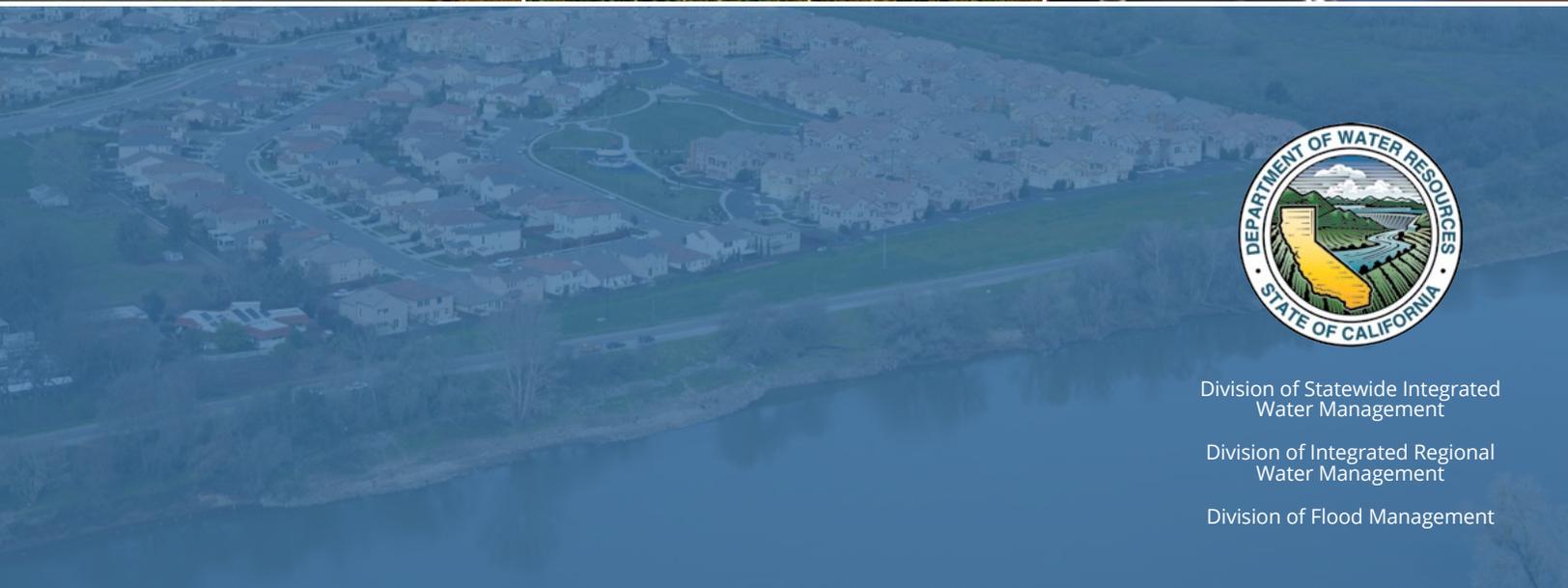




2013 ANNUAL REPORT

Integrated Water Management



Division of Statewide Integrated Water Management

Division of Integrated Regional Water Management

Division of Flood Management

California Department of Water Resources Mission Statement

“To manage the water resources of California in cooperation with other agencies, to benefit the State’s people, and to protect, restore, and enhance the natural and human environments.”



Fish Restoration Program



Director’s Message

Thank you for taking the time to review this annual report. It highlights the significant accomplishments made in 2013 by DWR’s integrated water management programs.

In 2013, we worked diligently to advance the practice of integrated water management. This holistic approach to managing water and related resources seeks to concurrently achieve the goals of improving public safety, fostering environmental stewardship, and supporting economic stability.

In April, DWR co-hosted the first Integrated Water Management Summit in the State to bring together over 200 State and national water leaders. We exchanged ideas and reaffirmed our common vision of reliable and resilient water resources systems for future generations.

In May, the Governor called for a statewide water action plan. The draft five-year Water Action Plan was released in the fall and finalized in early 2014. The Governor’s proposed 2014 budget and recent drought legislation reflect the Action Plan’s priorities. The Water Action Plan speaks of the need for integrated water management in terms of the three foundational social, environmental, and economic goals. This underscores the importance of the work we’re doing.

Throughout 2013, we continued to collect, assess, and report essential data used by water managers and academia to inform smart decisions about water resources management. We continued to enhance the tools we use to share the data, such as the popular California Data Exchange Center and the California Statewide Groundwater Elevation Monitoring Program. Now, in the midst of 2014, DWR is putting the finishing touches on a comprehensive update of the California Water Plan. For nearly 60 years, this evolving document has served as the most relevant and thorough guide for those seeking to learn about California’s water and tap into our vast repository of data and tools. This latest update stresses the need for integrated water management, alignment of government agencies, and investment in innovation.

I am pleased to see the number of integrated water management projects completed or advanced in 2013, as highlighted in this report. In addition to DWR’s projects, a great deal of progress has been made in the regions, through the dedication of 48 regional water management groups, thanks in part to State funding. Our investments are paying off.

Looking forward in 2014, we face many challenges, chief among them is a drought state of emergency. Ensuring that all Californians have safe drinking water while minimizing impacts to our agricultural economy and valuable ecosystems is no simple balancing act. But our current situation also presents a huge opportunity, as public awareness of our water crisis grows daily. There is now keen interest in a resource that Californians, in years of abundant precipitation, may take for granted.

Public engagement, we hope, will help us marshal the necessary resources to make the investment, achieve the alignment, and spark the innovation necessary to advance the integrated water management approach and ensure reliable and resilient water resources for generations to come.

A handwritten signature in black ink that reads "Mark W. Cowin". The signature is fluid and cursive, with a prominent "M" and "C".

Mark W. Cowin

Director, Department of Water Resources

Achieving Results Through Integrated Water Management

Managing California's water today requires us to take a different approach than in the past. Conditions facing our State are increasingly complex and variable given our aging infrastructure and dynamic physical and environmental conditions threatened by natural disasters and climate change. Our society is evolving, values are changing, and today there are diverse stakeholders' perspectives to understand and consider. The laws enacted over the last half century to protect people and the environment now stretch our limited dollars.

In these challenging times, we must work together to find integrated, multi-benefit, fiscally responsible solutions that work across jurisdictional boundaries at the appropriate geographic scale. "Integrated water management" (or integrated water resource management) is a comprehensive and collaborative approach to managing water to concurrently achieve social, environmental, and economic objectives. At DWR, we focus these objectives toward improving public safety, fostering environmental stewardship, and supporting economic stability.

"Integrated water management is an approach to developing and managing water and related resources that balances the objectives of improving public safety, fostering environmental stewardship, and supporting economic stability."

– The Governor's California Water Action Plan, January 2014



A multi-purpose project can provide integrated benefits; for example, constructing bypasses that carry floodwaters, support habitat for migratory waterfowl, and provide fertile land for agricultural commodities. Single-purpose projects (e.g., construction of a new drinking water well) can be combined in a watershed setting with other projects that collectively provide integrated benefits.

Practicing integrated water management is now second nature to nearly 50 regional water management groups in the State. Thanks in part to a decade of State and federal grants, regional groups have formed collaborative partnerships, developed comprehensive plans, and leveraged their own resources to begin innovative projects. Project benefits include water supply reliability, water use efficiency, flood protection, and others.

