90 percent of the basin in a 100-year event. DWR executed an agreement for remaining design components of the projects.

– Folsom Dam Modification Joint Federal Project (JFP) – See pg. 13.

Conservation Strategy**

– Expended \$2.3 million in Proposition 1E funding for two advance mitigation projects to help implement future SPFC projects.

***Advance mitigation projects support the timely implementation of SPFC improvement projects.*

Folsom JFP Reaches More Milestones

The JFP reached the following milestones in 2014:

Phase III: The control structure reached its final height with the last major monolith pour in July, and the six tainter gates on the control structure have been installed. Phase III is scheduled for completion in August 2015.

Phase IV: Installation of the secant pile cutoff wall was completed in July. This structure serves as a temporary dam between the control structure and Folsom Lake until the control structure is fully functional. Concrete placement in the auxiliary spillway, chute, and stilling basin is approximately 35 percent complete.

The entire project is expected to be completed in 2017.



Levee Repairs*

- Committed \$14 million to fund seven projects, including:
 - **Repairing levee erosion sites:** providing financial support to local levee maintaining agencies in rural areas makes it possible for repairs to be completed.
 - **Re-graveling levee access roads:** gravel roadbase makes accessing levees for maintenance activities and during flood emergencies possible.
 - **Replacing the electrical control system for the gates on the Chowchilla Bypass Bifurcation Structure:** the bifurcation structure redirects flood flows from the San Joaquin River into the Chowchilla Bypass and reduces pressure on levees downstream that protect both the community of Firebaugh and surrounding agricultural land.

Urban Flood Risk Reduction*

- Two projects of the Three Rivers Levee Improvement Authority in the Yuba Basin, totaling 19 miles, are 90 percent complete, bringing this urban basin to a 200-year level of protection and substantially

improving flood protection for the communities of Linda, Olivehurst, and Plumas Lake.

- Provided funding to complete 12 miles of levee repairs and improvements along the Natomas Cross Canal and Sacramento River east levee, which increases flood protection for 80,000 people living in the Natomas Basin.
- Released and finalized draft program guidelines for the 2014 Project Solicitation Package, which will allow DWR to allocate remaining bond funding to provide additional urban flood protection.

Urban and Non-Urban Levee Evaluations

- Completed comprehensive analysis for 415 miles of urban levees (327 miles of SPFC levees/87 miles of non-SPFC levees), utilizing borings, LiDAR, bathymetry, penetrometer, “as built” documents where available, geomorphology and geophysical studies, and interviews with local maintaining agencies and the U.S. Army Corps of Engineers. Analysis identified risks for levees and whether levees met performance criteria.

**Program provides cost-share funding for projects.*

Downstream side of new auxiliary spillway at Folsom Dam, showing six bays with tainter gates installed, December 2014.

(Photo: USACE)

- Completed evaluations for 96 percent of 411 miles of urban levees in 27 study areas to determine if they meet defined urban geotechnical criteria. Where levees did not meet criteria, program identified remedial measures and provided cost estimates to meet the urban criteria to appropriate agencies. The remaining 16 miles of levees will be evaluated in early 2015.
- Completed evaluations for 97 percent of 1,740 miles of non-urban levees to determine if they meet defined non-urban geotechnical criteria at current maximum water elevations (U.S. Army Corps of Engineers 1955/57 water surface profiles). Where the criteria were not met, remedial measures and cost estimates have been provided to appropriate agencies. The remaining 52 miles of levees will be evaluated in early 2015.
- Completed analysis reports that include an interactive section on past performance for levees. This section allows online users to select a levee segment and access a written summary of levee conditions. Having the ability to access levee analysis information gives local maintaining agencies a better

understanding of what will be needed to remediate problems and the associated costs. Additionally, having quick access to summaries of levee conditions provides DWR's Flood Emergency Response program the ability to identify which sections of levees are at greater risk in a high water event and plan accordingly. Interactive sections of reports will be available in April 2015.

Yuba-Feather Flood Protection*

- Awarded and executed funding agreements for four new projects in the Yuba and Feather rivers watershed, including the Colusa Drain Flood Reduction Project, the Oroville Wildlife Area Flood Project, the Gridley Bridge Erosion Site Repair, and the Dry Creek Feasibility Study.

Flood Control Subventions*

- Reimbursed approximately \$69 million for eight projects undertaken by five local agencies. These projects help increase flood protection for millions of people and critical infrastructure outside the Central Valley.

Flood Corridor*

- Salt River Ecosystem Restoration Project – See sidebar.



Salt River Named one of the “Ten Waters to Watch”

The Salt River Ecosystem Restoration Project – named one of the 2014 “Ten Waters to Watch” in North America by the National Fish Habitat Partnership – will improve flood protection, agricultural preservation, and provide ecosystem restoration. Additionally, salmon habitat is being re-established and the sediment that has been removed is being repurposed for farming. This tributary of the Eel River Estuary became a non-functioning stream filled-in with sediment and brush. Ranches on either side of the river flood annually, and the land cannot be used. The Flood Corridor Program is funding two miles of the 7-mile project, and about 60 percent of the re-channelization and restoration is complete. During the 2014 construction season of approximately three months, more than one mile of the project was completed. The project includes a sediment management plan in perpetuity to prevent flooding on ranchlands on either side of the stream in the future.

Restoring functionality of the Salt River upstream of the salt water intrusion barrier.
(Photo: DWR)

**Program provides cost-share funding for projects.*

- Completed the Ojai Meadows Preserve Habitat Restoration and Flood Control Project, which provides increased flood protection for a transportation corridor (State Route 33) and recreation opportunities.
- Completed the Bedford Temescal Wash Flood Protection Corridor Restoration Project, which prevents development in a geologically unstable floodplain and creates a wildlife corridor.

Local Levee Assistance*

- Completed six projects to evaluate or repair critical levees in Alameda and Ventura counties.
- Released the third and final project solicitation package for \$13 million.
- Executed funding agreements for levee evaluations to determine deficiencies, slope stability, improvements, and feasibility of upgrades at Olney Creek in Shasta County, East Weaver Creek in Trinity County, and Jacobs Avenue in Humboldt County.
- Mission Beach Seawall Project – *See sidebar.*
- Oakland International Airport Project – *See sidebar.*

Delta Levee System Integrity*

- Completed construction to strengthen 5,500 linear feet of levees on Jersey Island and 4,000 linear feet of levees on Bradford Island. Both islands are among the eight key western Delta islands that protect the state’s water supply.
- Completed construction of approximately 17 miles of levee rehabilitation on Bouldin, Jersey, King, and Bacon islands, as well as Rindge, Holland, and Brack tracts. These repairs enable these levees to provide a level of flood protection that meets local hazard mitigation plan requirements.



