

CLIMATE CHANGE ANNUAL REPORT, 2012



California Department of Water Resources

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Our program successes again this year stemmed from the good work of our matrixed Climate Change “Hawks,” those vigilant scientists, engineers, and administrative staff tasked with keeping DWR at the forefront of water management’s response to a warming planet. While climate change is not the primary driver of all DWR program activity, it is a key cross-cutting issue within Integrated Water Management. As the State prepares for simultaneously longer droughts and higher peak flows, the examples set and projects started by this program will set the standard for practical climate change strategizing within the context of IWM.

Program funding continued to be a focal point for program management, with state budgets dwindling, a keener eye from the Department of Finance, and scrutiny on Resources Agency spending. Bond funds from Prop 84 support seven full-time climate change adaptation staff, with fees generated by AB-32 supporting two mitigation staff. The program aim is to utilize funds wisely, and at an appropriate pace, thereby perpetuating the efforts described in this report for years to come. Clearly, the problem is a long-term one; support for the response ought to be also.

Key successes in 2012 included the release of DWR’s Greenhouse Gas Emissions Reduction Plan, the first State agency plan to substantially reduce GHG emissions; receipt of a Sacramento County Sustainable Business Award; a detailed report on proposals from IRWM groups on addressing climate change; a Cooperative Climate Data Volunteer Network assessment and migration plan; and the Climate Change Technical Advisory Group issuing guidance for California Water Plan 2013 climate scenarios. In addition, DWR climate change support to local agencies is repeatedly singled out as worthy, helpful, and understandable. From providing direct support to IRWM groups regarding to grant funding requirements, to new energy intensity content for the next Water Plan, and archiving and assessing decades of hand-written climate data in the regional offices, this past year was another success for the world of climate change data collection, adaptation and mitigation.

Elissa Lynn, Program Manager

March 22, 2013

FIELD STUDIES

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Evaluation of Benefits of Meadow Restoration on Sierra Nevada Water Supply

Sponsor/Program Manager	FESSRO/DSIWM/Climate Change Team
Project Manager	Harry Spanglet

Project Objective:

Investigate the role of restoring degraded montane meadows in water management in the Sierra Nevada

Project Description:

In a natural, un-degraded condition, mountain meadow communities have deep soils, dense herbaceous vegetation, and a naturally-developed drainage pattern where water flows across the flat meadow surface and infiltrates the soil; shallow meandering channels then carry water to downstream drainages. Meadows typically remain fully saturated for most of each year and can store substantial quantities of groundwater in their soils, acting as natural reservoirs of water at high elevations. Slow release of water stored in meadow sediments can provide base flow to downstream drainages long after surface runoff has stopped for the season; in addition, the water storage capacity of meadows can buffer the rate of water runoff during snowmelt and reduce peak flows that cause flooding downstream. The net result is a reduction in extremes of runoff, increasing the low flow and reducing peak flows.

Degraded meadows that have been exposed to poor land-use practices, such as overgrazing of livestock, off-highway vehicle traffic, and draining, typically exhibit “gully erosion,” in which shallow channels are deeply eroded and all water entering the meadow drains rapidly into stream channels rather than across meadow surfaces. The channelized flow does not allow the soils to become saturated, eliminating the beneficial hydrologic effects of meadow communities and leading to drastic changes in meadow vegetation. Meadow restoration is the practice of reversing the effects of gully erosion by filling gullies and re-establishing a quasi-natural hydrologic regime by redirecting surface flows across meadows, allowing water to infiltrate the sediment, raise groundwater levels, and potentially restore the beneficial hydrologic functions of meadows.

DWR has provided funding to the US Forest Service for a three-year investigation (partly extended into a fourth year) of the hydrologic effects of meadow restoration and how restored meadows can contribute to improved system operation as well as ecosystem functioning. In 2010 the project began meeting the goals of the funding, including: delineating potential meadows using available Geographic Information System (GIS) datasets, delineating meadows in the field and comparing the field delineations to those derived from GIS analysis; assessing meadow condition in a random sample to extrapolate to the condition of all Sierra meadows; installing instrumentation to assess hydrology of undisturbed and restored meadows.

Funding Information:

Project Budget:	\$313,000 (DWR match)	Funding Source:	Prop 84
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**Project Start
Date:**

6/1/2010

**Project End
Date:**

DATE IN PROGRESS N/A

Project extended to 2014

External Partners:

National Fish and Wildlife Federation, US Forest Service

Project Accomplishments for 2012:

- Updated bibliography of scientific literature pertaining to meadow restoration and hydrology, which indicates that meadow restoration has beneficial effects on streamflow
- An inventory of meadow communities on public lands in the Sierra Nevada. Efforts to identify and delineate meadow communities on all lands in the SN using GIS and remote sensing methods were unsatisfactory. An alternative inventory of meadows on public lands was compiled based on existing inventories, and produced a more-reliable estimate of ~86,000 acres.
- The extent and degree of meadow erosion was quantified by field measurements in a sample of meadows throughout the Sierra Nevada. Results indicate that the majority of SN meadows are eroded/incised, and an estimated 25% of meadows are sufficiently eroded to eliminate beneficial hydrologic functions.
- Water budget studies for representative meadows have been partially completed, and will continue in 2013. Initial results indicate that meadow erosion depletes both meadow alluvium and surrounding bedrock of groundwater.
- Long-term hydrologic effects of meadow erosion are still uncertain, but likely include diminished streamflow, lower regional water tables, reduced mountain block recharge, and reduced groundwater storage in headwater areas.

Project Deliverables/Timeline:

- Literature review of hydrologic effects of montane meadow restoration: completed
- Geographic inventory of meadow communities in the Sierra Nevada: completed
- Evaluation of extent and prevalence of meadow degradation through erosion: completed
- Determination of water budgets for sample of degraded and undegraded meadow communities: additional data will be collected during a one-year no-cost extension of project funding period, and results will be available in winter 2013.
- Simulation modeling of meadow hydrology and synthesis of results: groundwater modeling is near completion, and results will be described in a paper submitted for publication to a peer-reviewed scientific journal. The evaluation of the hydrologic role of ponds in restored meadows is underway and will be completed in winter 2013.

Customers:

US Forest Service

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Paleohydrology

Sponsor/Program Manager	John Andrew
Project Manager	Jeanine Jones

Project Objective:

Use paleoclimate information to better understand natural climate variability & develop analog years
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Project Description:

<p>The Department executed a contract with the University of Arizona for development of tree-ring reconstructions of paleostreamflows in the Sacramento, San Joaquin, and Klamath River Basins. Extending streamflow records beyond the relatively short period of the historical record provides an improved picture of climate variability and yields data for use in operations model sensitivity analyses and for vulnerability analyses. Very limited fieldwork under the contract began in fall 2010; the final report will be completed in 2014. Additionally, with funds provided by USBR, the University is developing a database of climate analog years for DWR including the paleo data.</p>
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Funding Information:

Project Budget:	\$400,000 DWR/\$200,000 USBR	Funding Source:	Prop 84
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Project Start Date:	2010	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center; border-bottom: 1px solid black;">DATE</td> <td style="width: 25%; text-align: center; border-bottom: 1px solid black;">IN PROGRESS</td> <td style="width: 25%; text-align: center; border-bottom: 1px solid black;">N/A</td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </table>	DATE	IN PROGRESS	N/A		X	
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External Partners:

University of Arizona, US Bureau of Reclamation

Project Accomplishments for 2012:

<p>Most of the field work involving coring living trees was completed this year, but collection of dead wood using a chainsaw could not be performed due to dry conditions and USFS prohibitions on chainsaw use. Chronologies have been prepared for the samples collected, and preliminary reconstructions have been developed with presently available samples. The approach to setting up the analog years database has also been worked out.</p>

Project Deliverables/Timeline:

1. Reconstructed streamflows for Sacramento, San Joaquin, and Klamath Rivers
2. Database of analog climate years
Final field collections will be completed in summer 2013, followed by preparation of final chronologies and reconstructions in the fall. The final report on the work under DWR's contract is due by March 1, 2014. The USBR-funded work on the analog years database should also be completed in 2014.

Customers:

DWR Drought program, Calsim modelers, DFM hydrology branch

PLANNING, MODELING, AND DATA COLLECTION

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change Technical Advisory Group (CCTAG)

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Objective:

An external panel of expert advisors provides Department-wide guidance for Climate Change Scenario selection and methodology for the California Water Plan and various Department planning efforts and projects, future flood needs, and IRWM support.

Project Description:

The CCTAG advises DWR on the scientific aspects of climate change, its impacts on water resources, the use and creation of planning approaches and analytical tools, and the development of adaptation responses. A standing technical advisory group on climate change impacts and adaptation serving all DWR programs provides external guidance and support for a variety of climate-related issues, including scientific review of climate change models and scenarios, interpretation of scientific information produced by the National Climate Assessment and the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, and informing DWR's climate change adaptation policies. Benefits include consistency in the scientific advice the Department receives on climate change, and the administrative efficiency of not having redundant climate change advisory groups across the Department. The Department's Climate Change Program oversees and coordinates the CCTAG.

Funding Information:

Project Budget:	\$300,000	Funding Source:	Prop 84
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Project Start Date:	2011	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; border-bottom: 1px solid black;">DATE</th> <th style="width: 33%; border-bottom: 1px solid black;">IN PROGRESS</th> <th style="width: 33%; border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
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External Partners:

California Water Plan Statewide Water Analysis Network, State Climatologist Office

Project Accomplishments for 2012:

CCTAG members were chosen from solicited statements of qualification by a technical review committee within DWR, and announced on February 13, 2012. A group of experts will serve the Department for a three-year term, commencing in 2012. Specialties of panelists include: Atmospheric science; Hydrology; Civil Engineering/Infrastructure; Environmental science; Climate data and statistics; Social science; Resource Economics; Land use planning; and Climate modeling. CCTAG members are:

Holly Alpert, Inyo-Mono Integrated Regional Water Mgmt Program

Michael Anderson, State Climatologist (DWR)

Barney Austin, INTERA Incorporated

Dan Cayan, Scripps Institution of Oceanography

David C. Curtis, WEST Consultants, Inc.

Mike Dettinger, Scripps Institution of Oceanography

Guido Franco, California Energy Commission

Konstantine Georgakakos, Hydrologic Research Center/ Scripps Institution of Oceanography

John Gyakum, McGill University

Michael Hanemann, U C Berkeley/ Arizona State University

Al Herson, Sohagi Law Group

Ruth Langridge, University of California, Santa Cruz

M. Lev Kavvas, UC Davis

Kelly Redmond, Western Regional Climate Center

Sarah Young, Santa Clara Water District

The CCTAG provided the California Water Plan Update 2013 Statewide Water Analysis Network with advice on climate change scenario selection for Future scenarios.

In-person meetings of the CCTAG in 2012 were held on March 30, May 11, and September 14.

Subgroup webinar meetings to discuss climate scenario selection were held on April 12, July 17, and October 31.

The materials for all CCTAG meetings are posted on devoted the public website:

<http://www.water.ca.gov/climatechange/cctag.cfm>

Project Deliverables/Timeline:

In addition to a broad array of technical and policy advice, the CCTAG will provide specific guidance on climate change scenario selection for the California Water Plan, and other planning efforts of the Department, including DWR Framework guidance climate change approach recommendations.

Customers:

In general, the Department of Water Resources is the customer. Specific customers within DWR include the California Water Plan, the Climate Change Framework Team, which is developing guidance on the selection of climate change scenarios, approaches and project-level analytical tools, and other groups, including IRWM, Flood Management, and the Natural Resources Agency, on the incorporation and consistency of climate change in planning studies and projects.

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

California Water Plan Update – Climate Change (CWP)

Sponsor/Program Manager	John Andrew, Paul Massera, Lew Moeller
Project Manager	Elissa Lynn

Project Objective:

Provide greater detail and regionally specific climate change information in Update 2013 than in Update 2009, including regionally appropriate and statewide adaptation and mitigation strategies, resource management strategies, and climate change scenarios decision support.