About This Report

This annual report presents 2013 accomplishments made by DWR's integrated water management programs. For simplicity, services are discussed in three broad categories:

Tools/Data collection and assessment: Each year, DWR scientists and engineers collect and compile data all over the State. We share the data with the public and analyze and assess it using state-of-the-art models and other tools to make informed decisions about managing water and related resources throughout the State.

Planning studies and investigations: Using data collected by DWR and others, we perform water resources studies and create integrated plans that drive State projects and decision making, and are used by government agencies, water and flood districts, academic institutions, private businesses, and others to identify and inform actions for developing and managing water and related resources.

Project implementation: Informed by data and guided by plans, we conduct projects and provide funding to allow local groups to take actions based on integrated water management principles.

Applying Tools to Inform Planning and Decision Making

In 2013, DWR scientists and engineers continued to collect and compile data from all over the State, ranging from snow surveys to reservoir and river levels, groundwater elevations, atmospheric and soil moisture data. We continued to enhance the tools we built to share all this data, such as the California Data Exchange Center, the Water Planning Information Exchange, California Irrigation Management Information System, and California Statewide Groundwater Elevation Monitoring Program. Government agencies, universities, environmental advocates, farmers, regional watershed managers, and others access and rely on our data to inform smart decisions about managing water resources; i.e., operating reservoirs, irrigating farm land, and supplying drinking water. Most importantly, the data is used to forecast and prepare for storms, floods, and droughts that can threaten lives, the environment, and our economy.

Supporting San Joaquin River Restoration

The San Joaquin River Restoration Program (SJRRP) was established to implement a court settlement to restore flows and fish to the San Joaquin River below Friant Dam. As part of the settlement, the U.S. Bureau of Reclamation is releasing additional flows to create a continuous migration path for fish from Friant Dam to the Sacramento-San Joaquin River Delta. These flows are necessary to support recent efforts to reintroduce Chinook salmon in the river; however, the river system has a history of flood performance problems, and these releases could cause levee stability issues. Historically, the city of Firebaugh has been threatened by floods and in 1997 several levee failures in the area flooded thousands of acres of agricultural land.

DWR is advising the SJRRP on flood management issues and has collected topographic data using remote sensing equipment, developed hydraulic models, and performed targeted geotechnical evaluations to determine the maximum restoration



DWR's levee and channel capacity evaluations will help restore environmental flows without increasing flood risk.

flows that can be released without significantly increasing flood risk.

Collecting geotechnical data and performing evaluations along the entire river is the next step by DWR. We will recommend refined channel capacities and levee remediation measures that may be necessary to release full restoration flows as required in the settlement. DWR's efforts will lead to a more robust restoration program, adding value to ecosystem enhancements and ensuring a more stable and resilient river system that provides multiple benefits.

Enhancing Water Use Efficiency

DWR continued to work with researchers at U.C. Davis in 2013 to enhance the California Irrigation Management Information System (CIMIS). Using CIMIS, our scientists collect data from a network of 145 weather stations in the State and provide information to farmers and other large-scale irrigators to allow them to manage scarce water resources more efficiently. The importance of this work has never been so critical given California's unprecedented drought and dramatic declines in groundwater basins, particularly those that many agricultural users draw from in the Central Valley.

In 2013, as a result of several years of research and analysis, we made an important discovery. We found that using combinations of data derived from satellites and interpolated between statewide CIMIS stations measurements can significantly improve our understanding of evapotranspiration rates throughout the State. The more precise evaporation data is key in assisting agricultural users to adjust irrigation

systems throughout the year. This in turn leads to savings of water, money, and energy; as well as mitigation of the effects of drought and climate change.

Other CIMIS data uses include: assessing the potential for renewable energy sources, modeling air quality, protecting the environment, and weather forecasting.

Highlight: California Statewide Groundwater Elevation Monitoring (CASGEM)



In response to 2009 legislation, DWR established a program of regular and systematic monitoring of groundwater elevations to track seasonal and long-term trends in groundwater elevations statewide. This program relies and builds upon the many established long-term groundwater

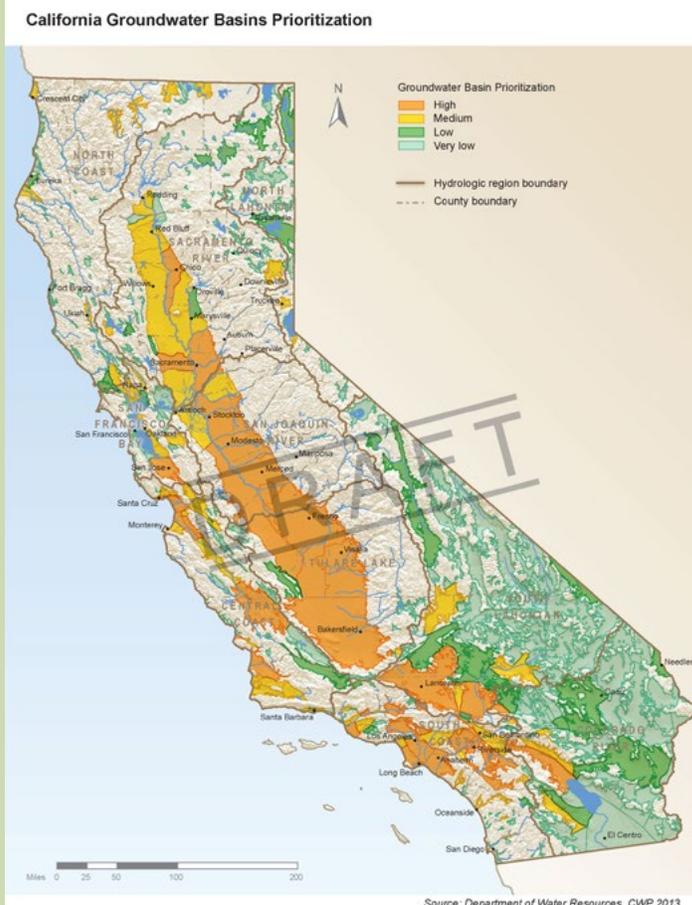
monitoring and management programs conducted by local entities throughout the State. DWR's role is to coordinate the CASGEM program, work cooperatively with local entities, and maintain the submitted groundwater elevation data in a manner that is readily and widely available to the public.

In 2013, DWR developed a draft basin prioritization structure for ranking all of California's 515 groundwater basins. This prioritization will be used to focus resources on the highest priority basins due to limited funding. The groundwater basins were prioritized by a systematic ranking process that accounted for a number of factors including: population, projected growth, agricultural demand, and overall groundwater reliance, and were categorized as high, medium, low, and very low priority. Findings indicate that the high and medium priority basins comprise 92% of California's annual groundwater pumping and 89% of the population overlying the groundwater basin areas. The map depicts the prioritization geographically. The basin prioritization structure is scheduled to be finalized in late spring 2014.

The CASGEM program provides public access to groundwater data from over 2,500 wells in the State. Implementation of the CASGEM program has provided a strong foundation for improving collection and public dissemination of groundwater data throughout the State and is compatible with recommendations in the California Water Plan and the Governor's California Water Action Plan. Its value is in providing critical information to water managers dependent upon California's groundwater resources.



Data collected from 145 CIMIS weather stations, in combination with satellite data, helps farmers and other irrigators use water more efficiently.



The basin prioritization structure, depicted here, will be used to focus resources on the highest priority basins due to limited funding.