Mission Beach Seawall Feasibility Study and Design

The Local Levee Assistance Program helped fund the design of improvements to repair and replace portions of an existing seawall and adjacent walkway at Mission Beach in San Diego, a major tourism and business area in the city. This project demonstrates how the program can be used to fund more than just traditional levees.

- Released the 2014 Project Solicitation Package that for the first time requires funded projects address all three elements of integrated water management: water supply, flood protection, and habitat enhancement. Project solicitations submitted by local entities are being evaluated.
- The Central Valley Flood Protection Board approved DWR’s recommendation to fund \$12 million for maintenance and repair work on 700 miles of non-federal and eligible federal levees in the Delta.

Delta Special Investigations*

- The Delta Protection Commission and DKIP are working with the Delta Stewardship Council (DSC) to determine if a statewide assessment district with fee authority to provide flood protection and emergency preparedness in the Delta is practical. The study covers the entire Delta and supports the DSC’s *Delta Plan* recommendation to create an assessment district for levee maintenance and improvements.
- DWR is providing funding to the DSC for conducting a Delta levee

After decades of damage caused by storm-induced tidal surges, high tides, and tsunamis, the seawall at Mission Beach in San Diego is being repaired and improved. The seawall protects a key business and tourism area in San Diego. (Photo: City of San Diego)

Improving Flood Protection for Oakland International Airport

In May, the Local Levee Assistance Program helped fund planned improvements to an existing dike protecting the Oakland International Airport from the San Francisco Bay. Previously completed geotechnical investigations, preliminary environmental review, and permitting elements will be funded under an evaluation agreement, while design and construction will be performed under an implementation agreement. The airport is a crucial transportation hub, and this project will help address the effects of sea-level rise.

*Program provides cost-share funding for projects.

prioritization study that will help provide a comprehensive approach for State investments in Delta flood protection. The DSC will produce an interactive, criteria-driven, economic analysis tool that helps assign priority to Delta islands.

North Delta Project

– **Grizzly Slough Riparian Habitat Enhancement Project:** Developed a Project Funding Agreement and Scope of Work to design and permit a 400-acre riparian and floodplain enhancement project. Levees on this 400-acre parcel will be breached to enable more natural floodplain functions that will restore riparian habitat and alleviate pressure on levees downstream.

Before and After

Ojai Meadows Preserve Habitat Restoration and Flood Control Project

Before: No habitat, no recreational opportunities, and frequent flooding of State Route 33. (Photo: DWR)

After: Established wetlands and wildlife habitat, educational and recreational opportunities - and increased flood protection for State Route 33. (Photo: DWR)



Jersey Island Delta Levee System Integrity Project

Before: Narrow levee and levee crown road on Jersey Island in the Delta. (Photo: DWR)

After: Levee and levee crown road have been widened. Note: landside levee slope is less steep which helps increase levee stability and makes emergency access easier. (Photo: DWR)



Brack Tract Delta Levee System Integrity Project

Before: Encroachment into the levee protecting Brack Tract in the Delta. (Photo: DWR)

After: Encroachment has been removed and levee regraded to improve levee stability. (Photo: DWR)



Flood System Operations and Maintenance

Operates, maintains, and repairs specific levees, channels, weirs, gates, pumping plants, and bridges that are considered facilities of the SPFC. Operating and maintaining the SPFC is the joint responsibility of DWR and local maintaining agencies. Specifically, the program is responsible for maintaining approximately 300 miles of SPFC levees and all Sacramento River SPFC channels. Local maintaining agencies are responsible for the remaining levees, as well as San Joaquin River SPFC channels.

Flood Control Facilities Evaluation and Rehabilitation ②⑧⑨④⑦

Under this program, DWR evaluates, operates, maintains, and repairs SPFC facilities identified in the California Water Code – e.g., Sacramento River Flood Control Project SPFC facilities, including 11 weirs, 5 gate structures, 4 pumping plants, and specific bridges associated with the east levee of the Sutter Bypass. Work is prioritized based on flood risk, public safety, and available funding.

Channel Evaluation and Rehabilitation ②⑧⑨④⑦

The program is responsible for operating, maintaining, and repairing approximately 1,200 miles of SPFC channels identified in the California Water Code. These channels are operated and maintained to ensure flood conveyance capacity and functionality.

Specific program activities include inspecting and evaluating channels and developing and utilizing hydraulic models to identify areas within channels that require vegetation or sediment removal to maintain channel capacity and functionality.

Levee Operations and Maintenance Components

②⑧⑨④⑦

This program, like the Channel Evaluation and Rehabilitation Program, focuses on ongoing maintenance of specific levee structures in the Sacramento River Flood Control Project to help ensure these levees will perform satisfactorily during high water events.

When a levee evaluation and inspection report indicates a significant repair is required, the Levee Repairs Program (see Flood Risk Reduction Projects section) is notified, and design and construction is done as a capital outlay project. Projects are prioritized considering both risk and consequences of levee failure.

Accomplishments

Channel Evaluation and Rehabilitation

- Developed/refined models incorporating CVFED program data and models to identify maintenance needed to address conveyance concerns for the East Side Canal, Natomas Cross Canal, Tisdale Bypass, Wadsworth Canal, and SPFC channels in and around Chico.
- Modeling for the *Feather River Corridor Management Plan* was completed and presented to the Central Valley Flood Protection Board.
- Began conducting a study investigating the impacts climate change will have on mercury, sediment transport, and water flow as part of ongoing mercury characterization studies within the Cache Creek Settling Basin and watershed, as well as the Yolo Bypass.

Urban/Non-Urban Levee Evaluations' Cost Analysis Tool

This new tool is helping flood managers develop accurate estimates for levee repairs. The tool provides the previously unknown factor in the cost analysis of levee repairs: an analysis of levee conditions for 1,914 miles of levees (1,548 miles of SPFC levees/366 miles of non-SPFC levees) while also accounting for hard construction costs and soft costs like design. The tool is currently being used by DWR's Central Valley Flood Management Planning Office, the U.S. Army Corps of Engineers, and local levee maintaining agencies.