Project Description:

Climate change stems from a steady gradual increase in global temperatures that has been taking place over recent decades. Determining the local impacts of and response strategies to climate change in California involves climate modeling downscaled to the regional level. Current developments in climate science and research can provide guidance for projecting likely ranges of temperatures and precipitation changes by region. Responding to these hydrologic changes and reducing their impact are known as adaptation strategies. Reducing GHG (Greenhouse Gas) impacts by reducing energy consumption are known as mitigation strategies. Many adaptation and mitigation strategies are conducted at the regional level, so CWP update 2013 will include climate change in the regional reports, based on appropriate hydrologic impact, as well as statewide strategies in the broader document. Strategies and vulnerabilities to climate change will also appear in the Resource Management Strategies. This project will also be tasked with technical assistance to the Statewide Water Analysis Network choice of scenarios related to climate change impacts. These four approaches to incorporating climate change into CWP 2013 will improve upon the initial steps taken in CWP 2009 to include responses to climate change.

Funding Information:

Project Budget:	\$648,000.00	Funding Source:	Prop 84
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Project Start Date:	2010	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">DATE</th> <th style="border-bottom: 1px solid black;">IN PROGRESS</th> <th style="border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
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External Partners:

Public Advisory Committee, Statewide Water Analysis Network, Local Water Planners and IRWM's

Project Accomplishments for 2012:

The Climate Change Technical Advisory Group provided guidance on climate change scenario selection to the Water Plan SWAN in 2012. Content was drafted for each Resource Management Strategy of the CWP 2013, providing assessment of whether each strategy provides climate change adaptation or mitigation benefit. Text and graphical content were drafted for each Regional Report of CWP 2013, related to appropriate adaptation strategies and energy intensity of local water supplies. Text and graphical content were drafted for two climate change sections of CA Water Today of the CWP 2013; Climate change and Sea Level Rise, and Water-Energy. Progress reporting was completed by the climate change team for the new CWP 2013 Progress report.

Project Deliverables/Timeline:

Draft content was developed as listed in the Accomplishments above. The text and graphics will be finalized in 2013, to coincide with CWP 2013 release dates. Additional deliverables of this project are climate change references and specific climate change material to be showcased in CWP 2013 Highlights.

Customers:

California Water Plan, Public Advisory Committee, State Agency Steering Committee, The Public

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Analysis of Climate Change for the California Water Plan Update

Sponsor/Program Manager	Paul Massera
Project Manager	Rich Juricich

Project Objective:

Quantify alternative scenarios of future water demand and supply conditions and use to evaluate performance of potential water management responses for Water Plan Update 2013

Project Description:

The California Water Plan Update 2013 (CWP 2013) will build upon the scenario planning begun in previous Updates and include an analysis of the performance of different resource management strategies and response packages for the Central Valley under different assumptions about uncertain future conditions. The Water Plan will also evaluate the effect of different assumptions about uncertain future conditions including climate change on future water demand for all 10 hydrologic regions in California. A wide range of scenarios will reflect uncertainty about future population growth, agricultural land use, climate conditions, water use rates, and other factors.

Uncertain future climate conditions are represented by diverse sequences of temperature and precipitation applied to geographically-disaggregated catchment areas in the Water Evaluation and Planning (WEAP) model. Some sequences will be based upon projections of temperature and precipitation from global climate models (Atmosphere-Ocean General Circulation Models—GCMs). Others will be based on historical observations and will be designed to test the effects of drought conditions experienced in the recent past at different times in the future. The Climate Change Technical Advisory Group (Climate TAG) provided guidance to DWR about which specific sequences to evaluate that reflect a wide range of plausible climatic conditions and include periods of droughts similar to those experienced in recent decades.

A significant improvement to the Water Plan scenarios in Update 2013 is a quantitative look at the uncertainty surrounding future climate change when evaluating the performance of new resource management strategies. After consultation with its Climate Change Technical Advisory Group, DWR chose to include 27 alternative climate scenarios in the evaluation of future strategies. These include 12 climate scenarios identified by the Governor's Climate Action Team (CAT) for future climate change, 5 scenarios repeating historical climate offset by 10 years, 5 scenarios repeating historical climate with a severe 3 year drought offset by 10 years, and 5 scenarios repeating historical climate with a warming temperature trend offset by ten years. Each of the climate scenarios have separate estimates of future precipitation and temperature. Collectively these estimates provide planners with a range of precipitation and temperature that might be experienced in the future and are used with other factors to estimate future water demands.

The CWP Update 2013 will evaluate 12 sequences of downscaled global predictions of temperature and precipitation, corresponding to the 12 model-emissions scenario combinations selected by the Governor's Climate Action Team (Maurer and Hidalgo, 2008). The GCMs used were:

1. CNRM-CM3 (France)

2. GFDL-CM21 (USA)
3. Micro32med (Japan)
4. MPI-ECHAM5 (Germany)
5. NCAR-CCSM3 (USA)
6. NCAR-PCM1 (USA)

The two emissions scenarios used were the A2 and B1 scenarios:

“The A2 SRES global emissions scenario represents a heterogeneous world with respect to demographics, economic growth, resource use and energy systems, and cultural factors. There is a de-emphasis on globalization, reflected in heterogeneity of economic growth rates and rates and directions of technological change. These and other factors imply continued growth throughout the 21st century of global GHG emissions. By contrast, B1 is a “global sustainability” scenario. Worldwide, environmental protection and quality and human development emerge as key priorities, and there is an increase in international cooperation to address them as well as to convergence in other dimensions. Neither scenario entails explicit climate mitigation policies. The A2 and B1 global emission scenarios were selected to bracket the potential range of emissions and the availability of outputs from global climate models” California Climate Action Team (2009).

Downscaled monthly temperature and climate projections were obtained from the downscaled climate dataset jointly developed by the Lawrence Livermore National Laboratory (LLNL), the U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and Santa Clara University (SCU), available at <http://gdo-dcp.ucllnl.org>. These data were derived from the World Climate Research Programme's (WCRP) Coupled Model Intercomparison Project Phase 3 (CMIP3) multi-model dataset, and include data from 112 different global climate simulations of 16 global models evaluated for three global emissions scenarios. The projections are available from 1950 to 2099.

Funding Information:

Project Budget:	\$750,000	Funding Source:	Proposition 84
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Project Start Date:	July 2010	Project End Date:	<u>DATE</u>	<u>IN PROGRESS</u>	<u>N/A</u>
			12/31/2013	X	

External Partners:

MWH, RAND Corporation, Stockholm Environment Institute, National Center for Atmospheric Research
--

Project Accomplishments for 2012:

Developed and vetted Proof of Concept for Update 2013 scenario analysis with Water Plan stakeholders

Project Deliverables/Timeline:

- Three narrative future scenarios for California describing alternative values for uncertain factors like population growth, land use changes, socioeconomic conditions, technological advancement, and institutional and political changes
- Up to 27 scenarios of future climate conditions (precipitation, temperature) for California's ten hydrologic regions and all Central Valley planning areas selected with advice from the Climate Change Technical Advisory Group
- Quantification of future water demands for California's ten hydrologic regions reflecting the three narrative future scenarios and up to twelve future climate scenarios
- Quantification of future water supplies and demands reflecting the three narrative future scenarios and up to twelve future climate scenarios for all Central Valley planning areas
- Performance criteria for evaluating effectiveness of regional water management responses
- Evaluation of many alternative water management responses using Robust Decision Making for all Central Valley planning areas

Customers:

- Department of Water Resources for support of DWR programs and projects
- Local and regional water planning entities for consideration of alternative future scenarios and water management responses
- California Legislature to meet Water Code requirements
- General public for education on future water issues
- Water Plan advisory groups including the Public Advisory Committee, State Agency Steering Committee, Statewide Water Analysis Network, and Regional Forums.

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change Basic Data Workgroup

Sponsor/Program Manager	Elissa Lynn, Greg Smith, Michael Anderson
Project Manager	Aaron Cuthbertson

Project Objective:

Assessment and coordination of basic climate data collection efforts across DWR

Project Description:

DWR's Climate Change Basic Data group is composed of representatives from DSIWM and the Division of Flood Management, and DWR's regional offices. The project goals are to assess current climate data acquisition efforts at DWR, promote cooperation and coordination across programs, and strategize on issues of data storage, management, and dissemination.

Funding Information:

Project Budget:	\$120,000	Funding Source:	Prop 84
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Project Start Date:	May 2011	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; text-align: left; padding: 2px;">DATE</th> <th style="width: 33%; text-align: left; padding: 2px;">IN PROGRESS</th> <th style="width: 33%; text-align: left; padding: 2px;">N/A</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> <td style="padding: 2px; text-align: center;">X</td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A			X
DATE	IN PROGRESS	N/A							
		X							

External Partners:

Western Regional Climate Center

Project Accomplishments for 2012:

The Basic Data Workgroup began in 2011, with monthly meetings to strategize on data collection and management issues within DWR. An internal Memorandum Report on volunteer climate data collection and future recommendations was released in 2012. Preliminary research into snow/rain trends in California was conducted. A partnership with the Western Regional Climate Center (WRCC) continued for coordination of statewide climate data collection, storage and dissemination. DWR volunteer climate data collectors were contacted, and decision was made to move these volunteers to the CoCoRaHS network in the future.
--

Project Deliverables/Timeline:

During 2013, the Basic Data workgroup will focus on continued strengthening working relationship with the WRCC, inventorying old climate records in the regional offices, and working on integrating existing data collection and management within DWR. New projects on research into snow and rain trends, using DWR and other data sources will be conducted. DWR volunteer climate data observers will be encouraged to migrate to the CoCoRaHS network.
--

Customers:

State of California Agencies, General Public, DWR Staff

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Data Collection and Climate Services

Sponsor/Program Manager	John Andrew, Elissa Lynn
Project Manager	Dr. Michael Anderson

Project Objective:

Collect relevant climate data to support Department's emergency response and planning initiatives and monitor for climate change; provide relevant climate data and value added products to general public
--

Project Description:

In 2011 DWR continued its development of the Flood Emergency Response Information Exchange (FERIX). Efforts are underway to link information presented in FERIX to the climate data in the California Climate Data Archive. FERIX will also house a new map-based server for (former State Climatologist) Jim Goodridge's precipitation Depth-Duration-Frequency curves and annual extremes data sets that make up Bulletin 195. This will greatly facilitate the serving of the data which is currently handled through an ftp site with over 4000 spreadsheets. Data gathering for this effort will be transitioned from Jim Goodridge to DWR in the coming years.

For observing data systems, DWR is continuing its partnership with the Earth Systems Research Lab of the National Oceanic and Atmospheric Administration (NOAA) and Scripps Institution of Oceanography to deploy new monitoring equipment for extreme precipitation events. For this network, water vapor measurements, wind profilers, soil moisture sensors and freezing level radar are being deployed across the state. The data from this network is currently served through NOAA's Hydrometeorology Testbed website at <http://hmt.noaa.gov>. Efforts continue to get the data into the California Data Exchange Center. Other observing opportunities that are in their initial stages include elements of the Forecast Coordinated Operations Program and the UC Merced observing system in the American River watershed. A new remote sensing monitoring effort using airborne LIDAR measurements of the snowpack is being developed under a joint project between DWR and NASA's Jet Propulsion Laboratory. NOAA has stopped funding for the new Regional Climate Reference Network and is considering streamlining the National Weather Service Cooperative Observer Network.