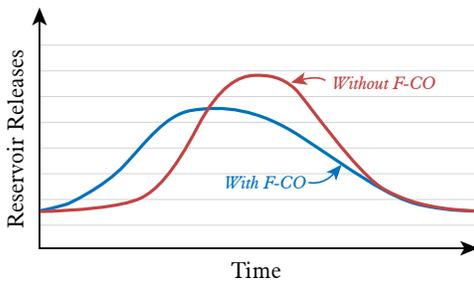
Applying Tools to Inform Planning and Decision Making

Forecast-Coordinated Operations to Optimize Reservoir Operations During Major Flood Events

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 of reservoirs. The program has expanded the F-CO to reservoirs with flood control space on the San Joaquin River System.

DWR developed a graphic interface, with input from the F-CO program participants, that allows agencies to run and analyze different reservoir release scenarios during high water events. This is part of a multi-faceted effort to provide value by improving public safety and awareness, and providing for a more robust water management system.

Conceptual Reservoir Operation with Forecast-Coordinated Operations During Major Floods



Using DWR's new web-based dashboard, State, federal, and local water managers can work together to re-operate reservoirs to reduce downstream peak flows during major flood events. This, in turn, reduces the risk of flooding.

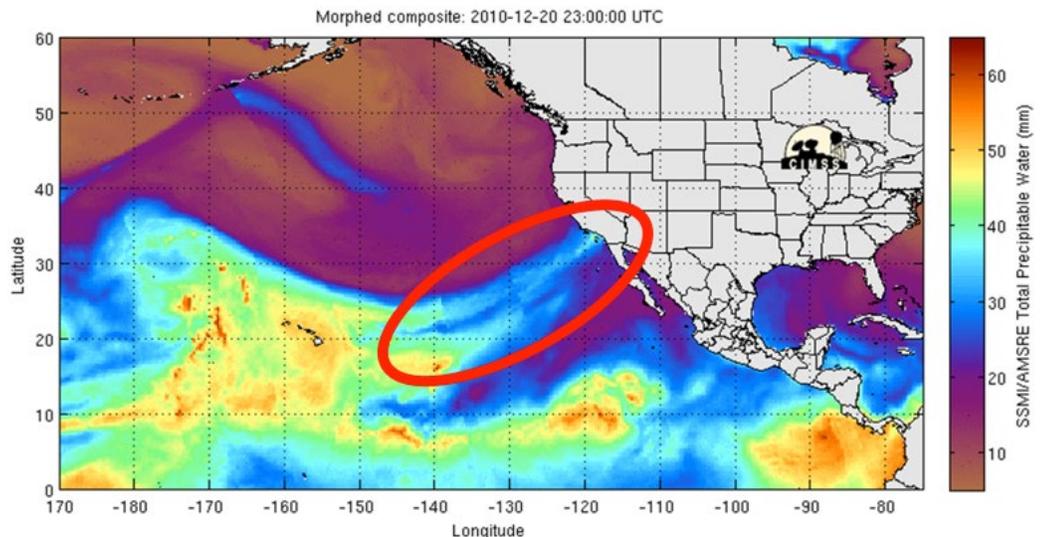
Improving Flood Forecast and Warning Systems

In an effort to bolster California's preeminent 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. Atmospheric rivers are narrow, intense bands of moisture that can lead to heavy precipitation and flooding for the State. One of the key elements of this new observation 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. DWR installed the first of four atmospheric observatories in February and it went online in March. This information is critical in preparing for and managing potential flooding in the State. This system enables the State to inform the public about potentially dangerous and destructive storms, providing value by benefiting public safety and supporting economic stability.

Tracking Atmospheric Rivers

In 2013, DWR worked with NOAA and Scripps Institute to install the first of four atmospheric observatories in Bodega Bay, which went online in March. The three other observatories are planned for Eureka, Point Sur, and Goleta. The observatories are a tool for tracking atmospheric rivers, which are intense bands of moisture that can lead to heavy precipitation and flooding in the State. The 2010 atmospheric river shown here, led to the Governor declaring "states of emergency" in several counties.

(Graphic courtesy of NOAA)



Field Surveys Inform Trinity River Restoration

The Trinity River Restoration Program is a multi-agency program with eight partners charged with restoring and rehabilitating the upper 40 miles of the Trinity River to increase anadromous fish populations, such as Chinook salmon. DWR is one of the partners in this program. Northern Region Office staff, funded through the Environmental License Plate Fund, provides engineering and surveying support to the program and its partners as well as serves on several program technical work groups.

In 2013, Northern Region Office staff performed topographic and bathymetric surveying, seismic field investigations, and developed design alternatives on a remote rehabilitation site (Dutch Creek) near Junction City. Each design alternative was analyzed by creating two-dimensional hydraulic models to determine which alternative would provide the greatest increase in fish rearing habitat. Currently, engineering design plans are being developed and construction is scheduled for the summer of 2015.



Pre-project field data collected by DWR and California Department of Fish and Wildlife scientists will be used to assess performance after project completion.

The New California Water Sustainability Indicators Framework Receives National Recognition

Sustainability is a broad concept including social, economic, environmental, and management processes and activities and holding a promise for future generations. Indicators can be used to measure progress toward sustainability goals and to measure conditions of particular parts of natural, social, economic, and management systems. Working in collaboration with U.C. Davis and the U.S. Environmental Protection Agency (EPA), DWR created the Water Sustainability Decision-Support Tool and Sustainability Indicators Catalog to support the California Water Plan Update 2013, as well as future Water Plans and other State plans. See <http://indicators.ucdavis.edu/>.

The web-based Sustainability Indicator Framework provides a model for assessing sustainability using a science-based approach and communicating these findings in a way that can be understood by agency managers, the public, and decision makers. The framework provides a scientifically defensible approach for aggregating and assessing combinations of environmental, economic, and social indicators. The geographical scope of the indicator framework varies and is based upon the watershed area being evaluated. The framework acknowledges that humans and their activities are integral parts of watersheds and their ecosystems.

The California Water Sustainability Indicators Framework was nominated by the U.S. EPA for a national award in 2013.

Other Key Accomplishments

Data

- **Central Valley Floodplain Delineation:** Processed new data to help water managers and the public better understand Central Valley flood risk
- **Urban Level of Flood Protection Criteria:** As required by Senate Bill 5 (2006), published criteria needed by urban land use managers to make decisions related to 200-year flood protection in concert with smart growth and climate change adaptation strategies

Assessments

- **2013 Rector Reservoir Water Yield Study:** Completed a reservoir yield study to determine the availability of surplus water
- **2050 Future Scenarios:** Developed forward-looking water use scenarios based on projected population growth and land use data for publication in California Water Plan Update 2013 to inform decisions about improving future water supply reliability
- **Basin-wide Feasibility Studies:** Launched studies to identify and prioritize needed improvements to the State-owned flood management infrastructure in the Sacramento and San Joaquin valleys.

Creating Innovative Plans to Drive Action

In 2013, DWR worked on planning studies and investigations that provide broad statewide and regional benefits. In the fall we hosted a plenary and released the public review draft of the California Water Plan Update 2013, which for 60 years has served as the most comprehensive resource for water managers in the State looking to tap into a vast repository of data related to California's water resources. In 2013, DWR teamed with the U.S. Army Corps of Engineers to publish the California's Flood Future report, culminating several years of work to assess flood risk for all 58 counties in the State and recommending actions to reduce that risk. The report is now being referenced by groups such as the Public Policy Institute of California in determining future investments needed to sustain California's water infrastructure and services. In 2013, DWR also continued work with outside experts to complete the initial phase of investigations for creating or expanding surface storage in the State, an important tool in addressing future water reliability needs.