Urban/Non-Urban Levee Evaluations Geotechnical Analyses Guidance Document Being Used Internationally

Flood planners in Japan, the United Kingdom, New Zealand, Australia, and in the U.S. are using the Urban/Non-Urban Levee Evaluations Program's geotechnical analyses guidance document as a model to implement similar programs. The guidance document describes the program's comprehensive process for levee exploration, evaluation, and data analysis.

Flood Control Facilities Evaluation and Rehabilitation

- Completed 80 percent of repairs to modernize three antiquated Sutter Bypass pumping plants – e.g., replacing motors, updating communications systems, and installing back-up generators. The repairs make operating the pumping plants more efficient and will reduce operations and maintenance costs.
- Completed data collection and analysis report with findings on potential fish entrapment at two Sutter Bypass pumping plants.
- Completed the design phase and the environmental permitting documents for the Butte Slough Outfall Gates Rehabilitation Project. The gate structure is vital for draining the Butte Sink. When completed, all gates will be operational (currently several gates are not operable); corroded pipes will be replaced; and, operation will be automated (currently, staff access the gates via a narrow, unsafe catwalk over the slough and use a 25 lb. drill to open the operable gates).

Levee Operations and Maintenance Components

- Initiated an easement identification program for DWR-maintained areas. Because most easements are quite old, ownership and easement rights need to be clarified, and consolidating all easement information into a single resource will improve appropriate encroachment abatement enforcement. Completed easement identification for Maintenance Area 9 (MA9).
- Assisted the Central Valley Flood Protection Board with implementing improved encroachment abatement efforts in MA9 (pilot project area). Encroachments are a major concern for the SPFC and must be addressed to minimize flood risk, maintain Public Law 84-99 levee rehabilitation eligibility and FEMA 100-year level of flood protection certification efforts for communities protected by levees.



Colusa Weir flowing into Colusa Bypass, December 2014. Colusa Weir is more than one-third of a mile long and can manage a flow of 70,000 cubic feet per second. (Photo: Z. Sarah)

Flood Emergency Response

Maintaining a high degree of readiness requires a disciplined approach involving annual training, proactive pre-season coordination with cooperating agencies, annual review and replenishment of supplies, 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, the program conducts functional exercises within DWR and joint exercises with local, State, and federal agencies. The program also supports local preparedness efforts.

Additionally, the program provides information about the integrity of SPFC levees, channels, and structures through coordination and collaboration with local maintaining agencies and the Central Valley Flood Protection Board. The information improves DWR's ability to annually assess the integrity of the SPFC. This data provides valuable information to emergency responders and local levee maintaining agencies, as well as for flood system repair and enhancement. Supporting local preparedness efforts has included grants to local responders for emergency response planning across the state with particular attention to the Delta.

Hydro-Climate Data Collection and Precipitation Runoff Forecasting

5 8 9 7

The program provides real-time data collection and dissemination through DWR's California Data Exchange Center (CDEC) and predicts the amount of runoff from Sierra snowpack that has direct implications for the state's water supply. Information collected by DWR and its partners and exchanged through CDEC is essential for flood management operations and effectively managing hydro-electric power generation, water supplies



for irrigation, municipal and industrial uses, and environmental requirements. Forecasts produced by DWR are used by regulatory agencies and most water suppliers to set standards statewide, as well as to determine water allocations affecting most of the population in California.

Real-Time Conditions Status & Warning

5 8 9 6 7

This program inspects SPFC facilities to assess maintenance practices, assess and document the integrity and vulnerabilities of the SPFC, and provide flood emergency information. CDEC provides a centralized database to store, process, and exchange real-time hydrologic information gathered by DWR inspectors and various partners throughout the state. CDEC also provides flood system conditions, historical information, and serves as the backbone for flood emergency response for the State, federal, and local partners.

DWR staff work on anchoring levee wave-wash protection during the Twitchell Island flood fight functional exercise. Wave-wash protection is placed on eroded levees to prevent further eroding during a flood, November 2014. (Photo: DWR)

River Forecasting and Reservoir Operations 5 8 2 6 7 9

In collaboration with the National Weather Service's (NWS) California-Nevada River Forecast Center, the program provides year-round daily forecasts of reservoir inflows, river flows, and water levels throughout California and much of Nevada. These forecasts are used by emergency responders to anticipate and prepare for flood conditions. During high water events, federal and State river forecasters work around the clock to update their forecasts and monitor real-time changes in California's and Nevada's larger rivers and estuaries. Through this program, DWR works to enhance early warning systems by improving lead time and filling-in data voids with regard to flood forecast.

In collaboration with NWS California Nevada River Forecast Center, the program is responsible for monitoring storms, preparing river and reservoir inflow forecasts, and issuing flood bulletins. Forecast-Coordinated Operations programs are being developed and enhanced for reservoirs in the San Joaquin River Basin and the Sacramento River Basin. Coordinated operations give reservoir operators the ability to make smaller, controlled releases in advance of major storms, allowing for more

water supply storage during the winter flood season. The above activities help minimize the risk of exceeding river channel capacity and increase the warning times to communities along major California rivers and downstream of reservoirs.

Flood Emergency Preparedness & Operations 2 8 5 7 9

In an effort to bolster flood emergency preparedness and response at the local level, the program has been promoting local flood preparedness and response planning in both the Delta and in communities statewide. This program strengthens the capacity of both DWR and local flood emergency response through coordination, planning, training programs, warning systems, and placement of flood fight materials, among other activities.

Accomplishments

Hydro-Climate Data Collection and Precipitation Runoff Forecasting

– The *Central Valley Hydrology Study* won the Floodplain Management Association's Award for Excellence in September 2014. Through collaboration with the U.S. Army Corps of Engineers, the study developed flow-frequency curves at over 200 locations throughout the SPFC, standardized hydrologic procedures, fostered support and information-sharing among organizations, and provided outreach about how to put the data and procedures to immediate use.

– **Bulletin 120: Water Conditions in California:** This annual report that forecasts and reports on the state's water conditions had added importance because of the drought, and it helped DWR increase communications with partner agencies to confirm data and avoid surprises, resulting in improved relationships with these agencies.