Funding Information:

Project Budget:		Funding Source:	N/A
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Project Start Date:	July 2009	Project End Date:	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">DATE</th> <th style="text-align: center;">IN PROGRESS</th> <th style="text-align: right;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
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External Partners:

NOAA ESRL, Scripps, Jim Goodridge

Project Accomplishments for 2012:

Prototype map server, beta version desktop tool, site installations for extreme precipitation monitoring

Project Deliverables/Timeline:

Map based server for B195 data, desktop updating toolkit, full EPN sites with data flow to CDEC

Customers:

DWR, General Public

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Using Downscaled Climate Change Information for Water Resources Planning
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Sponsor/Program Manager	Francis Chung
Project Manager	Jianzhong Wang, Hongbing Yin, Francis Chung

Project Objective:

Evaluate Downscaled Climate Model Projection Products for Use in Water Resources Planning

Project Description:

<p>Climate change projections from Global Climate Models (GCMs) typically provide information at a scale that is too large to use for water resource planning. To make the climate change projection information more useful for planning purposes, it is converted to a smaller scale by a process called downscaling. Downscaling methods fall into two categories, statistical downscaling, which is based on historical patterns, and dynamical downscaling, which relies on physical principles and relationships. Both downscaling and the use of downscaled data for water resources planning are evolving areas of research. DWR’s activities related to downscaling included:</p> <ul style="list-style-type: none"> • Created downscaled data at 2km resolution for California from PRISM-based Bias Corrected Spatial Downscaled (BCSD) data and associated uncertainty estimates • Comparing dynamical and statistical downscaling methods to better understand the strengths and weaknesses of each method and how that might affect their use for water resources planning purposes • Generating climate change reservoir inflow projections through a process called double quantile mapping • Assessing climate change impacts for the Bay Delta Conservation Plan project • Submitted paper titled “Isolated and integrated effects of sea level rise, seasonal runoff shifts, and annual runoff volume on California’s largest water supply” to the <i>Journal of Hydrology</i>
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Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:	4/2008	Project End Date:	<table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">DATE</td> <td style="width: 33%;">IN PROGRESS</td> <td style="width: 33%;">N/A</td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </table>	DATE	IN PROGRESS	N/A		X	
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External Partners:

N/A

Project Accomplishments for 2012:

The paper “Isolated and integrated effects of sea level rise, seasonal runoff shifts, and annual runoff volume on California’s largest water supply” has been published in the <i>Journal of Hydrology</i> .
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Project Deliverables/Timeline:

Develop A New Validation Strategy to Climate Change Impact Study Approaches. The product: climate model projections for use in climate change impact study on CVP/SWP

Customers:

DWR

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sensitivity Analysis of Sierra Nevada and Coastal Range Upper Watersheds to Temperature Changes Using SWAT

Sponsor/Program Manager	Francis Chung
Project Manager	Tariq Kadir

Project Objective:

To develop calibrated rainfall/runoff models for the upper watersheds of the Sierra Nevada and Coastal Range mountains for areas tributary to the Sacramento – San Joaquin Delta and determine impacts on stream outflows caused by air temperature warming of 1^oC to 4^oC.

Project Description:

Physically-based, distributed hydrologic models are essential tools for evaluating long-term hydrologic changes in California. The semi-distributed Soil Water Assessment Tool (SWAT) is being used to develop individual models of eighteen watersheds of the Sierra Nevada and Coastal Range mountains for areas Tributary to the Sacramento – San Joaquin Delta. A common and consistent database of digital elevation, land use, soil and climate data are used with GIS to develop the SWAT models. Model calibration and validation are based on observed or reconstructed monthly unimpaired streamflows at the watershed outlets. The parallel optimization package is used in model calibration. The calibrated models will be used to study the effect of imposed warming of 1^oC to 4^oC on the hydrology of these source watersheds and their impacts on water supply of the Central Valley of California.

Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:	2010	Project End Date:	DATE	IN PROGRESS	N/A
				X	

External Partners:

None

Project Accomplishments for 2012:

- (1) Previously developed SWAT models for nine watersheds: Shasta River, Feather River, Yuba River, American River, Merced River, Tuolumne River, Trinity River, Bear River, San Joaquin River, and Putah Creek were improved and extended from the simulation period of 1915-2003 to 1915-2010 with new 800m PRSIM climate data and 1km DAYMET data.

(2) New SWAT models were developed for Consumnes River, Mokelumne River, Calaveras River, Chowchilla River, Stony Creek, Cache Creek, and Fresno River.

(3) Results from SWAT models were compared with USGS Basin Characteristics Models (BCM).

Project Deliverables/Timeline:

Tangible Products to date:

1. Computer based rainfall/runoff models for 17 watersheds in the Sierra Nevada and Coast Range mountains have been developed and calibrated for outflows based on observed or reconstructed streamflows.
2. For seven of the watersheds temperature warming of 1⁰C to 4⁰C was imposed and impacts on outflows determined.

Future Products:

1. Development and calibrated computer based rainfall/runoff models for other minor watersheds in the Sierra Nevada and Coastal Range mountains and determining impacts of imposed warmings on outflows.
2. A pre-development C2VSIM integrated model for Central Valley, to be coupled with SWAT or BCM models for climate change study.
3. Use the developed models to determine the impacts of potential global warming using downscaled GCM results as input.

Customers:

Federal, State, Local, and Private stakeholders in California interested in the impacts of potential climate change on stream flows for areas tributary to the Sacramento – San Joaquin Delta.

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Represent DWR in Interagency and Stakeholder Groups

Sponsor/Program Manager	John Andrew, Elissa Lynn
Project Manager	Regional Climate Staff

Project Objective:

For regional DWR staff to represent DWR in a variety of interagency and stakeholder groups within California

Project Description:

Federal, state, and local agencies, as well as other entities, have been convening workgroups to facilitate discussions in preparing for climate change, to understand the dynamics of water management and the interaction with managing other resources, and to implement the measures identified in the *2009 California Climate Adaptation Strategy*. Regional DWR staff represents DWR in these discussions, communicates the agency's perspectives, provides technical expertise and climate change resources, and reports to the Climate Change Program on relevant information that DWR can use in its own departmental activities.

Funding Information:

Project Budget:	\$60,000/year	Funding Source:	Prop 84
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Project Start Date:	January, 2010	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">DATE</th> <th style="border-bottom: 1px solid black;">IN PROGRESS</th> <th style="border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
	X								

External Partners:

Federal, state, and local agencies, water and electrical providers, teachers, and non-profit entities

Project Accomplishments for 2012:

Regional DWR staff participated in the following workgroups: the California Department of Fish and Wildlife (CDFW) State Wildlife Action Plan (SWAP) Stakeholder Workgroups; the Climate Action Team (CAT) Biodiversity Working Group; the CAT Climate Change, Land Use, and Infrastructure (CCLU-In) Working Group; California Landscape Conservation Cooperative (CA-LCC); the Baylands Ecosystem Habitat Goals Technical Update Steering Committee; the Bay Area Ecosystem Climate Change Consortium; and the California Water-Energy Coalition (CalWEC). Staff was also an active participant in the Communications Committee of CalWEC. As a Steering Committee member of the CA-LCC, staff helped develop the CA-LCC draft five-year strategic plan and participated on the science subcommittee.

Staff continued to assist the Fossil Discovery Center of Madera County in developing an exhibit on climate change, which will be completed in early 2013. Staff also assisted Project WET (Water Education for Teachers) by participating in teacher workshops and providing relevant presentations to facilitate the development of water resources and climate change curriculum. Staff continued to support the CoCoRaHS (Community Collaborative

Rain, Hail, and Snow Network) non-profit group as part of DWR's Climate Change Program "Citizen Science" outreach initiative. Staff offered support to local Resource Conservation Districts and provided presentations for local volunteer weather monitoring programs. Staff also collaborated with the CDFW's Going Green Team to coordinate DWR's sustainability efforts related to business management practices and policy.

In addition, regional staff provided comments and participated in a meeting for a draft proposal developed by the Los Angeles County Flood Control District (LACFCD) to do a Los Angeles Basin Stormwater Conservation Study with the U.S. Bureau of Reclamation (USBR). This basin study was approved to proceed in December, 2012. Staff will be involved with the Stakeholders Technical Advisory Committee for that basin study, which will include downscaling climate change and hydrologic modeling. Also, as cost-share partners, regional staff is working collaboratively with the USBR and the State of Oregon's Water Resources Department to perform the Klamath Basin Study. Staff is involved with the Technical Working Group of that Klamath Basin Study, which is a comprehensive assessment to define current and future imbalances in water supply and demand, to evaluate the effects of climate change on water supply and demand, and to develop and analyze adaptation and mitigation strategies to resolve imbalances in the Klamath Basin.

Project Deliverables/Timeline:

2013:

- DFW SWAP Stakeholder Group products: Climate College (October 2012-May 2013)
- CAT Biodiversity and CCLU-In Working Groups – California Climate Adaptation Strategy Update
- CA LCC final five-year Strategic Plan
- Climate change exhibit at the Fossil Discovery Center of Madera County
- LACFCD/USBR Basin Study products: Water Supply and Demand Projections report (August 2013); Downscaled Climate Change and Hydrologic Modeling report (September 2013)

2014:

- Baylands Ecosystem Habitat Goals Technical Update – final report expected summer 2014
- CA LCC Science Plan
- Klamath Basin Study product: a series of nine technical reports and a final report

2015:

- SWAP report (tentative, 2015)
- LACFCD/USBR Basin Study product: Los Angeles Basin Stormwater Conservation Study Report (May 2015)

Customers:

Federal, state and local agencies, water and electrical providers, teachers, non-profit entities, and DWR climate change program

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

National Research Council (NRC) Sea Level Rise Study

Sponsor/Program Manager	John Andrew
Project Manager	Jeanine Jones

Project Objective:

Contract with National Research Council for science study on West Coast sea level rise

Project Description:

In 2010, the contracting process was completed to put in place funding for the National Research Council (NRC) sea level rise (SLR) study called for in Executive Order S-13-08. DWR executed contracts with four other California state agencies and with Oregon and Washington for their contributions to the West Coast SLR study; three federal agencies provided their share of the funding directly to NRC. Study funding is summarized in the table below; DWR's contribution to the study is in the form of in-kind services to manage the work. DWR's master contact with NRC on behalf of this consortium of agencies was also executed in 2010. The report will provides best available science estimates of a range of likely amounts of local SLR in 2030, 2050, and 2100.

Contributor	California (\$)	Other States (\$)	Federal (\$)
State Water Resources Control Board	95,000		
California Energy Commission	95,000		
Ocean Protection Council	100,000		
Caltrans	95,000		
Washington Department of Ecology		70,000	
Oregon Water Enhancement Board		49,999.99	
US Geological Survey			25,000
National Oceanic and Atmospheric Administration			25,000
US Army Corps of Engineers			25,000
Totals	385,000	119,999.99	75,000

Grand Total: \$579,999.99

Funding Information:

Project Budget:	\$0, DWR	Funding Source:	N/A
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Project Start Date:

2010

Project End Date:

June, 2012

External Partners:

States of Oregon & Washington, NOAA, USGS, USACE, Caltrans, SWRCB, CEC, OPC

Project Accomplishments for 2012:

The NRC study was completed and the report was released in electronic and hard copy versions.

Project Deliverables/Timeline:

This project is now completed

Customers:

Same as external partners

OPERATIONS

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Evaluation of Benefits of Reoperation of Water Supply and Flood Protection Systems

Sponsor/Program Manager	Kamyar Guivetchi
Project Manager	Sean Sou

Project Objective:

Improve water supply reliability and flood protection and ecosystem restoration and protection
--

Project Description:

<p>California’s water system is composed of state, federal, and local agencies, each having infrastructure in place to provide water supply and flood control benefits. The current operation of these independent systems is based on physical and legal constraints. Changes in the climate, legal framework, and social values associated with water use may require modifications to existing operations and management procedures, new facilities, and new laws.</p> <p>Senate Bill X2 1(SB X2 1) authorized DWR to perform a system reoperation study to identify potential reoperation strategies of California’s existing water supply and flood protection systems that will optimize the use of existing facilities and groundwater storage capacity. System reoperation refers to changes made to existing operations and management procedures to achieve a certain objective(s). The following are objectives of the System Reoperation Program as defined by SB X2 1:</p> <ul style="list-style-type: none"> a) Integrate flood protection and water supply systems to increase water supply reliability and flood protection, improve water quality, and provide for ecosystem protection and restoration. b) Re-operate existing reservoirs, flood facilities, and other water facilities in conjunction with groundwater storage to improve water supply reliability, flood control, and ecosystem protection, and to reduce groundwater overdraft. c) Promote more effective groundwater management and protection and greater integration of groundwater and surface water resource uses. d) Improve existing water conveyance systems to increase water supply reliability, improve water quality, expand flood protection, and protect and restore ecosystems. <p>DWR has completed a Plan of Study which described the four phases of carrying out the studies and identified some initial potential reoperation concepts. Appropriate climate change scenarios will be incorporated in the system reoperation study. More information on the System Reoperation Study and the Plan of Study can be found at http://www.water.ca.gov/system_reop/.</p> <p>DWR will prepare a report that will describe the formulation of reoperation strategies, identify strategies that meet the objectives of the study, evaluate the viable strategies in terms of engineering and economic feasibility, and identify institutional and legal constraints and challenges to implementing the strategies. The studies and report are anticipated to be completed in the Fall of 2014.</p>
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Funding Information:

Project Budget:	\$10,000,000	Funding Source:	Prop. 84
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**Project Start
Date:**

2010

**Project End
Date:**

Fall 2014

External Partners:

Project Accomplishments for 2012:

Completed a Plan of Study; Developed a list of preliminary reoperation scenarios

Project Deliverables/Timeline:

Study Report in Fall of 2014

Customers:

General Public

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Cement

Sponsor/Program Manager	Division of Engineering
Project Manager	Gordon Enas

Project Objective:

Reduce GHG emissions related to cement production. DWR will first identify its current contribution to cement-related GHG emissions and then develop a policy to opportunistically replace the use of cement in DWR construction, maintenance, and replacement activities in accordance with state-wide goals.
--

Project Description:

Emissions of greenhouse gases (GHG) from cement production arise primarily from chemical processing (calcination) and fossil fuel combustion. While the cement industry has achieved significant GHG emission reductions since 1990, opportunities for further reductions still exist, particularly with expanded research into cement processing and concrete blending technologies. DWR was tasked to identify its current contribution to cement-related GHG emissions and then develop a policy to use cement with lower carbon content, if technically feasible, in DWR construction, maintenance, and replacement activities.