DWR also completed regional planning work in 2013. We hosted two sets of workshops throughout the State to engage hundreds of regional water managers and interested parties in development of the IRWM Strategic Plan to shape the future of IRWM in California. Additionally, we began coordinating with six regional planning groups in the Central Valley protected by the State-owned flood control facilities, to begin implementing flood risk reduction actions described in our 2012 Central Valley Flood Protection Plan.

Plans Influencing Development and Management of Water in California

DWR's integrated water management programs prepare and update several of the most influential water management plans in the State, including the California Water Plan, California's Flood Future, Central Valley Flood Protection Plan, and IRWM Strategic Plan.

Water Plans in California Today

Statewide	
California Water Action Plan: The Governor's Priority Actions for 2014-2018	California Water Plan: Strategic vision, guiding principles, and menu of recommended strategies and actions for California (incorporates 37 "companion plans" by myriad agencies and groups)
California's Flood Future: Recommendations for planning and actions to reduce flood risk throughout California	
Delta/State	
Delta Plan: Rules and recommendations to improve statewide water supply reliability, and protect and restore Delta ecosystem, while protecting and enhancing the Delta's agricultural, cultural, and recreational characteristics	
Bay Delta Conservation Plan (BDCP): Long-term plan to ensure continued water supply reliability and protect Delta ecosystem	
Regional/Area-Specific	
Central Valley Flood Protection Plan (CVFPP): Improve State-owned flood control facilities and provide ecosystem enhancement opportunities	
Integrated Regional Water Management Strategic Plan: Strategies for the future of integrated regional water management in California, affecting 48 regional water management groups (99% of the State's population)	

Five Things Every Californian Needs to Know About Water

- Water is the Essence of Life for California.
- California's Complex Water System is in Crisis.
- A Diverse Portfolio Approach is Required.
- Solutions Require Integration, Alignment, and Investment.
- We All Have a Role to Play in Securing Our Future.



California's Hydrologic Regions

California Water Plan Update 2013

For almost 60 years, the California Water Plan has served as the long-term strategic plan for informing and guiding the sound management and development of water resources in our State. Updated every five years, it remains the single most complete and relevant body of knowledge about statewide water resources and is referenced by policy makers and water managers to inform smart decisions about managing our most precious resource. DWR released the public review draft in 2013 and the final is expected in mid-2014.

The 2013 update of the California Water Plan characterizes water resource conditions in the State today, describes the factors that are driving change, recognizes challenges and impediments to effective solutions, and lays out a comprehensive suite of potential future actions intended to move California toward more sustainable management of water resources and more resilient water management systems.

The document informed development of the Governor's 5-year California Water Action Plan and is an essential resource for implementing the Governor's priority water actions in a manner aligned with the State's long-term, strategic vision for water.

Implementing the 5-year California Water Action Plan

The updated California Water Plan is a resource for implementing the Governor's 5-year California Water Action Plan (January 2014) in a manner that is aligned with the State's long-term, strategic vision for water.



New Information About California's Growing Water Crisis

The 2013 update to the California Water Plan (Plan) presents new information not available before, and the five-year process engaged additional stakeholders, representing land use, water quality, flood, coastal, tribal, and other interests. The Plan process was guided by a 28-member State agency steering committee and nearly 40 other State agency plans. For the first time, the Plan presents data illustrations of significant declines in groundwater basins in the Central Valley and elsewhere in the State. Recognizing the need for tools to measure performance, the 2013 updated Plan includes the Sustainability Indicators Framework, the product of a successful collaboration between DWR, U.C. Davis and the U.S. EPA.

The Plan also includes a first-of-its-kind statewide integrated water management finance framework developed by a diverse Finance Caucus designed to help frame and inform future investment decisions.

California's Flood Future: Recommendations for Reducing Statewide Flood Risk

Over the last 60 years, California has experienced more than 30 major flood events, resulting in more than 300 lives lost, more than 750 injuries, and billions of dollars in disaster claims. Recognizing the critical need to bring statewide attention to this issue, DWR partnered with the U.S. Army Corps of Engineers in 2013 to prepare California's Flood Future: Recommendations for Managing the State's Flood Risk.

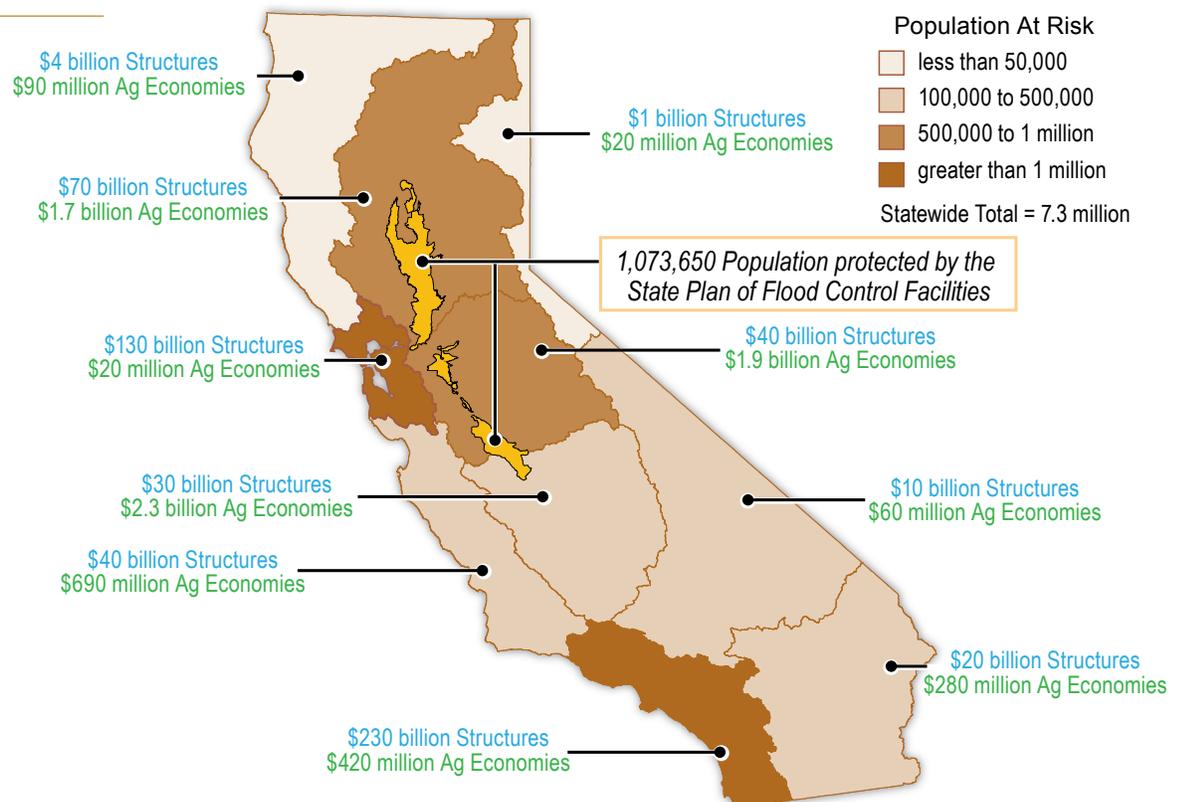
California's Flood Future provides the first look at statewide exposure to flood risk and identifies and addresses the barriers to improved flood management. The report will inform decisions about federal, State, and local policies and financial investments to improve public safety and contribute to a stable economy, while also adding environmental benefits.