Cache Creek Settling Basin weir releasing flood flows into the Yolo Bypass, December 2014. (Photo: DWR)



- Completed the 2014 *Snow Survey Manual*, which describes the need for snow surveys, best practices for equipment use and data gathering, and information about keeping safe while conducting a survey.
- DWR made progress toward expanding the Atmospheric River/ Extreme Precipitation Network. Began installation of the second of four atmospheric river observatories at Pt. Sur. The last of 100 new sensors have also been installed throughout the state as part of a five-year project among DWR, the National Oceanic and Atmospheric Administration, and Scripps Institution of Oceanography.

Real-Time Conditions Status & Warning

- Digitized 21,000 Central Valley Flood Protection Board records and permits into a searchable database.
- Completed an inventory cataloging location and condition of SPFC levee penetration sites associated with utility crossings. Crossings were categorized into urgent and non-urgent maintenance priorities. Information was added to the online local maintaining agency database application.
- Enhancements to the above database application allow local maintaining agencies to update information for their areas of responsibility – e.g., utility crossing condition, status of issues identified during inspections. The application provides the most current information available for federal, State, and local entities.

River Forecasting and Reservoir Operations

- Provided hydrologic and water supply information throughout the year to the State's drought management team and responded to requests for this information from partner agencies. This effort is instrumental in providing drought response officials with an up-to-date water supply overview.

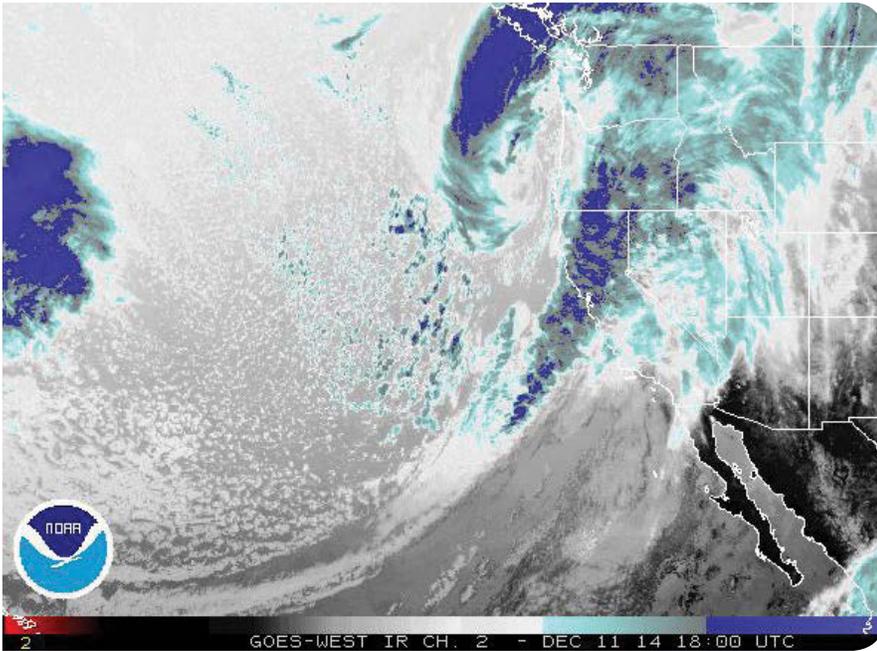


- Developed hydrologic data and tools through the *Central Valley Hydrology Study* and provided these tools to several flood management programs – e.g., Basin-Wide Feasibility Study program. These data and tools will inform a variety of flood management and flood planning efforts, both statewide and locally – e.g., funding, projects.
- Enhanced the Yuba-Feather Decision Support System with improved technical equipment and conducted a large flood event table-top exercise with San Joaquin River reservoir operators. This exercise was particularly important because the smaller-capacity San Joaquin River can become quickly overwhelmed by flood flows.

Flood Emergency Preparedness, Response & Operations

- Began Phase II of the U.S. Army Corps of Engineers-DWR Joint Delta Risk Reduction Project that will enhance DWR's and the U.S. Army Corps of Engineers' ability to rapidly respond to levee emergencies and more effectively integrate federal resources in support of the State's emergency response to local levee maintaining agencies.

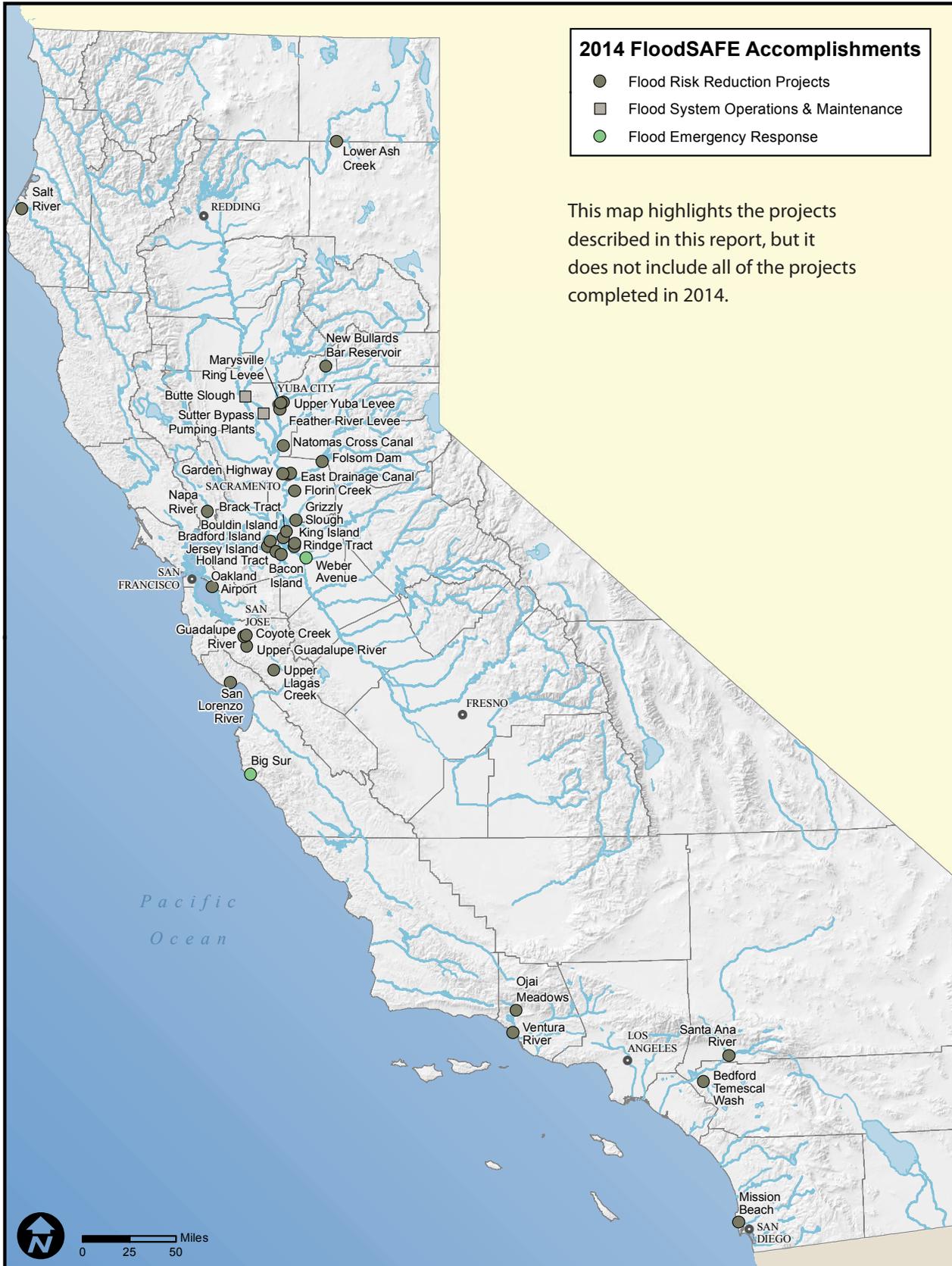
Residential street and vehicles buried in a mudslide in Camarillo Springs. The mudslide was caused by heavy rains, December 2014.
(Photo: Bill Nash, County of Ventura)