Funding Information:

Project Budget:	\$48,000	Funding Source:	SB XX1 Staffing BCP
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Project Start Date:	August 9, 2010	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; border-bottom: 1px solid black;">DATE</th> <th style="width: 33%; border-bottom: 1px solid black;">IN PROGRESS</th> <th style="width: 33%; border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> <td> </td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
	X								

External Partners:

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Project Accomplishments for 2012:

The Division of Engineering examined their current practice for specifying cement for reinforced concrete and controlled low-strength materials (CLSM). DOE typically specifies Portland cement conforming to ASTM C 150 requirements, which allows up to 5% limestone rock dust to be included with the final portland cement product. This is consistent with the recommendation made by the Cement Sub-group to the Climate Action Team to substitute other cementitious materials such as pozzolan (flyash), blast furnace slag, silica fume and limestone for cement, thereby reducing GHG emissions associated with cement production. Information was incorporated into the Climate Action Plan – Phase 1: Greenhouse Gas Emissions Reduction Plan

Project Deliverables/Timeline:

Project completed. No Further Assignments.

Customers:

DSIWM

ENERGY & GREENHOUSE GAS EMISSIONS

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Water-Energy Subgroup of the Governor’s Climate Action Team (“WETCAT”)

Sponsor/Program Manager	John Andrew
Project Manager	Qinqin Liu

Project Objective:

Coordinate state-level water-energy planning in support of AB 32

Project Description:

DWR is a principal agency in the Water-Energy Subgroup—known as the “WETCAT”—of the Governor’s Climate Action Team. DWR coordinated Water-Energy policy and management actions with other principal WETCAT agencies including State Water Resources Control Board, California Energy Commission, and the California Public Utilities Commission. The WETCAT coordinates and focuses its efforts on GHG emission reduction actions related to the transport, treatment, delivery and use of water for environmental, agricultural, residential, commercial, institutional, and industrial needs. In 2008, the WETCAT developed following five measures in the AB 32 Scoping Plan.

- Water use efficiency
- Water recycling
- Energy intensity of water systems
- Urban runoff and stormwater reuse
- Renewable energy production

DWR is working with other principal WETCAT agencies to develop AB 32 Scoping Plan update. DWR continues to play lead roles in water resource management and planning regarding water conservation, and water use efficiency as well as water recycling.

Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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**Project Start
Date:**

2006

**Project End
Date:**

DATE	IN PROGRESS	N/A
	X	

External Partners:

Other State agencies, State Water Resources Control Board, California Energy Commission, and the California Public Utilities Commission (CPUC)

Project Accomplishments for 2012:

DWR developed water-energy contents with WETCAT actions and coordinated with other WETCAT principal agencies to address water-energy issues in CA Water Plan Update. DWR also continued to be a key player in WETCAT water-energy funding policy group.

DWR continued to lead the implementation of the “20x2020” program to reduce per capita urban water use by 20% by year 2020. DWR also took a lead role for developing Water Use Reduction Guidelines and Criteria for State Agency Facility Pursuant to Executive Order B-18-12.

Other DWR project accomplishments include: 1) reviewed Agricultural Water Management Plans, 2) reviewed and evaluated Urban Water Management Plans, compiled information and developed a report and recommendations regarding climate change on Urban Water Management Plans, 3) developed concept proposals for future funding regarding water and energy efficiency projects in Urban Water Management and Integrated Regional Water Management.

Project Deliverables/Timeline:

DWR will complete Water-Energy sections of CA Water Plan Update, and related report and information framework by 2014.

Customers:

DWR, CEC, CPUC, SWRCB, CARB

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Integrated Resource Plan for the State Water Project

Sponsor/Program Manager	William Forsythe
Project Manager	Veronica Hicks

Project Objective:

A 20 year resourcing plan (updated every 3 years) under which the long-term energy needs of the State Water Project's (SWP) would be met.

Project Description:

<p>The Integrated Resource Plan (IRP) is a resourcing plan outlining strategies under which the long-term energy needs of the State Water Project's (SWP) would be met. The IRP considers a balanced approach to meeting the operational, economic, and policy needs of the SWP's water delivery requirements. One component of the IRP is a renewable resources procurement plan that will keep SWP operations consistent with the GHG reduction goals outlined in DWR's Climate Action Plan which incorporates the Governor's Executive Order S-03-05 and AB 32.</p> <p>In developing the IRP, DWR considers numerous operational and regulatory constraints and objectives the SWP is committed to meeting:</p> <ul style="list-style-type: none"> • Reliable water deliveries; • Affordable and sustainable water deliveries; • Protection of the natural environment; • Responsibilities under regulatory authorities; and • State and federal environmental policy goals.
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Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:	2006	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 5px;">DATE</td> <td style="border-bottom: 1px solid black; padding: 5px;">IN PROGRESS</td> <td style="border-bottom: 1px solid black; padding: 5px;">N/A</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px;">X</td> <td style="padding: 5px;"></td> </tr> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
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External Partners:

State Water Contractors

Project Accomplishments for 2012:

Project accomplishments prior to 2012 include:

- Committed to termination of the long-term power purchase agreement for energy from RG Unit No. 4, a coal plant in Nevada, in July 2013, at which point the SWP's CO₂ emissions levels will be reduced to nearly half of what they were in 1990.
- Completion of IRP 2009.
- Completion of Renewables Procurement Plan.
- Entered into a long-term power purchase agreement with Northern California Power Agency for 33.5% of the output of the Lodi Energy Center, which will be a low GHG-emitting combined cycle combustion turbine generating plant that will be operational in 2012.
- Developed and maintained a transparent and accurate record of the SWP's energy profiles, baselines, and GHG emissions.
- Completed initial evaluation of adding a second small hydroelectric generating unit at Alamo Powerplant, which would increase SWP's renewables portfolio.
-

Project accomplishments for 2012 include:

- Lodi Energy Center was certified with a commercial operational date (COD) in November 2012.
- Entered into a contract to purchase renewable energy with Alameda County.
- Continued progress on development of a solar development adjacent to the SWP's Pearblossom Pumping Plant – a transmission interconnection application was made to Southern California Edison.
- Continue to participate with O&M in the A.D. Edmonston Pumping Plant pump replacement study to determine the efficacy of replacing up to seven pumps which are the largest SWP loads.
- Completed a report about the California Cap and Trade program outlining the rules, risks, and opportunities.
- Completed a report on the California SO₂ market that provided an overview of the market, how it worked, and what lessons can be learned and applied to the California Cap and Trade program.
- Completed a report on intermittent resources and what challenges lie ahead for California load serving entities.
- Completed a report on the Federal Acid Rain emission program that provided an overview of the market, how it worked, and what lessons can be learned and applied to the California Cap and Trade program.

Project Deliverables/Timeline:

Triennial update to the IRP and renewables procurement plan will be completed in Summer 2013.
Enter into a contract for renewable resources under the 2012 renewable request for proposal (RFP), Spring 2013.
Long-term power purchase agreement for energy from RG Unit No. 4 will terminate in Summer 2013.
Completed the standard block purchases recommended as part of IRP09 by Summer 2013.
Complete the power planning portion of the Edmonston value engineering study following O&M's efficiency tests (by Spring 2014).
Complete initial studies of additional small hydro power plants at or adjacent to SWP facilities in 2014.

Customers:

State Water Contractors

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

2012 Emissions Reports to The Climate Registry and the California Air Resources Board
--

Sponsor/Program Manager	Veronica Hicks
Project Manager	Ram Verma/Veronica Hicks

Project Objective:

Reporting and verification of 2011 Greenhouse Gas (GHG) emissions.
--

Project Description:

<p>DWR reported its direct and indirect GHG emissions to The Climate Registry (TCR). The emissions are the result of the State Water Project (SWP) power purchase transactions, energy consumed at DWR-occupied buildings, fuel consumed by DWR’s vehicles and field equipment, coal burnt at Reid Gardner unit 4 (RG4), natural gas burnt at RG4, fuel consumed by equipment at RG4, methane emissions from GR4 coal pile, CO2 used at DWR facilities, acetylene used at DWR facilities, and fugitive SF6 emissions from DWR facilities. The Department’s TCR Greenhouse Gas Emission Report is in the process of verification by an independent third party verifier. In May 2012, DWR submitted its GHG report the California Air Resources Board (CARB) for the emission year 2011. The report included energy generated and consumed by the SWP, GHG emissions due to energy imported from RG4, and SF6 emissions associated with the SWP’s switchyard circuit breakers.</p>

Funding Information:

Project Budget:	\$	Funding Source:	
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Project Start Date:	01/02/12	Project End Date:	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;"><u>DATE</u></td> <td style="text-align: center;"><u>IN PROGRESS</u></td> <td style="text-align: center;"><u>N/A</u></td> </tr> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </table>	<u>DATE</u>	<u>IN PROGRESS</u>	<u>N/A</u>		X	
<u>DATE</u>	<u>IN PROGRESS</u>	<u>N/A</u>							
	X								

External Partners:

The Climate Registry and California Air Resources Board

Project Accomplishments for 2012: What did the Project accomplish in 2012?

<p>In 2012, CDWR reported 2011 GHG emissions to TCR and CARB. The emissions reported to CARB were verified by a third party verifier.</p> <p>Verification of 2011 emissions reported to TCR is in progress.</p>

Project Deliverables/Timeline: What are the current or future objectives of the project? Create a list of tangible products that have/will result(ed) from project.

Current Objectives:

1. Compliance with mandatory reporting requirements of AB32
2. Voluntary reporting to TCR and establishing emission baseline
3. Monitoring emissions, and quantities of SF6 and fuels
4. Third party verification of the reported emissions

Future Objectives:

1. Compliance with CARB's Cap and Trade program
2. Tracking and reducing GHG emissions

Tangible results that will result from the project:

1. Compliance with AB32 regulation
2. Compliance with CARB's Cap and Trade Program
3. Optimizing compliance cost
4. GHG Emission reduction
5. Monitoring, controlling and optimizing fuel usage
6. Preparing emission reports

Customers:

Public, CARB, TCR and State Water Contractors

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Mitigation Team

Sponsor/Program Manager	John Andrew, Elissa Lynn
Project Manager	Qinqin Liu

Project Objective:

GHG emission reduction in water resource management and planning to implement AB 32 Scoping Plan for climate change mitigation

Project Description:

DWR major actions for GHG emission reduction related to water- energy efficiency for water resource management and planning include 1) developing qualitative and quantitative criteria for water-energy and GHG reduction contents for CA water, resource management strategies and regional reports in California Water Plan Update, 2) providing outreach for agriculture water use efficiency, 3) contributing to WETCAT Climate Action Team management actions and coordinating with the other WETCAT agencies for AB 32 Scoping Plan implementation and update, 4) evaluating, managing and coordinating grant and urban water management plan programs for urban water conservation projects regarding water energy efficiency and GHG emissions reductions, 5) develop framework to bridge policy gaps in AB32 and SB 7x7, 6) worked with carbon offset work teams, 7) contributing to the AG-CAT including streamlining the permitting process for methane digesters on dairies and working on the AB32 scoping plan update.