"Today, more than 7 million Californians, or one in five, live in the 500-year floodplain, and approximately \$580 billion in assets (crops, structures, and public infrastructure) are exposed to flooding."

- California's Flood Future, November 2013

Key findings:

- California is at catastrophic risk for devastating floods. California's diverse geography contributes to the State's significant flood risk.
- Flooding is a statewide problem. Every one of California's 58 counties has experienced a federally declared flood disaster in the past 20 years.
- The impacts of a major flood would be devastating to California and to the nation. A major flood in California, which has one of the world's largest economies, could have an unprecedented impact on the national economy as well.



To develop California's Flood Future report, DWR gathered information from over 140 local, State, and federal agencies responsible for flood management throughout California. DWR also created public information toolkits, including county-specific flood risk maps, to assist local flood management agencies to share the findings in California's Flood Future report with their communities.

Seven recommendations to reduce flood risk and impacts in the State:

1. Conduct regional flood risk assessments
2. Increase public and policymaker awareness about flood risks
3. Increase support for flood emergency preparedness, response, and recovery programs
4. Encourage land use planning practices that reduce the consequences of flooding
5. Consider regional, systemwide, and statewide perspectives to provide multiple benefits
6. Increase collaboration among public agencies to improve planning, policies, and investments
7. Establish sufficient and stable funding mechanisms.

Investigating Offstream Storage Solutions in Northern California

DWR and the U.S. Bureau of Reclamation, working in cooperation with other federal, State, and local agencies, completed initial studies related to increasing surface storage north of the Sacramento-San Joaquin Delta in Colusa and Glenn counties. This is one of five potential storage sites identified by the CALFED Bay-Delta Program Programmatic Record of Decision (2000).



The proposed Sites Reservoir could deliver up to 350,000 acre-feet of new water supply

Generally referred to as the Sites Reservoir project, the goal of the investigation is to meet future needs of water supply for municipal, agricultural, and industrial uses, as well as the environment. Initial results indicate that Sites Reservoir could provide, on average, a new water supply of up to 350 thousand acre-feet (TAF) during dry years and up to 175 TAF during an average year. It could also release, on average, up to 150 TAF/year of water for ecosystem enhancement, and up to 170 TAF/year to improve water quality. In conjunction with other reservoirs, it could also help improve cold water pool conditions necessary for fish survival. The Sites Reservoir project would generate hydropower and increase the reliability of solar/wind power generation through integrated operation. Finally, the project would provide recreational opportunities and reduce flood risks in the vicinity of the reservoir.

Other Key Accomplishments

- **Flood Risk Mapbooks:** Produced visual displays of flood risks facing each of California's 58 counties, for use by local flood managers
- **Clover Creek Fish Passage Design (Milville Diversion):** Provided engineering support to enable successful salmon migration in Clover Creek
- **Flood System Repair Guidelines:** Provided valuable assistance to flood system managers through guidance development and on-the-ground actions
- **Climate Change:** Contributed key information to the Safeguarding California Plan, released by the Natural Resources Agency in 2013 to update the 2009 Climate Adaptation Strategies
- **Borrego Water Coalition:** Provided facilitation and technical support to the Borrego Springs community to create a working group and develop a Groundwater Basin Management Objectives discussion report
- **Draft Californians Without Safe Water and Sanitation Report (CWP Update 2013):** Prepared with assistance from other State agencies, members of the Tribal Advisory Committee, and public stakeholders, this report includes an assessment of those without safe water or adequate sanitation facilities. Recommendations are provided for ensuring safe water and sanitation for all Californians
- **Tribal AC Legislative Work Group – IRWM Report (CWP Update 2013):** Developed by the Tribal Advisory Committee to describe the issues and concerns about Tribal participation in the State of California's IRWM Grant Program as administered by DWR.

Delivering Integrated Actions to Build Resiliency

In 2013, DWR took various actions, ranging from construction of emergency response facilities in the Delta, to repair of failing levees, and restoration of damaged ecosystems. But perhaps the greatest impact was made through our grants programs. We continued to provide funding to communities across the State so that they could leverage their limited resources to conduct projects to provide drinking water, promote water conservation, protect or restore the environment, reduce flood risks, and provide other benefits. We required grantees to track their progress and impact using locally defined performance measures, and we continued our work to develop sustainability indicators for more widespread use within and outside of DWR in order to demonstrate the benefit and value of our investments.

Improving Flood Safety for Sacramento

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 Joint Federal Project (JFP) was initiated. The new auxiliary spillway project includes an approach channel, control structure, chute, and a stilling basin at the bottom of the chute.

In 2013, the spillway project made significant progress with over 51,000 cubic yards of concrete poured for the control structure, which is approximately 70 percent complete. Installing the gates for the control structure is expected to start in early 2014. The scheduled completion for the auxiliary spillway is 2017.

The JFP is part of the American River Watershed Project (ARWP) that includes strengthening levees at strategic locations along the American and Sacramento rivers. The completion of the JFP project will help the Greater Sacramento urban area—which includes approximately 400,000 people and in excess of 110,000 buildings valued at \$58 billion dollars—to achieve the goal of a 200-year level of flood protection. Future elements of the ARWP project include raising the dam 3.5 feet, which will provide additional safety resiliency and freeboard.



In 2013, DWR worked with federal, State, and local partners to make significant progress on the auxiliary spillway at Folsom Dam. The project will provide flood protection for 400,000 people and assets valued at \$58 billion in the Sacramento area.

Drought Management Team Mobilizes

Acting swiftly in anticipation of a drought proclamation, DWR initiated a new effort in December 2013 to prepare for and reduce the impacts of a third straight dry year in 2014. An Emergency Program Manager was appointed who immediately began organizing the effort under the State's Standardized Emergency Management System (SEMS) structure, allowing DWR to focus and align its existing personnel and programs to offset potentially devastating impacts to public health, natural resources, and the economy.

As part of the suite of actions to address the drought, a water transfer management team was developed that immediately set about streamlining the water transfers process, as transfers were identified as a key drought response tool. Additionally, drought preparedness workshops were held to inform agricultural users of statewide water conditions and available measures. Underlying much of this effort is the reliance on the ongoing and well established DWR integrated water management data collection programs for both surface and groundwater quality and quantity measurements, including CASGEM, stream gauging, runoff forecasting, and land use assessments. These data collection efforts allow DWR to report groundwater level trends, forecast water storage and runoff, and assess water demand related to land use patterns.