Infrared image of atmospheric river that brought urgently needed rain but also flooding to much of California, December 2014. (Image: NOAA)

- **Delta Flood ER Grants:** Awarded \$5 million in grants and initiated contracts for six additional projects that will benefit over 125 reclamation districts, cities, and communities and ensure all reclamation districts in the Delta have robust flood emergency response plans that are incorporated into county Hazard Mitigation Plans.
- Conducted Twitchell Island flood fight functional exercise during California Flood Preparedness Week. This annual exercise provides the opportunity to train emergency responders and practice interagency integration and communications with partner agencies in a simulated emergency, so teams are prepared when flood emergencies occur.
- Completed pre-season flood coordination meetings to prepare for the upcoming wet season, clarify roles and responsibilities, and review existing flood emergency procedures and available resources and capabilities. The meetings were held in strategic locations throughout the state, allowing multiple counties, cities, and other local agencies to engage each other and facilitate discussions on flood emergency management issues unique to each region.
- Conducted flood fight training classes statewide for approximately 800 attendees. Provided internal training to meet basic Standardized Emergency Management System/National Incident Management System requirements for approximately 375 DWR staff.
- Functioned as the DWR Drought Management Operations Center for the initial activation in response to the Governor's Drought Proclamation.
- DWR executed a 30-year lease with the Central Valley Flood Protection Board to obtain Sacramento-San Joaquin Drainage District property in Rio Vista, which will serve as a flood fight material stockpile site to expedite flood emergency response efforts in the Delta. DWR also completed purchase of the Stockton Weber Road complex that will help expedite transportation of flood fight materials in the event of an emergency.
- Released draft DWR *Delta Flood Emergency Management Plan* for partner agency comment. The Plan provides a concept of operations and management objectives for DWR when flooding occurs in the Delta.
- **Statewide Flood ER Grants:** Executed 14 funding agreements benefitting 80 agencies statewide and totaling \$5 million. The purpose of the grants is to enable local agencies to update their flood emergency response plans in compliance with legislative requirements and increase coordination with other regional agencies to improve flood emergency response.

2014 Flood Management Projects



2014 FloodSAFE Accomplishments

- Flood Risk Reduction Projects
- Flood System Operations & Maintenance
- Flood Emergency Response

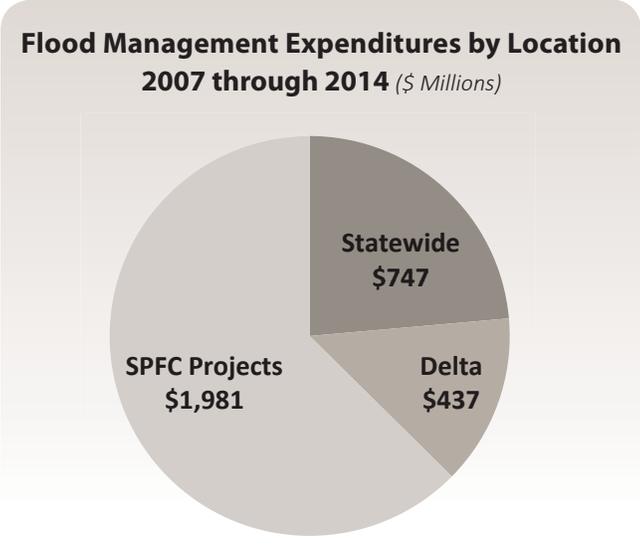
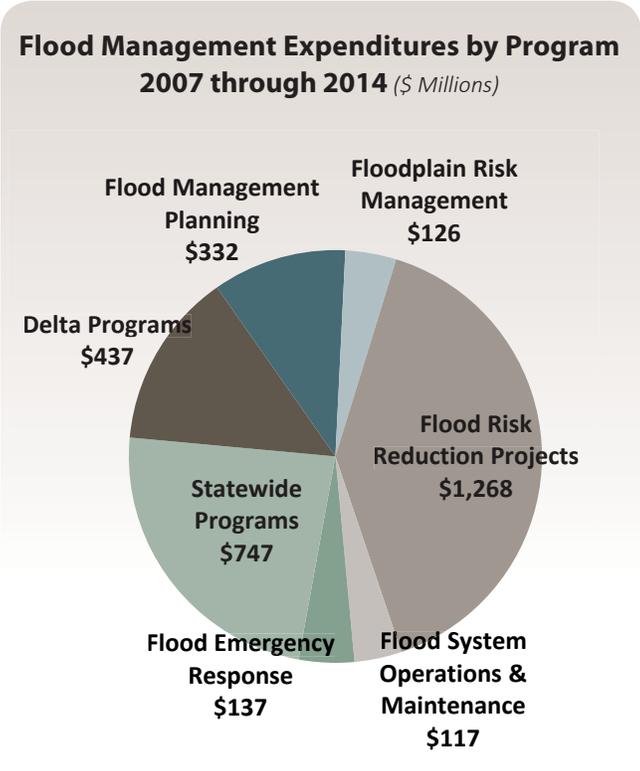
This map highlights the projects described in this report, but it does not include all of the projects completed in 2014.