Funding Information:

Project Budget:	\$300,000	Funding Source:	AB 32
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Project Start Date:	2011	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">DATE</th> <th style="border-bottom: 1px solid black;">IN PROGRESS</th> <th style="border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
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External Partners:

WETCAT agencies, agriculture and urban water organizations, the public

Project Accomplishments for 2012:

1) Developed water-energy and GHG reduction contents for CA water, the resource management strategies and regional reports in water plan update 2013, 2) provided outreach for agriculture water conservation by working with the Conservation Agriculture Systems Institute and the Center for Irrigation Technology, 3) Managed grant contract for urban water conservation project and 4) served at the technical advisor team to produce a report to assist urban water planning for climate change, 5) served in a work team and developed priority list to coordinate with the other WETCAT agencies for AB 32 Scoping Plan implementation and update, 6) evaluating, managing and coordinating

grants and urban water management plan programs with recommendations, grant concept proposals and report; 7) completed a poster for a public awareness campaign highlighting the effects of climate change on agriculture and the mitigation steps the public can take.

Project Deliverables/Timeline:

Climate change mitigation content for Water Plan Update 2013, and water-energy chapter or paper

Customers:

WETCAT agencies, agriculture and urban water organizations, the public.

BUSINESS PRACTICES & TECHNICAL EXPERTISE

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

DWR Climate Change Program

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn/Michael Healey

Project Objective:

<p>The Climate Change Program supports all climate change activities across the Department. Specialists in both adaptation and mitigation are located throughout the regional offices, and headquarters. Program goals include providing regionally-specific climate change information to programs, projects, and documents, by accessing and synthesizing research, data, tools, and topical content for California's unique water management issues with regard to a warming climate.</p>
--

Project Description:

<p>DWR has had a climate change program since 2009. Executive Manager for Climate Change, John Andrew, expanded the program to provide a team of climate change specialists to serve Department and public on issues related to climate change and water management. Members are matrixed across Departments and Division. No new hires were made in 2012.</p> <p>The Climate Change program receives funding from Proposition 84, and fees from the Air Resources Board under Assembly Bill 32 (Global Warming Solutions Act). Seven full time staff are supported by Prop 84, with two supported by AB32. Additional climate change support is provided by Executive, and Water Use Efficiency.</p>

Funding Information:

Project Budget:	\$1,500,000/year	Funding Sources:	Proposition 84 and AB 32
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Project Start Date:	2009	Project End Date:	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">DATE</th> <th style="width: 25%;">IN PROGRESS</th> <th style="width: 25%;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
	X								

External Partners:

Matrix managed across multiple divisions of DWR.
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Project Accomplishments for 2012:

<p>Climate Change Program staff conducted or supported many of the individual projects listed in this Annual Report. In addition, the program held four Climate Change Matrix Team meetings in 2012, for internal coordination on projects and topics related to climate change and water management. The Climate Change team meets biweekly, as does a subgroup working on mitigation issues.</p>
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Project Deliverables/Timeline:

The program has funding that should support all activities of the climate change program through FY 15/16.
--

Customers:

California Water Plan, Integrated Regional Water Management, and FloodSAFE program. The program also provides support to the Governor's Climate Action Team.

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change Matrix Team

Sponsor/Program Manager

Gary Bardini

Project Manager

John Andrew

Project Objective:

Communication and coordination of climate change activities across DWR

Project Description:

DWR's Climate Change Matrix Team includes representatives from every division and major program in the Department. The team of approximately 40 staff (membership is on the last page of the annual report) meets quarterly to communicate and coordinate on climate change issues. Meetings regularly feature an external speaker on climate change, Department and State policy discussion, and an update from the State Climatologist.

Funding Information:**Project Budget:**

\$40,000

Funding Source:

Various

Project Start Date:

March 2007

Project End Date:

Ongoing

External Partners:

None

Project Accomplishments for 2012:

The matrix team focused on sustainability issues during 2012.

Project Deliverables/Timeline:

During 2013, the matrix team will develop phase III (adaptation) of DWR's Climate Action Plan.

Customers:

DWR staff

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Development of Internal DWR Policies on Climate Change Mitigation, Analysis, and Adaptation
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Sponsor/Program Manager	John Andrew, Katy Spanos, Heidi Rooks
Project Manager	Phase I: Andrew Schwarz and Lauma Jurkevics, Phase II: Andrew Schwarz, Abdul Khan, and Erin Chappell, Phase III: Andrew Schwarz and Michelle Selmon

Project Objective:

Develop comprehensive DWR policies and procedures to guide climate change mitigation, analysis, and adaptation on activities performed by DWR.
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Project Description:

In June 2009, the Director formally established the CEQA Climate Change Committee (“C4”) to review all climate change analyses in DWR environmental documents and exemption considerations prior to publication. Since that time C4 has served as the key advisory board for all elements of climate change analysis in CEQA documents. Since 2008, C4 has reviewed and commented on tens of environmental impact reports and nearly 100 other Departmental environmental documents.

Over the past 4 years, C4’s recommendations and approach to addressing climate change issues in CEQA documents has evolved and matured as new legislation and litigation has provided additional requirements, information, and context. In 2010, C4 began a three phase process to develop a comprehensive DWR Climate Action Plan which will contain internal policies to address climate change mitigation, effects analysis, and adaptation. DWR staff, located in the four regional offices and headquarters, will continue to provide technical assistance to project managers and consultants throughout the department to implement policies and guidance developed by the C4.

Phase I of the Climate Action Plan is a comprehensive DWR-wide Greenhouse Gas Emissions Reduction Plan that documents 1) DWR’s actions to reduce GHG emissions from its activities consistent with AB 32 and Executive Order S-3-05 and 2) Complies with the requirements of CEQA Guidelines section 15183.5 for “Plans for the reduction of greenhouse gas emissions” that can be relied on in subsequent project specific analysis.

Phase II of the Climate Action Plan will be a guidance framework and data toolbox to guide incorporation of climate change in future planning analysis of DWR projects and activities. Completion of Phase II will result in a guidance document and an accompanying climate scenario toolbox to assist DWR project managers with assessing the need for climate change analysis in their planning activities and guiding decision making for selection of analytical tools and analysis procedures, as well as, assumptions about future conditions. The guidance framework will ensure that DWR projects meet standards for consistency, quality, and adequacy in climate change analysis. This phase of the Climate Action Plan builds on the December 2010 publication of “[Climate Change Characterization and Analysis in DWR Planning Studies](#)” by Abdul Khan and Andrew Schwarz. This foundational document is a comprehensive and comparative review of planning studies conducted by DWR and its partner agencies that have addressed climate change.

Phase III of the Climate Action Plan will be a DWR Climate Change Resiliency and Adaptation Plan. This plan will review DWR owned and operated facilities and DWR’s activities throughout the state, conduct a vulnerability analysis of these facilities and activities and develop resiliency and adaptation strategies for the department to

prepare and protect DWR's assets and services from expected change in climate.

NOTE: This project is an update to and expansion of project updates that were described in the 2011 Climate Change Program Update under the titles: "Coordination of Climate Change Analysis Methods for DWR Planning", "Addressing Climate Change in Departmental CEQA Documents", and "Provide Assistance for DWR CEQA Documents".

Funding Information:

Project Budget:	\$300,000	Funding Source:	N/A
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Project Start Date:	2009	Project End Date:	<u>DATE</u>	<u>IN PROGRESS</u>	<u>N/A</u>
				X	

External Partners:

Phase I: California Attorney General's Office, OPR. Phase II: DWR Climate Change Technical Advisory Committee
Phase III: TBD

Project Accomplishments for 2012:

Phase I: Completion of DWR GHG Emissions Reduction Plan (GGERP) March 2012, Completion of CEQA review May 2012, formal adoption of GGERP by DWR Director Cowin May 24, 2012. Full implementation of GGERP began June 1st, 2012. Multiple roll-out presentations and workshops were held in 2012 to familiarize DWR staff with new procedures and practices under the GGERP including and all staff workshop in October, a presentation at the September Environmental Scientists Conference, and focused meetings with the Flood Maintenance and Flood Projects Offices, State Water Projects Contracts Office, and SWP Operations and Maintenance Office. Staff also made several presentations to groups outside of DWR to highlight DWR's accomplishment and promote the use of the GGERP as a model framework for other state agencies and utilities throughout the state. Presentations were made to the WET-CAT, the Energy Subgroup at the Annual ACUA conference, and to the Environmental Law Conference at Yosemite. Additional presentations are planned for 2013.

Phase II: Continued work with CCTAG to evaluate climate change scenarios and analysis methods. Continued work on data toolbox including completion of climate change scenario data gathering and uploading.

Phase III: Initiated discussion on scoping and overall format of Adaptation Plan

Project Deliverables/Timeline:

Three Phase Climate Action Plan: Phase I completion in 2012, Phase II completion in 2014, Phase II completion 2014.

Customers:

DWR project managers

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Monitoring and Tracking of Implementation of DWR Greenhouse Gas Emissions Reduction Plan

Sponsor/Program Manager	John Andrew, Katy Spanos, Heidi Rooks
Project Manager	Andrew Schwarz

Project Objective:

Monitor and track implementation of DWR Greenhouse Gas Emissions Reduction Plan to meet the commitments laid out in the Plan and ensure that DWR is on course to meet its GHG emissions reduction goals.

Project Description:

With the adoption of the DWR Greenhouse Gas Emissions Reduction Plan (GGERP) on May 24th, 2012 DWR committed to substantial GHG emissions reduction goals (Near-term: Reduce GHG emissions to 50% below 1990 levels by 2020; Long-term: Reduce GHG emissions to 80% below 1990 levels by 2050). DWR also committed to annual tracking and reporting of GHG emissions and a quinquennial review of progress toward achievement of goals and re-evaluation of GHG emissions reduction strategies if necessary.

Funding Information:

Project Budget:	\$50,000	Funding Source:	N/A
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Project Start Date:	2012	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; text-align: left;">DATE</th> <th style="width: 33%; text-align: left;">IN PROGRESS</th> <th style="width: 33%; text-align: left;">N/A</th> </tr> </thead> <tbody> <tr> <td colspan="3">On-going through 2050</td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A	On-going through 2050		
DATE	IN PROGRESS	N/A							
On-going through 2050									

External Partners:

The Climate Registry

Project Accomplishments for 2012:

A general protocol and procedures have been developed for tracking and reporting annual emissions. 2011 Emissions have been documented and are currently being reviewed (as of February) and will be posted on the DWR Climate Change webpage (/CAP.cfm) when complete. Initial discussion have taken place with DWR's Sustainability Coordinator and the new Water and Energy Efficiency Office to develop a proposal to use the "Carbon Impact" software package to track GHG emissions from construction in the future, which would improve the accuracy and timeliness of emissions estimates for future reporting.

Project Deliverables/Timeline:

On-going monitoring and reporting of DWR GHG emissions consistent with the GGERP each year, Quinquennial evaluation of progress toward meeting GGERP GHG emissions reduction goals.