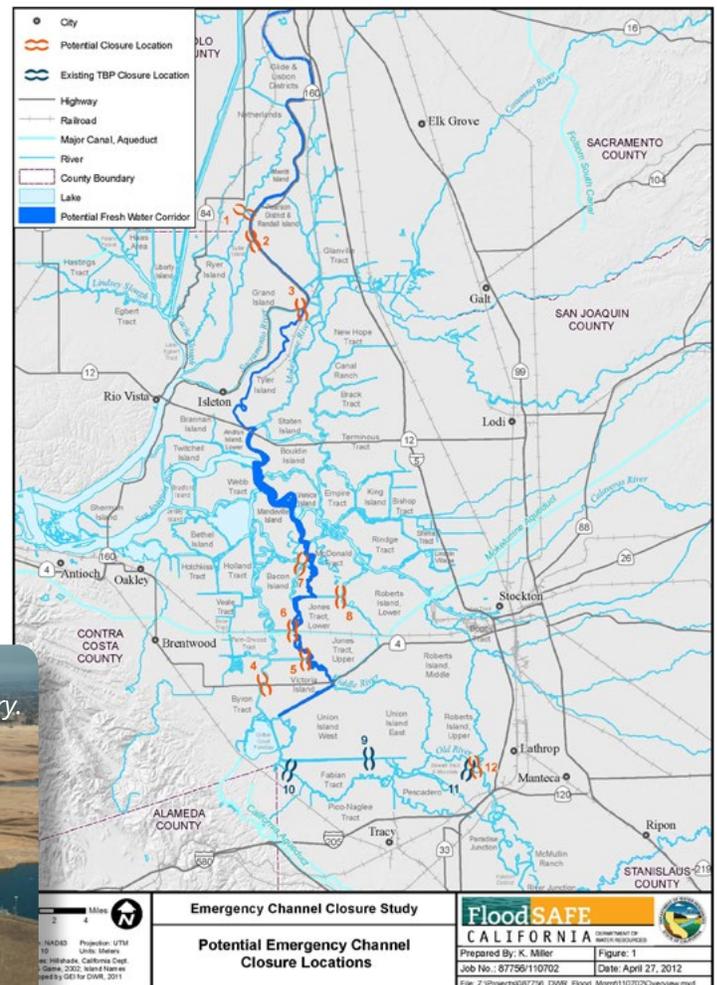
DWR Drought Manager, Bill Croyle, right, discusses the process for voluntary water transfers during a panel on drought at the California Department of Food and Agriculture on January 7, 2014. Paul Fujitani, U.S. Bureau of Reclamation, center, and Tom Howard, State Water Resources Control Board, far left, completed the expert panel.

Potential Actions for Mitigating Drought Impacts

- Incentives for voluntary conservation measures
- Requirements for mandatory conservation measures
- Shared regional water resources
- Expansion of water infrastructures (deeper wells, surface conveyance, etc.)
- Water transfers
- Delta water quality improvement actions (e.g. channel salinity barriers).



At the end of 2013, the water level in Folsom Reservoir was the lowest in history.



DWR is working with the State Water Board to determine potential locations for placing salinity barriers to protect Delta water quality.

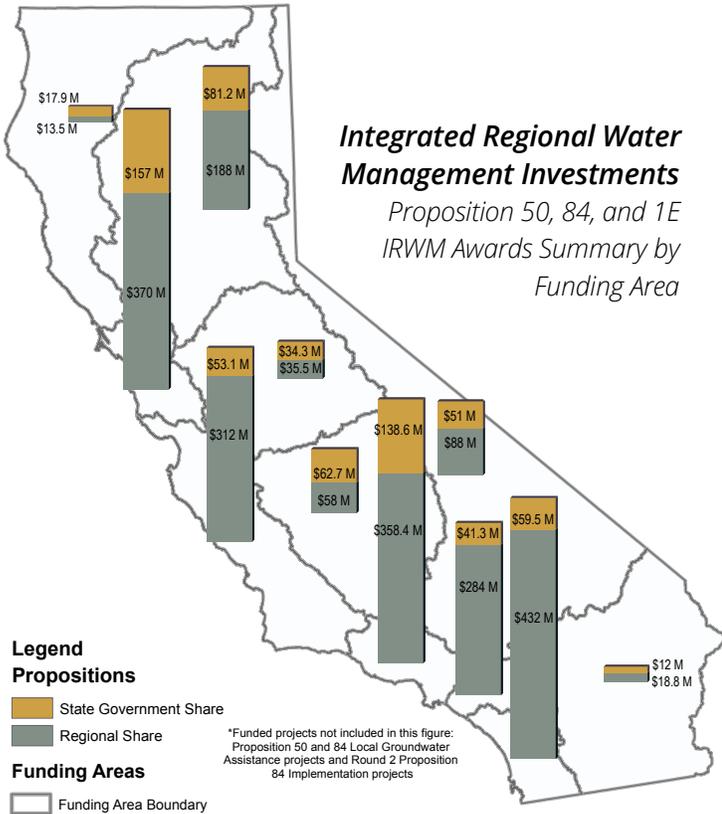
Delivering Integrated Actions to Build Resiliency

A Decade of Investment in Integrated Water Management

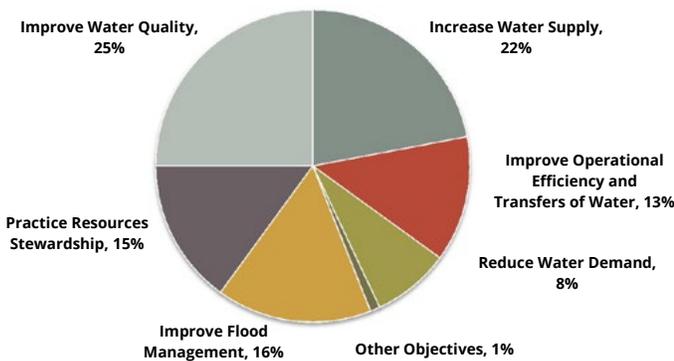
Thanks to voter-approved bond measures Propositions 50, 84, and 1E, DWR has been awarding grants since 2002 to make possible regional planning and on-the-ground projects that provide a wide range of benefits to California. Nearly \$750M has been competitively awarded and leveraged by \$2.3B in local funds. This tremendous investment has resulted in formation of 48 collaborative regional water management groups, completion of 37 comprehensive management plans, and funding for more than 500 projects. Benefits range from improving water quality to increasing water supply, protecting environmental resources, increasing water use efficiency, and improving flood management.

In addition to the IRWM Grant Program, DWR has several other grant programs that have awarded funds to a number of other projects over the last decade, such as agricultural and urban water use efficiency, desalination, and flood protection. The Agricultural and Urban Water Management Grant Programs have awarded \$88M to date to help urban and agricultural communities cope with water shortages and drought conditions through the implementation of water use efficiency projects; these projects were leveraged by \$148M in local funds. The Desalination Grant Program has awarded \$38.5M to date for planning, construction, and research related to brackish and seawater desalination projects; these projects were leveraged by \$127M in local funds. The Urban Flood Risk Reduction, Local Levee Assistance, and Yuba Feather Flood Protection Programs have awarded \$786M to date to reduce flood risk to rural, small communities, and urban areas statewide by repairing levees and improving public safety; these projects were leveraged by \$310M in local funds.

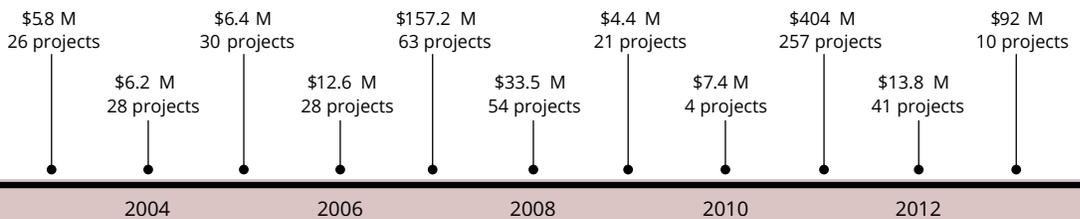
Since 2002, the State of California has invested nearly \$750 million in Prop 50, 84, and 1E funding for integrated regional water management planning, implementation, and stormwater flood management projects throughout the State.