Investing in Flood Management

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, has been instrumental in initiating major programs to reduce flood risk in our communities. In 2012, DWR prepared and the Central Valley Flood Protection Board adopted the *Central Valley Flood Protection Plan (CVFPP)*. The Plan provided investment guidance to ensure sound strategies and prioritization in selection of the projects for implementation. Since 2012, investment in flood management has been based on:

- **Planned-based investments.** Investments in flood risk reductions have been guided by the 2012 CVFPP for areas protected by SPFC facilities. The 2012 CVFPP presented a 25-year investment plan and a short-term investment plan through 2017 for State-owned SPFC facilities. Investments in non-SPFC facilities are guided by the 2013 *California's Flood Future* report, a comprehensive statewide flood management plan.
- **Funding programs and project funding prioritization.** Investments in flood management are made through a combination of reimbursements, directed funding and competitive grant programs. These programs are designed to maximize the flood risk reduction benefits of the investment. One objective of these funding programs is to select projects for implementation that help improve long-term flood management, including making the SPFC more resilient in the face of stressors, such as the potential for larger storms and flood flows due to climate change.
- **Implementing multi-benefit projects.** These funding programs are intended to increase overall benefits of the investment. As such, most of the funding programs encourage formulation and implementation of multi-benefit projects by increasing State cost-sharing for projects that integrate ecosystem, water supply, recreation enhancements, and other benefits with flood risk reduction benefits. The 2012 CVFPP investment priorities for flood management promote implementation of multi-benefit

programs and projects that improve public safety, foster environmental stewardship, and support economic stability in ways that are consistent with the Integrated Water Management principles outlined in the *California Water Plan Update 2013* and referenced in the Governor's 2014 *California Water Action Plan*.



Flood Management Expenditures by Program
 2007 through 2014 and Planned 2015 through 2017 (\$ Millions)

Flood Management Program	Expenditures			2012 CVFPP Planned Investments, 2007-2017
	Expenditures 2007-14	Planned Investment 2015-17	Total Investment 2007-17**	
Flood Management Planning and Engineering	\$332.3	\$34	\$366.3	\$427
Floodplain Risk Management	\$125.9	\$20	\$145.9	\$129
Flood Risk Reduction Projects				
<i>System Improvements</i>	\$266.7	\$300	\$566.7	\$845
<i>Urban Improvements</i>	\$878.7	\$320	\$1,198.7	\$1,095
<i>Non-Urban Improvements</i>	\$122.5	\$118	\$240.5	\$237
Flood System Operations and Maintenance	\$117.4	\$14	\$131.4	\$210
Flood Emergency Response Program	\$137	\$43	\$180	\$194
TOTAL SPFC Facilities	\$1,980.5	\$849	\$2,829.5	\$3,137
Statewide*	\$747.4	\$215	\$962.4	
Delta	\$436.5	\$72	\$508.5	
Grand Total	\$3,164.4	\$1,136	\$4,300.4	

* Statewide Programs include Statewide Bond Costs, Statewide Integrated Flood Management Planning, Flood Control Subventions, Flood Corridor, Local Levee Assistance, and Urban Streams Restoration. Delta Programs include Delta Levees System Integrity.

** This column reflects available funding and indicates a \$300 million shortfall between available funding and 2012 CVFPP Planned Investments, 2007-2017.

Bond Accountability

DWR utilizes a series of measures to ensure that bond funds are allocated according to requirements of the bond laws, funded projects provide the most value for the State's investment, and bond fund expenditures are thoroughly documented and transparent. The following items summarize DWR's bond accountability program:

- Some DWR Bond accountability measures are required by legislation and/or bond laws, including, but not limited to: State Controller audits of bond-funded projects, posting of grant guidelines and cost-sharing formulas online for public review and comment, and an independent audit of Proposition 1E expenditures by the Secretary of the Resources Agency.
- 2007 Executive Order (S-02-07) provided a three-part accountability structure to ensure full accountability of the State's investment. DWR has taken steps to ensure compliance with front-end accountability, in-progress accountability, and follow-up accountability as required by Executive Order S-02-07.

- DWR established a Financial Advisory Internal Review (FAIR) Committee to develop guiding protocols when establishing grant or loan programs. These guidelines provide a framework for DWR programs to follow to ensure that the grant or loan process is fair and transparent.
- Investment in federal flood management projects in the State are guided by the U.S. Army Corps of Engineers "Principles and Guidelines." The U.S. Army Corps of Engineers has oversight and permitting responsibilities over these projects.
- Bond expenditures for projects along the Sacramento and San Joaquin rivers and their tributaries require review by, and approval from, the Central Valley Flood Protection Board.
- Over the years, DWR has established funding processes with specific sets of best management practices that considerably improve accountability and transparency, as well as allow for investment in projects providing the most return for the State's investment.

Moving Forward

In January 2014, Governor Brown issued the *California Water Action Plan (Action Plan)* highlighting the need for a broad and integrated solution for the complex water management issues of the State. The *Action Plan* is a road map for the first five years of the State's journey toward sustainable flood and water management in California. It promotes integrated multi-benefit programs throughout the state. Today, aging flood management infrastructure, climate change and sea level rise, and growth in the floodplains create some of the pressures on the State-owned flood management system in the Central Valley and the locally managed flood systems around the State.

Consistent with the *Action Plan*, the next phase of flood system improvement implementation will emphasize investment in:

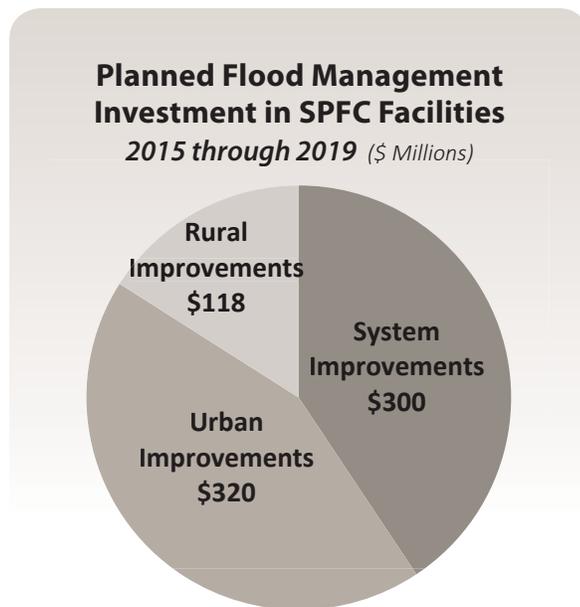
- Expansion of the flood management system to ensure system resiliency, enabling the system to carry larger floods and manage larger runoff resulting from climate change.
- Continued implementation of integrated programs that are multi-benefit and incorporate important fish and wildlife habitat and ecosystem improvements.