Customers:

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sustainability

Sponsor/Program Manager	Dale Hoffman-Floerke
Project Manager	Mary Simmerer

Project Objective:

DWR will be a sustainability leader within State government and the California water community
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Project Description:

<p>DWR has established a Sustainability Policy, which received approval from former DWR Director Snow, on April, 22, 2009. DWR’s Sustainability Policy embodies the goals and directions the Department will take to be a sustainability leader within State government and the California water community. The policy sets initial targets in the following areas:</p> <ul style="list-style-type: none"> • Carbon- 50% reduction below 1990 levels by 2020 (consistent with the AB 32 Scoping Plan); 80% reduction below 1990 levels by 2050 (EO S-0-05) • Energy- Progressive acquisition of 360 GWh of renewable energy resources by 2020; reduce grid-based retail energy demand 20% by 2015; ensure Energy Star purchasing (EO S-2-04) • Wastewater- Incorporate recycled wastewater and/or greywater into facilities if technically feasible and cost-effective • Waste- 50% diversion from waste stream by 2020 (AB 1016) • Water- 20% reduction in per employee water use by 2020 (consistent with SB 7x-7)

Funding Information:

Project Budget:	\$0.00	Funding Source:	N/A
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Project Start Date:	April 22, 2009	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; border-bottom: 1px solid black;">DATE</th> <th style="width: 33%; border-bottom: 1px solid black;">IN PROGRESS</th> <th style="width: 33%; border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;">X</td> <td> </td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
	X								

External Partners:

None

Project Accomplishments for 2012:

<p>2012 Sustainability Accomplishments</p> <p>Sustainability activities for DWR in 2012 focused both on education and awareness of Sustainability practices and principles, as well as implementing various Sustainability activities. Following is a list of significant 2012 sustainability</p>
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accomplishments and efforts. *(For the reader's convenience, the list is grouped alphabetically by activity.)*

- **Agency Sustainability Coordination Efforts**

- California Water Plan- Development of Sustainability Indicators.
 - The California Water Plan, updated every five years, presents the status and trends of California's water-dependent natural resources; water supplies; and agricultural, urban, and environmental water demands for a range of plausible future scenarios. The plan also evaluates different combinations of regional and statewide resource management strategies to reduce water demand, increase water supply, reduce flood risk, improve water quality, and enhance environmental and resource stewardship. The evaluations and assessments performed for the plan help identify effective actions and policies for meeting California's resource management objectives in the near term and for several decades to come. A Sustainability indicator framework, along with proposed targets and goals has been developed and is moving through the public comment phase. The Sustainability Indicators are expected to work within DWR's Integrated Water Management program over time.
- Review of various Department Documents for inclusion of Sustainability principles.
 - Sustainability principles at DWR are found across numerous programs. It is important that DWR relay these principals to the public with consistency and clarity. By reviewing major DWR documents for Sustainability principles, consistency of use and meaning is maintained. Some of the documents that contain Sustainability Principles include the Central Valley's Flood Protection Plan and the California Water Plan.

- **Committees: Updates & Accomplishments**

- Agency Sustainability Coordinators.
 - This external group consists of other State Agency personnel who are involved in Sustainability activities within their respective agencies. The group meets monthly at DWR to discuss Sustainability issues within the public sector.
- Carbon Committee
 - DWR established a committee to discuss on-going projects and issues with regards to legislative mandates on greenhouse gases, cap and trade issue and carbon sequestration.
- Environmental Coordination Committee
 - The purpose of the ECC is to provide assistance to DWR staff to assure that DWR's activities that involve environmental considerations are in compliance with legal, legislative and policy mandates, and that work products are internally consistent. The ECC is a forum in which DWR staff discusses a wide range of topics from current regulatory issues, document protocols, environmental analyses and mitigation policies.
- NRO Sustainability Committee
 - The Northern Regional Office is engaged in a Sustainability Pilot Project that looks to

implement Sustainability best practices. The committee meets monthly to plan and implement various projects.

- State Agency Green Employees (SAGE)
 - SAGE, originally known as the State Agency Recycling Coordinator's Committee (SARCC), is a group for State Recycling Coordinators and other employees involved with the State's Green efforts. Founded in April, 2008 SAGE was developed by employees of local Agencies who shared a need to communicate with other Agencies regarding meeting State mandates, materials reuse, recycling programs, and Environmentally Preferred Purchasing.
 - In May, 2008 the first SAGE meeting was held and Recycling Coordinators from eleven local agencies were introduced to the committee. Since then, SAGE has continued to grow and its network reaches over 42 agencies within the State
 - In May 2012 SAGE held its California Green Fair on the steps of the Capital.
- Sustainability Leads
 - This group meets bi-weekly to develop Sustainability Initiatives and Sustainability Best Practices. This group also makes annual recommendations on Sustainability Policy. In 2012, the group made three recommendations that are being reviewed by DWR's Director.
- Sustainability Working Group
 - This group meets monthly to discuss Sustainability initiatives, perform pilot projects and make recommendations on DWR's Sustainability policies.
 - Subcommittees
 - Life Cycle Assessment Committee
 - Committee is looking at various products frequently purchased by DWR and performing a LCA on each product. The final results will help DWR determine the feasibility of using LCA for more products.
 - Bike Committee
 - Drafted Commuter Biking Vision Statement
 - Supported May is Bike Month Activities
 - Established procedures for obtaining bike lockers
- TMA Commuter Club
 - The Sacramento TMA is the oldest TMA in Sacramento and one of the largest in the country. Incorporated in 1989, the TMA has 165 members, representing more than 90,000 commuters. The Sacramento TMA serves employers, commuters and residents from the American River to Elk Grove and from the Sacramento River to 65th Street.
 - Through DWR's membership in the Sacramento Transportation Management Association, DWR offers an employee commute program that puts the Emergency Ride Home vouchers

online and offers commute information, incentives, and prizes. By using the incentives that TMA has to offer, DWR continues to promote Greenhouse Gases awareness and encourage alternate transportation.

- **Education and Awareness Activities**

- Sustainability Collaboration Portal
 - In 2012, a web-based tool containing an array of information, news articles, images, etc. on Sustainability was developed and is now open to all DWR employees. See <https://sustainability.water.ca.gov>
- 2012 Sustainability Awareness Campaign.
- A series of seven videos, each with an accompanying Sustainability message, the campaign featured DWR Director Mark Cowin, and Resources Secretary John Laird. Other DWR personnel also discussed how Sustainability fit within their duties at DWR. The videos were on the Sustainability Collaboration portal and drew 1, 755 visitors, who viewed over 4,685 pages and spent an average of 1.21 minutes per page.
- 2012 Earth Day Activities
 - An electric car demo was held during April to celebrate Earth Day. Three vendors displayed their respective cars and gave demo rides and answered questions. Over 200 people participated.
- 2012 May is Bike Month
 - DWR participated in the Sacramento Transit Management Authority's "May is Bike Month" event. The event is held every May to encourage commuter biking and substitute bike riding for car trips. In 2012, 221 participants rode for a total of 34,750 miles.
- 2012 October is Low Car Use Month Challenge
 - 561 DWR employees participated in Low-Car Use Month.
- 2012 November America Recycles Day
 - DWR participated in America Recycles Day by partnering with CAL EPA's event. Approximately 500 people attended the event.
- 2012 Sustainability Section in Climate Change Class 201.
 - Two Climate Change classes featuring a Sustainability Section were taught in 2012.

- **Energy Efficiency Efforts**

- A new water and energy efficiency unit was established to help DWR achieve Energy Efficiency directives. The unit consists of a supervisor and three employees who will continue the identification and location of all DWR retail energy sources and meters and will begin benchmarking energy use at DWR.
- Various Enterprise Carbon Accounting (ECA) software packages were reviewed for suitability and

cost. The ECA package will assist DWR in tracking energy and water use as well as tracking and reporting DWR's greenhouse gases.

- **Environmental Stewardship Principles**

- DWR adopted Environmental Stewardship Principles in 2010 and in 2012 worked with the Department's Engineering Bulletin, Water Resources Engineering Memorandum (WREM) 58A to assure that the Principles were embedded into the Department's Engineering Practices. The new Bulletin, WREM 58B was adopted DWR in 2012.

- **Paper Reduction**

- Launched in 2010, Documentum is an enterprise system for managing all record types including video, podcast, images and other digital records as well as traditional media storage such as paper and microfilm. This paper reduction process is on-going, but electronic storage is becoming increasingly main-stream at DWR. A Department of General Services inventory of public records is required every five years. The next report (due in 2013) will be an excellent benchmark of DWR progress in this area.

.Reporting Sustainability Efforts

- **Annual Report**

- The second sustainability annual report was released in 2012, detailing events and accomplishments from 2011. That report may be accessed at:
 - https://sustainability.water.ca.gov/library/-/document_library/view/3364357

- **Water Use Efficiency**

- DWR has established a water and energy efficiency unit who will be tracking, monitoring and reporting DWR's water use. Accomplishments include identifying DWR's public water systems, meters and submeters and beginning to benchmark DWR's current water use.

Awards

- **Sacramento Area Sustainable Business of the Year Award**

- Sacramento County's Business Environmental Resource Center (BERC) awarded DWR a Sacramento Area Sustainable Business of the Year Award in the category of Government Agency in 2012. This award promotes businesses that adopt environmentally friendly practices, prevent pollution, and conserve resources. The Annual Awards honor the top performers in programs who have implemented outstanding achievements in Energy Conservation, Water Conservation, Pollution Prevention, Solid Waste Reduction, Green Building and Transportation/Air Quality.

Project Deliverables/Timeline:

- Carbon- 50% reduction below 1990 levels by 2020 (consistent with the AB 32 Scoping Plan); 80% reduction below 1990 levels by 2050 (EO S-0-05)
- Energy- Progressive acquisition of 360 GWh of renewable energy resources by 2020; reduce grid-based retail energy demand 20% by 2015; ensure Energy Star purchasing (EO S-2-04)
- Wastewater- Incorporate recycled wastewater and/or greywater into facilities if technically feasible and cost-effective
- Waste- 50% diversion from waste stream by 2020 (AB 1016)
- Water- 20% reduction in per employee water use by 2020 (consistent with SB 7x-7)

Customers:

DWR, State Contractors

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Sustainable Facilities Operations - Greenhouse Gas (GHG) Initiatives

Sponsor/Program Manager	Executive
Project Manager	John Engstrom

Project Objective:

Reduce GHG attributed to Business Operations

Project Description:

DWR will identify, measure, and implement sustainable business operations practices to reduce GHG, and educate employees. These practices will include reducing energy and resource consumption, while lowering greenhouse gas emissions and creating healthier working environments for DWR employees. The development of these enhanced business practices will include:

- DWR will integrate a document management system into its daily business operations. This type of system will reduce paper quantity and create an electronic system for tracking of approvals and electronic retention of documents to save time and resources.
- DWR will continue to promote the Environmentally Preferable Purchasing (EPP) program to utilize procurement methods that provide options for purchasing “green” products.
- DWR will increase its efforts to reduce, reuse, recycle, and rethink in all areas of DWR’s daily business activities. DWR will look at continuing to increase its waste reporting metrics under SB 1016 by using annual waste disposal as a factor when evaluating program implementation.
- DWR will promote and implement energy, water efficiency, and conservation in all capital and renovation projects as well as operations and maintenance activities within budgetary constraints and programmatic requirements.
- DWR will promote ways to reduce employee business travel for meetings by use of technology such as teleconference centers or web casting. In addition, training webinars and other online training opportunities will be investigated to reduce training commute for employees.

Other actions in progress or in planning to promote a more sustainable business include:

- DWR will continue to educate through outreach activities like the annual Green Week event, *DWR News/People* articles, Pod Casts, and Aqua Net announcements.
- DWR will provide an official office supply reuse room (Green Pastures) on the 3rd floor of the Resources Building for new, gently used, or open box office materials that will be available to all DWR employees free of charge.
- DWR is constructing a new State Water Project Southern Field Headquarters which is anticipated to become DWR’s first LEED (Leadership in Energy and Environmental Design) Gold building.

Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:

Continuous Efforts

Project End Date:

DATE	IN PROGRESS	N/A
	X	

External Partners:

Department of General Services

Project Accomplishments for 2012:

- DWR has participated in a loan program through the Department of General Services utilizing American Recovery and Reinvestment Act (ARRA) funds. These funds were used to update lighting, heating, and cooling systems at DWR’s three visitor centers and the West Sacramento Bryte Lab and Flood Yard facilities. The projects are approximately 95% completed at the end of the 2012. The energy savings currently appear to range from 20% to 50%.
- DWR implemented a Payroll Deduction Transit Pass Program in 2011 as part of its alternative commute program which subsidizes alternative transportation. The program sells monthly transit passes through a pre-tax payroll deduction. This benefits both employees and the Department. In 2012 calendar year, DWR has transitioned over 50% of transit purchases from counter sales to the payroll deduction program (reduced over the counter sales saving staff time). In addition, Travel Expense Claims (TEC’s) have been reduced by approximately 60% adding to adding staff savings. The program estimates that it has saved the Department approximately 50 to 60 hours a month in staff time while offering more transit fare options to purchase at work for DWR staff.
- DWR actively promotes commuting by bicycle. One of the efforts to increase this alternative mode of transportation is to encourage DWR staff to participate in the Sacramento’s regional “May is Bike Month”. DWR employees logged 34,750 miles for the month of May in 2012. That represented a 75% increase in miles rode by DWR employees.
- DWR participated in the new Executive Order (EO) B-18-12, Green Building Initiative. DWR took the lead role to add water reduction measures to the new EO. These measures are new to the EO which previously only focused on energy reduction. All State Agencies will be required to reduce water use 10% by year 2015, and 20% by year 2020.
- DWR’s Purchasing Services Office held purchasing workshops to update the department buyers about the Environmentally Preferable Purchasing Practices (EPP) program and why it is in the best interest for the Department to utilize this opportunity. The purchases are reportable in many cases under the mandated goals outlined in the Public Contract Code (PCC) ([12153-12320](#)) for buying recycled-content products (RCPs). The goal of this effort is to increase purchases of RCP’s.
- DWR holds an annual Green Week every April. This year, the week was highlighted by an “Electric Vehicle Display”, and a presentation by the Sierra Nevada Brewing Company on Sustainability Initiatives.
- DWR News/People- DWR has promoted sustainability through quarterly “DWR News/People” publication. The articles discuss accomplishments by DWR staff related sustainability at DWR.
- DWR created a “Waste Diversion Award” to promote waste reduction and recycling within our Department. The recipient of this sustainability award disposed the least amount of waste from 18 primary categories and six hazardous waste material categories. The first award was presented in 2008.
- DWR has taken the lead in both organizing and participating in the annual California State Green Fair held each May. This event brings both State Agencies and the private sector together to publicize services and products that reduce energy, promote sustainability, and reduces the States carbon footprint.