Projected Benefits of Implementation and Stormwater Flood Management Projects Propositions 50, 84 (Round 1), and 1E (Round 1 and 2)



****NOTE:** Percent based on number of projects; not costs. Projects may employ greater than one CWP Water Management Objective, except for Statewide Flood Management assumed to solely employ "Improve Flood Management"



2013 Regional Successes

Enhancements to Morris Dam Improve Water Supply

In July 2013, DWR joined water managers from Los Angeles County, the cities of Torrance and Los Angeles, and members of the Morris family at the dedication ceremony for the Morris Dam Water Supply Enhancement Project in the San Gabriel Mountains. The 3-year project was made possible by a \$5.1 million grant from DWR's Proposition 50 IRWM Grant Program to leverage \$5.5 million in local funding. A key project identified in the 2006 Greater Los Angeles County (GLAC) Integrated Regional Water Management (IRWM) plan, it demonstrates the value of using an integrated water management approach and delivering return on the public's investment to solve multiple water resources problems in the State. The GLAC group recognized that increasing the capacity of the reservoir by modifying the dam would provide an additional blend of water supply and flood protection to the region. The completed modifications allow the Flood Control District to replenish about 220,000 acre-feet of water a year to groundwater basins.



DWR and State water officials commemorate the completion of improvements to Morris Dam to improve Water Quality and Flood Protection.

Orland Project Regulating Reservoir and Associated Canal Structure Improvements

In 2013, the Orland Unit Water Users Association completed the Orland Project Regulating Reservoir and Associated Canal Structure Improvements construction project. DWR awarded \$2.5 million to the Association in 2007 under the Agricultural Water Use Efficiency Grant program. The structural improvements allow the Association to manage the flow releases at their discretion, in order to support long-term Stony Creek environmental restoration and fishery resource management objectives, while providing supplemental water supply to the Tehama Colusa Canal. The project results in more flows available to the San Francisco Bay Delta watershed.

Other Key Accomplishments

- **Small Erosion Repair Program:** Streamlined the approach for repairing multiple erosion sites, improving public safety, and environmental stewardship
- **Catch a Special Thrill (C.A.S.T.) for Kids:** This event highlighted DWR's commitment to promoting recreational opportunities at DWR facilities
- **Delta Emergency Rock and Transfer Facilities at Rio Vista:** Enhanced Delta flood emergency preparedness and readiness for improved public safety
- **Delta Special Projects:** Continued significant Delta levee system improvements that enhanced protections for public safety and economic stability
- **Morrison Creek Floodwall:** Improved flood protection for the Morrison Creek area, providing homeowners additional security
- **Delta Special Projects, Woodward Island:** Improved levees on Woodward Island providing better protection for critical infrastructure and agricultural activities
- **Santa Clara River Flood Protection Project:** Facilitated a strategic floodplain parcel purchase that improved public safety and infrastructure protections for the communities of Oxnard and Ventura
- **Urban Flood Risk Reduction:** Significantly improved public safety for 140,000 residents in the Sacramento and Yuba City areas through flood system improvements
- **Crop Coefficients Project:** A joint effort with U.C. Davis to estimate crop water use and improve information on current and future water demand.

2013: Year in Review

External Activities

MAY

- ▶ Governor signs Executive Order on Water Transfers
- ▶ ACWA Spring Conference— Governor announces need for water action plan

JULY

- ▶ Governor proclaims July to be Smart Water Month

January

EBMUD Connecting Mokelumne Aqueducts in Delta

East Bay Municipal Utility District (EBMUD), with DWR Implementation Grant funding, installed pipeline interconnections in Stockton and Brentwood, connecting EBMUD's three Mokelumne Aqueducts in the Sacramento-San Joaquin Delta. The aqueducts run underground in the Delta where they are vulnerable to damage from a seismic or other catastrophic event. If



ever needed, the interconnections will allow EBMUD to bypass damaged segments and divert water through operational segments.

May

IRWM Strategic Plan Workshops

DWR hosted a series of strategic vision and goal-setting workshops throughout the State on Integrated Regional Water Management (IRWM). These unique and participatory workshops generated vigorous discussions among IRWM stakeholders on the future of IRWM in California. The IRWM Strategic Plan will identify options, tools, and recommendations for others to support the practice of IRWM, while also identifying DWR's supporting role.



July

SB 1278 (2012) 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 State Plan of Flood Control levees and must make findings in regards to an urban level of flood protection.

February

Atmospheric River 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 for the State. The new observatories can quantify how much moisture is moving into the State and at what elevation rain changes to snow.

April



Integrated Water Management (IWM) Summit

DWR hosted the first IWM Summit, in partnership with the Water Education Foundation and the California Water Commission. The event brought together over 200 water leaders from State, local, and federal agencies and organizations to share experiences and ideas about how managers can effectively align to provide sustainable water resources services in the State in the face of an uncertain future.

IRWM Conference

The IWM Summit was followed by a 2-day IRWM conference to provide regional stakeholders the opportunity to engage in discussions about successes, challenges, and future needs for advancing IRWM in the State.

California Tribal Water Summit

The California Tribal Water Summit Design Team, in partnership with DWR, convened the second statewide California Tribal Water Summit. The summit showcased three topics: tribal ecological knowledge; indigenous rights to water; and water management and land use.

June

CIMIS/Crop Coefficient Project

Collaborated with U.C. Davis during the 2013 growing season. Data collection stations were activated in various agricultural crops that are considered economically important within California. The goal of the project was to determine updated crop coefficients and improve estimates on current and future water demand.

Local Groundwater Assistance Grants

DWR awarded 26 public agencies in the Proposition 84 Local Groundwater Assistance (LGA) grant solicitation totaling more than \$4.7 million in grant funds.

OCT

- ▶ *California Water Action Plan (Draft) released*

DEC

- ▶ Governor convenes Interagency Drought Task Force
- ▶ *Safeguarding California Plan released by California Natural Resources Agency*

September

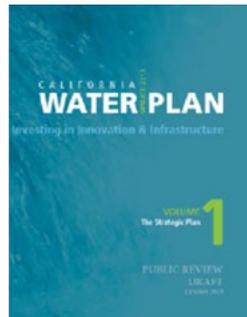
Proposition 1E Round 2 Stormwater Flood Management Grant Program—Final Awards

DWR awarded 10 proposals totaling \$91.8 million in grant funds for a range of multi-benefit projects.

October

CWP 2013 Public Review Draft and Plenary

DWR released the public review draft of the updated Plan and held a two-day public plenary meeting in order to get comments and feedback from stakeholders.



December

DWR Drought Management Team Formed

DWR mobilized a new drought management effort to prepare for and reduce potential impacts of what is expected to be a third dry year in a row in 2014.

Water Transfers Management Team Developed

DWR streamlined the water transfers process through the development of checklists for transfer proponents, creation of template contracts, increased coordination with sister agencies, and refinement of the process schedule.

Kings Basin Disadvantaged Pilot Project Study

The Upper Kings Basin Water Forum IRWM received a \$500,000 grant from DWR to collect information on the disadvantaged communities (DACs) within the Kings Basin sub-regions. Critical water-related needs within the DACs were identified and a DAC stakeholder engagement process was facilitated as part of the IRWM planning process.

August



Napa-Sonoma Salt Marsh Restoration and Recycled Water Project

In 2007, DWR awarded \$350,000 in Proposition 50 funds to the Bay Area Clean Water Agencies to design the Napa-Sonoma Salt Marsh Restoration and Recycled Water Project. The project is designed to facilitate restoration of important salt marsh habitat located in the Napa-Sonoma Marsh Wildlife Area, create new, reliable, and drought-proof water supply for the region, and reduce discharge of treated effluent to the San Francisco Bay.