- Reduction of flood risk in areas with the highest flood risk and associated losses in urban and rural agricultural communities.

An important element of the flood management system in the Central Valley is the bypass system. Future investment will also focus on expanding bypasses from downstream to upstream to ensure flood stages are reduced throughout the system, reducing pressure on levees and urban areas adjacent to the rivers. Implementing the Yolo Bypass improvements is an example of this type of investment.

Implementation of Yolo Bypass Improvements

In 2014, DWR initiated the Yolo Bypass Implementation Program. DWR is planning to implement a unique multi-agency and multi-benefit program to enhance the flood carrying capacities of the Yolo Bypass and the lower Sacramento River, provide for fish passage, habitat, water supply, and recreational enhancements. Proposed actions in the Yolo Bypass can substantially improve the flood conveyance capacity of the system in the lower Sacramento River, providing additional flood protection for communities in the Sacramento metropolitan area and enhancing agricultural sustainability, environmental quality, water supply reliability, and economic health. In order to successfully implement the actions that advance these goals, it will be important to gain and retain the support of many involved agencies' stakeholders by demonstrating concurrent benefits across resource categories. Over time, phasing implementation actions to achieve cost-effectiveness, and to account for the cumulative impacts and benefits of the various actions. Actions to achieve these goals will be executed over many years and sustainable financing for the program is essential for its success. Much work has been done on the ground and much more still remains.



The following are a few examples of key near-term flood management actions and their outcomes, most of which will be funded by Proposition 1E.

Flood Management Planning

- In 2017, update the *CVFPP*—a strategic plan assessing the financial need and value associated with continuing to improve State-owned SPFC facilities.
- Build capacity and broader alignment with local, State, and federal flood management agencies to increase funding for construction of flood risk reduction projects through the statewide flood management plan update.

Floodplain Risk Management

- Increase the ability of individuals to take steps to protect their families and property from flooding through flood awareness outreach programs, such as the annual flood risk awareness campaign.
- In coordination with FEMA, identify and elevate or purchase properties subjected to repetitive losses associated with flooding.

Flood Risk Reduction Projects

System Improvements

- Complete feasibility study, prepare environmental documentation, purchase land, design levee and structural improvements, and obtain permits for the Yolo and Sacramento bypasses' improvements to accommodate increased flood system resiliency for managing large flows associated with climate change while providing ecosystem enhancements in the Yolo Bypass.
- Assist in completing the Folsom Dam JFP.

Urban Improvements

- Provide State cost-shares to Central Valley urban communities working to meet Senate Bill 5's 200-year level of flood protection requirement.

Non-Urban Improvements

- Prioritize repairs at more than 140 SPFC facilities and repair sites that are not meeting existing performance standards.
- Work with county governments to design and construct facilities to provide 100-year level of flood protection for small communities protected by SPFC facilities.
- Identify and design levee improvements to accommodate increased flows associated with the San Joaquin River Restoration Program and climate change.

Flood System Operations and Maintenance

- Complete hydraulic and geotechnical evaluations of the performance of SPFC facilities to guide non-routine maintenance actions.
- Initiate invasive plant species eradication in coordination with local and State agencies and stakeholders to enhance natural riparian habitat.
- Identify and address physical encroachments that compromise the structural integrity of SPFC levees in coordination with the Central Valley Flood Protection Board and U.S. Army Corps of Engineers.
- Design sediment removal programs that can reduce the amount of mercury (a legacy from abandoned Coast Range mines) entering the Yolo Bypass through Cache Creek to improve floodplain and wetland habitat quality.

Flood Emergency Response Program

- Improve flood forecast accuracy and reduce the lag-time associated with high-water notifications in coordination with the National Weather Service and local emergency response agencies.
- Assist local agencies with developing and refining their emergency plans through State financial assistance grants and emergency exercises.
- Complete facilities in the Delta for stockpiling material and housing personnel during large-scale flood emergencies to protect State and Delta regional assets.

2014 Flood Management

January

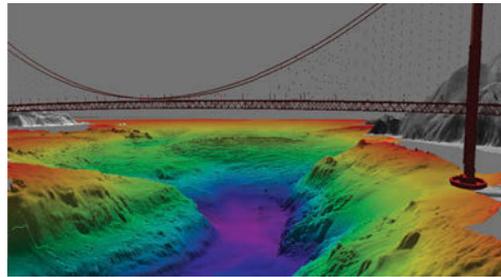
Joint Delta Risk Reduction Project

Phase II of this joint DWR-U.S. Army Corps of Engineers project began integrating federal resources with DWR operations in response to flood emergencies in the Delta. Both DWR's ability to rapidly respond to levee emergencies and streamlined federal assistance to local levee maintaining agencies will be enhanced.

March

Coastal Data Merge Project

DWR and the Ocean Protection Council oversaw the creation of the only existing, high-resolution imagery of California's coastal shoreline and off shore seafloor. Application of this data can facilitate production of consistent datasets among federal, State, and local agencies.



May

Ojai Meadows Project Completed

The Ojai Meadows Preserve project in Ventura County that included installing a culvert and restoration of 57 acres was completed. The project also addresses flooding of Maricopa Highway (SR 33).

February

Levee Rehabilitation

Construction of a total of 7.56 miles of sustainable Hazard Mitigation Plan levee rehabilitation was completed at Boudin Island, Jersey Island, and **Rindge Tract** in the Delta, bolstering the levees' resiliency.