Project Deliverables/Timeline:

Continuing GHG Reduction Measures

Customers:

DWR, and State Water Contractors

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Environmental Stewardship Policy

Sponsor/Program Manager	Executive
Project Manager	Ted Frink

Project Objective:

Implementation of the Environmental Stewardship Policy in DWR programs and projects

Project Description:

In October 2010 DWR’s Director Mark Cowin established the inaugural [Environmental Stewardship Policy](#). This policy is integral to advancing a Department-wide “Total Resource Management” approach to planning and design of projects. The Environmental Stewardship Policy commits DWR managers to consider, integrate, and design environmental stewardship attributes into DWR’s water supply and flood protection programs and projects in several ways: integrate ecosystem protection and restoration into water storage and conveyance and flood control/management planning and implementation; include environmental stewardship and ecosystem protection and restoration as criteria in project funding decisions for all DWR programs; plan for conservation, restoration and maintenance of the biological diversity and natural physical processes of aquatic and related terrestrial ecosystems; and plan and implement projects that contribute to the recovery of aquatic and riparian species listed under the federal and state Endangered Species Acts and other laws, as well as other at-risk species.

In an effort to further integrate and implement the concepts of environmental stewardship and sustainability, the Water Resources Engineering Memorandum (WREM) 58a Update Workgroup was established in November 2010 and charged with revising and updating the WREM to incorporate the new Department policies on environmental stewardship and sustainability. The WREM series is a means of permanently recording and disseminating engineering management decisions and implementation guidance to staff. In March 2012, the revised WREM 58 was adopted. [WREM 58b: Environmental Stewardship and Compliance](#) provides guidance for consideration and application of Environmental Stewardship Principles along with project-level guidelines to improve DWR’s ability to meet or exceed environmental compliance requirements. Following the adoption of the WREM 58b, the Environmental Stewardship Implementation Plan Work Group (ESIP) has begun development of an Environmental Stewardship Implementation Plan. The Plan will focus on developing education, outreach, and guidance on how to integrate Environmental Stewardship into all facets of DWR programs and projects. The outcomes of the project are expected to help advance sustainability of the State’s water management infrastructure and public trust resources by following the Director’s Total Resource Management approach.

Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:

November 2010

Project End Date:

DATE	IN PROGRESS	N/A
	X	

External Partners:

N/A

Project Accomplishments for 2012:

WREM 58b was adopted on March 28, 2012.

Project Deliverables/Timeline:

The ESIP workgroup has formed and will begin development of an Environmental Stewardship Implementation Plan by 2014.

Customers:

DWR managers and staff

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Provide Assistance for Water Use Efficiency

Sponsor/Program Manager	Manucher Alemi
Project Managers	Kent Frame

Project Objective:

Implementation of Water Conservation Act of 2009 (SBX7-7) to achieve (1) urban water use reduction statewide by 20 percent per capita by the year 2020, and (2) to help agricultural water suppliers with efficient water management practices.

Project Description:

The Water Use and Efficiency Branch completed or made significant progress in nine projects in the year 2012 among the total 18 projects for implementation of SBX7-7. They include three projects in urban water use (U1, U2, and U6), four in agricultural water use efficiency (A1, A2, A6, and A7), and two projects in combined urban and agricultural water use efficiency (B1 and B2). All of those projects aim at water conservation and water use efficiency.

U1 – Develop the best management practices in the CII water sector (CII - commercial, industrial and institutional);
 U2 – Update Demand Management Measures in urban water use and report to the Legislature;
 U6 – Reviewed the 2010 urban water management plans and reported to the Legislature in April 2012;
 A1 – In consultation with the AWMC, stakeholders and academics DWR completed a final report titled as *A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use* and submitted to the Legislature in May 2012.
 A2 – DWR adopted a regulation providing a range of options for water measurements that agricultural water suppliers may use to measure volume of water delivered to customers with sufficient accuracy to comply with the farm-gate delivery measurement requirement and to implement pricing structure. The regulation was approved by the OAL (Office of Administrative Law) in July 2012.
 A6 – DWR, in consultation with the SWRCB, revised the requirements for AWMPs and published the final document under the title of *A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2012 Agricultural Water Management Plan* in November 2012 and posted it on the DWR website. In the Guidebook the impacts of the climate change on the agricultural water use were documented in detail, and DWR requires the agricultural water suppliers to include the climate change subject in preparation of their AWMPs.
 A7 – DWR developed grant/loan funding criteria to make agricultural water suppliers ineligible for state funding unless they comply with the Water Conservation Act 10608.56(b). These criteria were used in DWR 2012 Agricultural Water Use Efficiency PSP (Proposal Solicitation Package).
 B1 – WUE Branch has been developing a single standardized water use reporting form to meet the water use information needs. The form will be used by the urban water suppliers as well as by agricultural water suppliers for tracking their progress to reach the state water conservation targets. (ongoing)
 B3 – DWR will propose new statewide targets or revise and update existing statewide targets for regional water resources management practices including but not limited to recycled water, brackish groundwater desalination and infiltration and direct use of urban stormwater runoff. The updated targets will be included in the California Water Plan Update. (ongoing)

Funding Information:

Project Budget:	\$10 million in multi-years	Funding Source:	Prop 84
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**Project Start
Date:**

U1 – Jan. 2010
U2 – Jan, 2010
U6 – Jan. 2010
A1 – Jan. 2010
A2 – Jan. 2010
A6 – Jan. 2010
A7 – Jan. 2010
B1 – Jan. 2010
B3 – Jan 2010

**Project End
Date:**

U1 – early 2013
U2 – Project delayed
U6 – Dec. 31, 2016
A1 – May 2012
A2 – July 2012
A6 – Nov. 2012
A7 – July1, 2013
B1 – 2013
B3 – Jan. 2011 (delayed)

External Partners:

U1: CUWCC (California Urban Water Conservation Council)
U2: an Independent Technical Panel consisting of retail water suppliers, environmental organizations, business community, wholesale water suppliers, and academia;
U6: None;
A1: AWMC, stakeholders, and academics;
A2: None;
A6: SWRCB
A7: None;
B1: California Bay Delta Authority, California Dept. of Public Health, CPUC, and SWRCB;
B3: None.

Project Accomplishments for 2012:

U1: The CII task force met 15 times by January 2013. The final report on the best management practices of the CII water is scheduled for release in 2013.
U2: DWR and the CUWCC have begun discussion to convene the Independent Technical Panel.
U6: DWR reviewed the 2010 UWMPs and reported to the Legislature in April 2012. As of January, total 397 UWMPs have been submitted to DWR.
A1: Completed the final report of *A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use*, and submitted it to the legislature in May 2012.
A2: Completed Agricultural Water Measurement Regulation, and it was approved by the OAL in July 2012.
A6: Completed the final document of *A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2012 Agricultural Water Management Plan* in November 2012 and posted it on the DWR website.
A7: The revised funding criteria were included in 2012 Agricultural Water Use Efficiency PSP. It will also be included in the future PSPs such as 2013 Desalination PSP, etc.
B1 and B3: ongoing projects.

Project Deliverables/Timeline:

Project Deliverables/Timelines are included in the Project Accomplishments for 2012. (See the box immediately above)

Customers:

Urban water suppliers and agricultural water suppliers

GRANTMAKING & TECHNICAL ASSISTANCE

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Integrated Regional Water Management Grant Program

Sponsor/Program Manager	Tracie Billington
Project Managers	Joe Yun and Zaffar Eusuff

Project Objective:

For Proposition 84 IRWM funding

- Sustainable water management – developing estimates for water supply yield, water savings, improved water quality, etc.
- All IRWM Plans updated to 2012 standards
- More collaborative water management
- Improved integration of projects
- IRWM Plans consider Climate Change vulnerability adaptation
- Project selection considers mitigation of greenhouse gas emissions

Project Description:

The IRWM Grant Programs provide financial assistance in a manner that:

- Results in optimal investment of state funding providing maximum benefit to the State's people and environment through improved local and regional water management
- Is transparent and provides for engagement by partner agencies, interest-based stakeholders, and the public on program development and implementation
- Is consistent with legal, legislative, and DWR policy requirements for each funding source

Funding Information:

Project Budget:	Varies annually. Total authorized funding \$1.25B	Funding Source:	Proposition 84 and 50 (IRWM)
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Project Start Date:	November 2002	Project End Date:	December 2020
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External Partners:

The IRWM grant program is solely administered by DWR. However, in order to deliver the program we work with a variety of state agencies along with 48 Regional Water Management Groups (RWMGs) supporting individual IRWM regions which includes a variety of local and regional water/flood management agencies, land use agencies, state and federal agencies, non-governmental organizations, and tribal entities.

Project Accomplishments for 2012:

- Issued 2012 IRWM Program Guidelines and Round 2 Proposal Solicitation Packages
- IRWM Round 2 Planning Grant Solicitation
 - Awarded \$9M to 15 Regions; Total Costs = \$14.7M

Project Deliverables/Timeline:

Current program schedule: http://www.water.ca.gov/irwm/docs/ResourcesLinks/Revised-Schedule3_29_12.pdf

Customers:

48 RWMGs supporting individual IRWM regions which includes a variety of local and regional water/flood management agencies, land use agencies, state and federal agencies, non-governmental organizations, and tribal entities.

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Integrated Regional Water Management (IRWM) Climate Change Evaluation

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Objective:

To evaluate current and proposed efforts of Regional Water Management Groups (RWMGs) to incorporate the climate change standard into IRWM plans and to determine the level of assistance needed for DWR to provide these RWMGs

Project Description:

After the passage of Proposition 84, Water Code Section 10541 was updated to define the elements of guidelines developed for approving and distributing the funds. These elements included requiring IRWM plans to consider greenhouse gas (GHG) emissions of identified programs and projects and to evaluate the adaptability to climate change of water management systems in the region. As a result, DWR 2010 guidelines for these funds required IRWM Plans to address both adaptation to the effects of climate change and mitigation of GHG emissions. Applications for Round 1 planning and implementation grants were received in 2010 and 2011, respectively, and funding decisions were finalized in 2011. This project evaluated the extent the climate change standard was addressed by the applications and the level of work the RWMGs were doing or proposing to do to include this standard into their IRWM plan updates.

Funding Information:

Project Budget:	\$6,000	Funding Source:	Prop 84
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Project Start Date:	July 2011	Project End Date:	June 2012
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External Partners:

N/A

Project Accomplishments for 2012:

UC Berkeley PhD candidate Esther Conrad finalized in June a report (*Climate Change and Integrated Regional Water Management in California: A Preliminary Assessment of Regional Approaches*) on IRWM climate change planning being proposed or undertaken by RWMGs. In developing this report, Ms. Conrad worked directly with the Climate Change and IRWM Programs at DWR. The report assessed how RWMGs were responding to the climate change requirements in the 2010 IRWM guidelines. The goals of this effort were to share information about the approaches being taken in IRWM regions across the state and to provide recommendations on how DWR might

improve guidance and support for RWMGs working to address climate change in their planning processes. The content and recommendations of this report represented the views of the author, and not necessarily those of DWR.