November

Final Flood Future Report Released

DWR and the U.S. Army Corps of Engineers released the California's Flood Future report. California's Flood Future provides information intended to inform decisions about policies and financial investments to improve public safety, foster environmental stewardship, and support economic stability.

Silver Jackets Signing Ceremony

California became the 40th state to join the national Silver Jackets program, which provides a forum for government agencies to coordinate activities that



reduce flood risk and raise public awareness of flooding.

High Water Mark Initiative

The cities of Sacramento and Roseville hosted the High Water Mark kickoff event to unveil FEMA's first "High Water Mark" sign in California as part of the federal "Know Your Line" initiative. A total of 11 signs were posted throughout both cities to promote awareness of historical high river levels and encourage responsive action.



ULOP Finalized

DWR completed the Urban Level of Flood Protection (ULOP) Criteria, which satisfies the legislative requirement of Senate Bill 5 (2006) without interfering with local land use authority. The criteria are designed to provide reasonable details and flexibility for making findings in regard to a 200-year level of flood protection, and to promote prudent floodplain management in concert with smart growth and climate change adaptation strategies.

Investments in Integrated Water Management

2013 Investments

DWR's portfolio of investments in integrated water management fostered significant accomplishments in 2013, highlighted within this report. By responsibly managing funding from a number of sources (including voter-approved general obligation bonds), DWR has helped advance integrated water management at the local, regional, and statewide level through various approaches, including data collection, tools development, evaluations, planning efforts, and water management actions. Good progress has been made, but more work remains and continued reliable funding is needed.

The table to the right shows the expenditures made in 2013. The figures include State operating budget expenditures (labor, indirect, direct, contracts, etc.) as well as disbursements for local assistance projects made in previous years.

2013 DWR IWM Program Expenditures (\$Millions)

Water Management Initiative	
Data Collection, Assessment, Planning and Management	\$22
Strategic Water Planning (e.g., CA Water Plan, IRWM Strategic Plan)	\$11
Infrastructure Investigations (Storage)	\$2
Water Use and Efficiency Programs	\$12
Financial Assistance Programs	\$76
Subtotal	\$123
FloodSAFE	
Flood Management Planning	\$45
Floodplain Risk Management	\$25
Flood Risk Reduction Projects	\$323
Flood System O&M	\$32
Flood Emergency Response Program	\$35
Subtotal	\$460
Integrated Water Management Total Expenditures	\$583

2014: Responding to the Drought and the Governor's Water Action Plan

The 2014 water year is expected to be one of the driest years in California's history, and it falls on the heels of two previous dry years. On January 17, 2014, Governor Jerry Brown proclaimed a State of Emergency and DWR is now leading the deployment of the State's drought emergency response operations, in close coordination with the California Office of Emergency Services and other State agencies through the Governor's Drought Task Force. Shortly thereafter, the Governor released the final California Water Action Plan, outlining ten priority actions (listed in the table on the next page) for reliability, restoration, and resilience. The integrated water management program activities completed or underway as described in this annual report are already addressing the Governor's priorities in many ways, but more can and will be done to align and integrate our efforts in 2014 according to the near-term priorities in the Water Action Plan.



DWR Director Mark Cowin and Natural Resources Agency Secretary John Laird look on as Governor Brown signs the drought proclamation on January 17, 2014.

Future Investments Needed

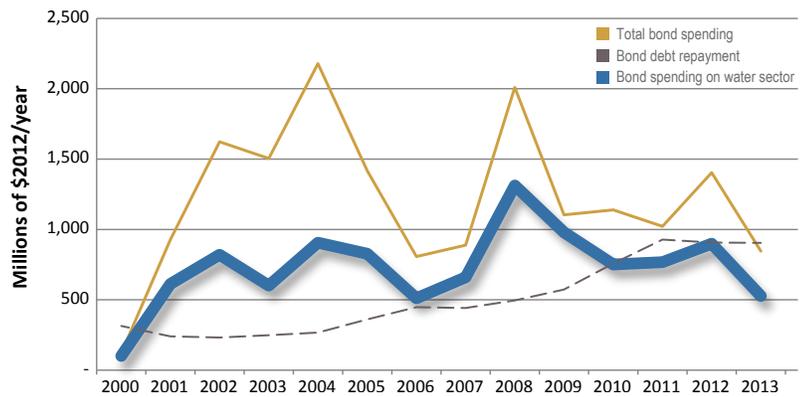
The Governor’s Water Action Plan recognizes that reliable, good quality water is essential for people’s health and safety as well as for a robust and resilient economy. Our watersheds, ecosystems, growing population, State agriculture, industry, and businesses all rely on the State’s water infrastructure. The Delta and its ecosystem are in a fragile state. Addressing these needs requires investment.

Several bond laws were approved by the voters over the last 20 years, as shown in the table below. Collectively, these bond laws have provided over \$15 billion of State funds for water management and environmental enhancement needs and have leveraged many more billions in federal and local investments. For example, as described on page 14, DWR has competitively awarded nearly \$750 million in IRWM grant funds to leverage over \$2 billion local investment in over 500 priority projects.

The State’s historic investments have been a good down payment but, as shown in the graph, have also been uncertain and sporadic. Investments have not kept pace with population, agricultural, and industrial growth, and the economic reality of the State and its climate change challenges. In addition, the State’s water supply and flood protection infrastructure is aging and has not received adequate and reliable funding in recent decades for necessary operation, maintenance, and system improvements. Moreover, those costs are rising as regulations get stricter. Moving forward, we need stable, reliable funding to implement both the near-term actions outlined in the California Water Action Plan and long-term management of the State’s water resources.

Based on the resources of the State, federal, and local water agencies; historic State bond financing; and a recent needs assessment, implementation of the California Water Action Plan will require an estimated State investment in the range of \$5 to 9.5 billion over the next five years.

Historical Water Sector Investments (\$Millions)



Historical bond spending has been sporadic and uncertain. Moving forward, stable, reliable funding is critical to ensure sustainable long-term management of the State’s water resources. (Source: PPIC, 2014 [Governor’s budgets])

Historical Approved Bond Allocation (\$Millions)

Finance Categories	CA Water Action Plan	Prop. 204 1996	Prop. 13 2000	Prop. 50 2002	Prop. 84 2006	Prop. 1E 2006	Totals
Water Reliability	1. Make conservation a California way of life	\$60	\$105	\$200	\$180		\$545
	2. Increase regional self-reliance and integrated water management across all levels of government	\$60	\$478	\$855	\$1,000	\$300	\$2,693
	5. Manage and prepare for dry periods						\$0
	6. Expand water storage capacity and improve groundwater management	\$40	\$262	\$50			\$352
Water Quality and Ecosystem Restoration	3. Protect and restore important ecosystems	\$442	\$556	\$1,550	\$2,638		\$5,186
	7. Provide safe water for all communities	\$140	\$70	\$715	\$380		\$1,305
Flood Management	8. Increase flood protection	\$85	\$249	\$70	\$800	\$3,790	\$4,994
Delta Management and Operation	4. Achieve the co-equal goals for the Delta	\$168	\$250		\$325		\$743
	9. Increase operational and regulatory efficiency						\$0
	10. Identify sustainable and integrated financing opportunities				\$65		\$65
TOTALS		\$ 995	\$ 1,970	\$ 3,440	\$ 5,388	\$ 4,090	\$ 15,883



Edmund G. Brown Jr.

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Secretary
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California Department of Water Resources



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