April

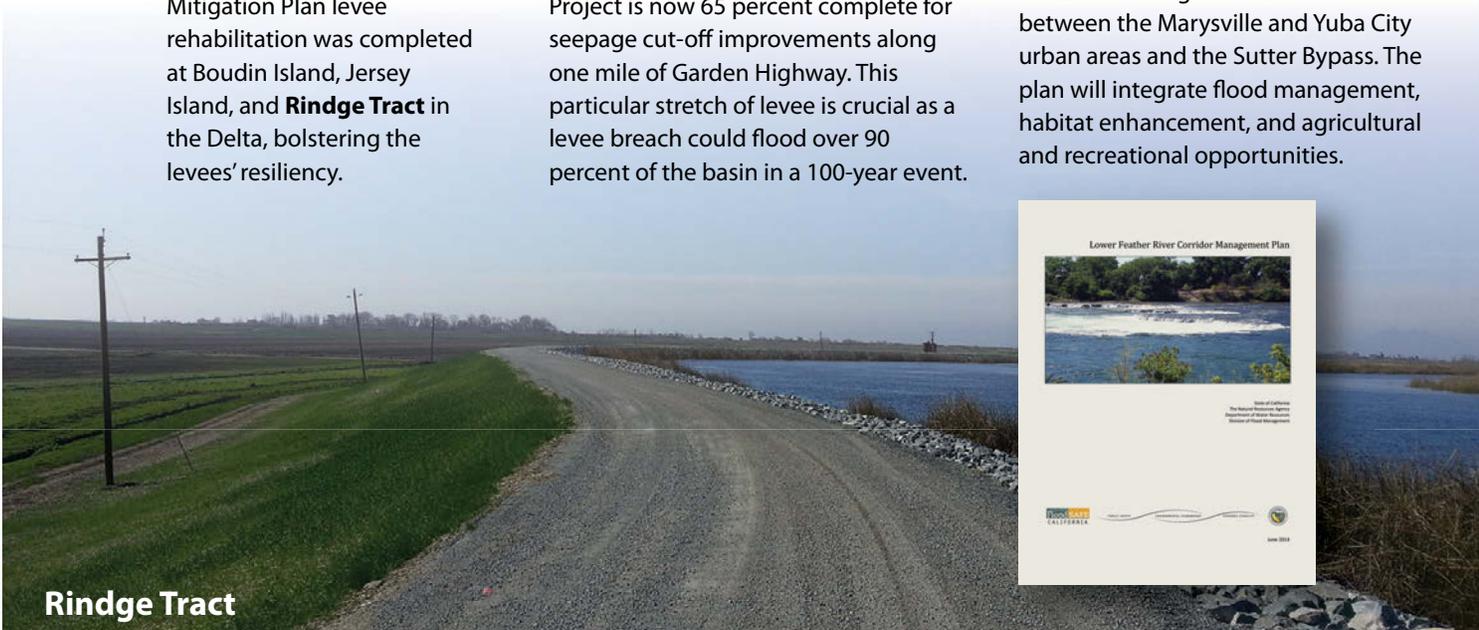
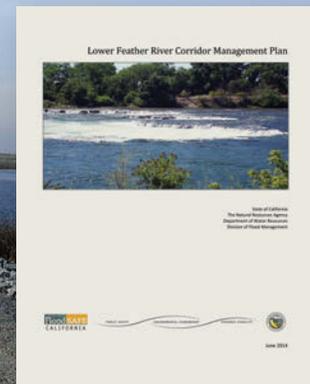
Natomas Basin Project

Design for this component of the American River Common Features Project is now 65 percent complete for seepage cut-off improvements along one mile of Garden Highway. This particular stretch of levee is crucial as a levee breach could flood over 90 percent of the basin in a 100-year event.

June

Lower Feather River Corridor Management Plan

DWR finalized a plan and associated hydraulic modeling that establishes a long-term management framework for the 20-mile long Feather River corridor between the Marysville and Yuba City urban areas and the Sutter Bypass. The plan will integrate flood management, habitat enhancement, and agricultural and recreational opportunities.



Rindge Tract

Year in Review

July

Folsom Dam Modification (JFP) Project

The control structure and secant pile cutoff wall were completed, and work to stabilize the right bank of the American River is now 35 percent complete.

September

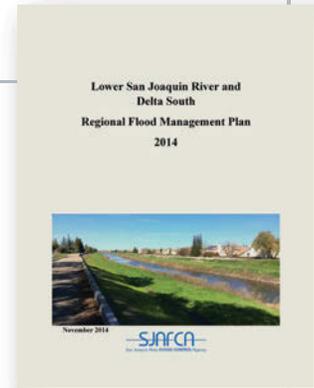
Central Valley Hydrology Study Recognition

The *Central Valley Hydrology Study* won the Floodplain Management Association's Award for Excellence and was recognized as a model for flood risk assessment and reduction studies. Among other things, the study developed flow-frequency curves at over 200 locations throughout the SPFC. These locations were selected for in-stream flow analysis because they represent locations that are crucial for operational understanding of the SPFC.

November

First of Six Regional Flood Management Plans Received

DWR received the first of six Regional Flood Management Plans in November 2014, specifically from the Lower San Joaquin River-Delta South RFMP working group. DWR funded the development of six plans from across the Sacramento-San Joaquin Valley, which prioritize the regions' project priorities and discuss funding.



August

Delta Island Improvement

Completed construction of 4,000 linear feet of levee strengthening on Bradford Island to support a saltwater intrusion barrier along the Old False River, providing flood protection and water supply benefits as the island is among eight key western islands protecting the state's water supply.

October

Salt River Ecosystem Restoration Project

Re-established functional river channel and restored habitat for 1.14 miles of the project, which was named one of the "Ten Waters to Watch" for 2014 by National Fish Habitat Partnership. Work included channel re-grading and constructing habitat for spawning salmon. DWR is funding two miles of this seven-mile project.

December

Sensor Network Extreme Precipitation Network

As a part of a five-year project with NOAA and Scripps Institution of Oceanography, DWR helped initiate installment of the second of four observing sites along California's coast. The last of 100 new sensors that provide unique information on atmospheric rivers was also installed.



Folsom Dam Modification

Edmund G. Brown Jr.

Governor
State of California

John Laird

Secretary
California Natural Resources Agency

Mark Cowin

Director
California Department of Water Resources



Keith E. Swanson, Chief
Division of Flood Management

Department of Water Resources
Division of Flood Management
3310 El Camino Ave., Rm. 120
Sacramento, CA 95821

<http://www.water.ca.gov/floodsafe/>
For more information,
contact floodsafe@water.ca.gov.

Updated May 28, 2015