DWR provided an opportunity for the RWMGs to comment on the draft version prior to it being finalized. For those RWMGs whose climate change activities were discussed in this report, DWR solicited RWMG feedback regarding whether the efforts of their regions were accurately represented. In addition, DWR invited any general comments on the content of the report and the recommendations. The final report was posted on DWR's climate change website (http://www.water.ca.gov/climatechange/docs/IRWM_CCReport_Final_June2012_EConrad_UCBerkeley.pdf) and in the Water Plan eNews. The report also was the basis for a presentation during a panel focused on adaptation and water management at the Adaptation Futures: 2012 International Conference on Climate Adaptation, held at the University of Arizona, May 29-31, 2012.

Project Deliverables/Timeline:

Project and report completed in June 2012. No further work to be done.

Customers:

RWMGs and DWR IRWM and Climate Change Programs

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Climate Change in Urban Water Management Plans

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Objective:

To assess how suppliers of different sizes and types have incorporated climate change into their 2010 Urban Water Management Plans, and to provide recommendations for how DWR could improve guidance for 2015 UWMPs to best support water suppliers in addressing climate change.

Project Description:

Urban Water Management Plans (UWMPs) are a crucial tool for ensuring adequate and reliable water supplies in California. These plans must be submitted by water supply agencies serving more than 3,000 customers or delivering over 3,000 acre-feet of water annually. Climate change is an increasingly important consideration in this water planning process. In its guidance for preparing 2010 UWMPs, DWR encouraged, but did not require, water suppliers to consider climate change impacts and GHG emissions. This study assesses how suppliers of different sizes and types have incorporated climate change into their 2010 plans. It also provides recommendations for how DWR could improve guidance for 2015 UWMPs to best support water suppliers in addressing climate change. The results of this study will help DWR better assess local responses to climate change risks, and to provide improved guidance and support to water suppliers.

Funding Information:

Project Budget:	\$11,000	Funding Source:	Prop 84
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Project Start Date:	August 28, 2012	Project End Date:	June 30, 2013
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External Partners:

UC Berkeley

Project Accomplishments for 2012:

This study has been conducted by Esther Conrad, PhD candidate at UC Berkeley, in collaboration with the Climate Change Program. DWR provided population data from approximately 200 UWMPs that had been entered into the DWR Online Submittal Tool (DOST). Of these, approximately 60 UWMPs were selected for inclusion in the study, representing water suppliers of various sizes and types. These UWMPs were analyzed for their content on climate change. In addition, 10 representatives of water suppliers were contacted by phone to understand their perspectives on climate change in the context of urban water management planning. A draft report was completed in December 2012 and was circulated within DWR and to external reviewers. Comments received from eight DWR staff and four external reviewers were received and are now being incorporated into the report. A new version will be available for

comment in April 2013. This version will be sent for final comments to the 10 water supplier representatives who were contacted during the analysis, and any other interested parties.

Project Deliverables/Timeline:

A final version of the report will be completed and submitted to DWR before June 30, 2013.

Customers:

DWR's Climate Change and Water Use Efficiency Programs, urban water suppliers submitting UWMPs

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Grantee California Environmental Quality Act (CEQA) Documents

Sponsor/Program Manager	John Andrew
Project Manager	Lauma M. Jurkevics

Project Objective:

To provide outreach and guidance on evaluating and documenting impacts resulting from greenhouse gas (GHG) emissions from projects funded by DWR and to assist, as needed, DWR project managers with CEQA reviews of grant projects in the area of GHGs.

Project Description:

Grantees are required to submit their final CEQA documents to DWR to inform DWR’s discretionary decision-making on grant awards and disbursement of funds. In 2010, the CEQA Guidelines were updated to explicitly include the emissions of GHGs as a potential environmental impact that must be addressed in CEQA documents. This project provides outreach and guidance materials for grantees and DWR project managers to assist them in evaluating and documenting project impacts from GHG emissions. The project also provides individual technical assistance to project managers in understanding and analyzing the GHG information of more complex projects.

Funding Information:

Project Budget:	\$50,000/year	Funding Source:	Prop 84
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Project Start Date:	January, 2010	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; text-align: left;">DATE</th> <th style="width: 33%; text-align: center;">IN PROGRESS</th> <th style="width: 33%; text-align: right;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
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External Partners:

N/A

Project Accomplishments for 2012:

In coordination with the Financial Assistance Branch, the Climate Change Program staff developed in April, 2012, (later updated in September and October, 2012) guidance for DWR grant managers in evaluating the GHG component of grantees’ CEQA documents and also developed a GHG Analysis Data Form for grantees. This latter form allowed grantees to report emissions in a standard format. In addition, a revised *Frequently Asked Questions: CEQA Process for DWR Grant Programs* was posted in August, 2012, to reflect further input from the Office of Chief Counsel but was subsequently modified to a simpler CEQA guidance document in October, 2012: *CEQA INFORMATION FOR GRANTEEES: Process, Greenhouse Gas Analysis, and Climate Change* (http://www.water.ca.gov/climatechange/docs/CEQA_Information_for_Grantees_final_10-17-12.pdf). Regional staff members also were available to assist with reviews of GHG analyses. Southern Region staff provided informal guidance in July, 2012, on addressing GHG emissions for Goleta’s *San Jose Creek Capacity Improvement Project*. In September, 2012, South-Central Region staff assisted with the review for a Madera IRWM project.

Project Deliverables/Timeline:

To continue to provide assistance, as needed. No further products envisioned at this time.

Customers:

Grantees and DWR project managers

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Provide Technical Assistance and Outreach for Integrated Regional Water Management (IRWM) Plans, Data Collection, and Other Climate-Related Tasks

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Objective:

To provide resources, technical assistance, and outreach within DWR and to IRWM planning groups, water agencies, and local governments to incorporate climate change mitigation and adaptation into their planning efforts

Project Description:

After the passage of Proposition 84, Water Code Section 10541 was updated to define the elements of guidelines developed for approving and distributing the funds. These elements included requiring IRWM plans to consider greenhouse gas (GHG) emissions of identified programs and projects and to evaluate the adaptability to climate change of water management systems in the region. As a result, DWR 2010 and 2012 guidelines for these funds required IRWM Plans to address both adaptation to the effects of climate change and mitigation of GHG emissions. This project involves developing and identifying climate change resources, working on data collection and consolidation, and providing technical assistance and outreach within DWR and to IRWM planning groups, water agencies, and local governments to mitigate for and adapt to climate change.

Funding Information:

Project Budget:	\$400,000/year	Funding Source:	Prop 84
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Project Start Date:	January, 2010	Project End Date:	In progress
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External Partners:

N/A

Project Accomplishments for 2012:

Assistance included distributing information at numerous local IRWM stakeholder meetings throughout the year and at two DWR workshops on *Climate Change, Extreme Weather, and Floods* for Southern California in January and for the Central Valley in February, and presenting the *Climate Change Handbook for Regional Water Planning* and climate change resources at the Regional Fora held statewide in January, April, May, September, October, and December. Staff presentations on climate change resources, mitigation and adaptation, and the climate change handbook occurred at the *Santa Ana Climate Change Workshop* in February, the *Southern California Groundwater and Climate Change Workshop* in February sponsored by the Water Policy and Science Center and the Center for Conservation Biology at the University of California in Riverside, the *Central and Southern California: IRWMP Planning and Climate Change* workshop in March, the Governor’s Office of Planning and Research’s *Confronting Climate Change: A Focus on Local Government Impacts, Actions and Resources* in April, the *Sierra Water Workgroup Summit* in June, and the Council for Watershed Health’s *The Mediterranean City 2012: A Conference on*

Climate Change Adaptation also in June. Staff continued to participate in the Government Alliance Pillar of the Santa Ana Watershed Project Authority (SAWPA) in the update of its IRWM plan, *One Water One Watershed* (OWOW), and the development of a government resource booklet, as well as to provide the pillar with presenters from DWR headquarters involved with the Regional Advance Mitigation Planning process and the Riparian Habitat Joint Venture.

The Regional Water Management Groups are initiating climate change work for the updates of their IRWM plans. Regional staff participated in the San Diego IRWM and the Antelope Valley IRWM climate change workgroups, the San Diego IRWM Land Use Planning and Watershed workshops, and the Greater Monterey IRWM, Upper Pit River IRWM, Bay Area IRWM, and the Consumnes, American, Bear, and Yuba (CABY) IRWM Technical Advisory Committees for climate change.

Staff experts from headquarters and the regional offices continued to update DWR's climate change website (<http://www.water.ca.gov/climatechange/>) with new resources and publications, continued dissemination of the Climate News Digest (<http://www.water.ca.gov/climatechange/news.cfm>), and finalized a summary report on the collection of climate data by volunteers. The Climate News Digest posted its Two-Year Anniversary Issue in April, while the climate blog, *Current Perspectives*, was put on hiatus because of the difficulty in getting articles from interested parties.

Staff worked with the State Climatologist, Dr. Michael Anderson, on analyzing statewide precipitation data and began cataloging the large amounts of climate data stored in the regional offices. Staff coordinated with retired State Climatologist, Jim Goodridge, to apply quality assurance and quality control standards on statewide precipitation data, to integrate those data into Geographic Information Systems, and to develop mapping for multiple products. Staff is also involved with a station update and verification process of Bulletin 195 in order to facilitate the process of collecting, storing, and analyzing precipitation data from various sources throughout California. This process is focused on Jim Goodridge's critical and unique knowledge of precipitation Depth-Duration-Frequency curves and annual extremes data sets that make up Bulletin 195. These datasets are stored on over 4,000 spreadsheets containing thousands of precipitation stations. Regional staff are learning the complexities of the datasets and facilitating the sharing process among data providers, DWR, the Western Regional Climate Center, GEI Consultants, Inc., and others. Data from verified stations will feed into databases, in coordination with Dr. Anderson's efforts for emergency response and planning initiatives and for monitoring climate change, and will provide relevant climate information and value added products for the general public. Extreme precipitation analysis will ultimately be available from map-based servers from DWR's Flood Emergency Response Information Service.

Project Deliverables/Timeline:

2013:

- San Diego IRWM Climate Change Planning Study
- San Diego IRWM Land Use and Water Management Study
- Antelope Valley IRWM Climate Change Planning Study
- Greater Los Angeles County IRWM Climate Change Planning Study
- Upper Santa Margarita River Watershed IRWM Climate Change Planning Study
- SAWPA's OWOW 2.0 Resource Guide
- Upper Pit River IRWM Vulnerability Assessment to Climate Change
- Greater Monterey IRWM Vulnerability Assessment for Climate Change
- Bay Area IRWM Vulnerability Assessment for Climate Change
- CABY IRWM Vulnerability Assessment for Climate Change

Customers:

DWR, IRWM planning groups, water agencies, and local governments

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

2012 Agricultural Water Use Efficiency PSP (Proposal Solicitation Package)

Sponsor/Program Manager	Manucher Alemi
Project Manager	Fethi BenJemaa

Project Objective:

This grant program will primarily fund the projects that provide water savings or contribute to in-stream flows that are beneficial to the Bay-Delta or the rest of the State. Consideration will also be given to projects that address water quality and energy savings.

Project Description:

The eligible projects for this funding program must fall in one of the two sections:
 Section A: Agricultural water use efficiency implementation projects that provide benefits to the State.
 Section B: Other agricultural water use efficiency projects such as, planning, research and development projects; feasibility and pilot studies or demonstration projects; training, education, or public outreach programs; or technical assistance programs related to agricultural water use efficiency. These projects' outcome should be transferable to other areas of the State.

Funding Information:

Project Budget:	\$15 million	Funding Source:	Proposition 50
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Project Start Date:	November 2012	Project End Date:	<u>IN PROGRESS</u>
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External Partners:

The program is solely administered by DWR. However, we have invited the staff from USBR and the SWRCB to join our review panel because they have had similar funding programs and we want to share the experiences with federal and other state agencies.

Project Accomplishments for 2011:

We released the PSP in November and received 54 proposals. We have been reviewing the proposals. The funding decision will be made around June 2012.

Project Deliverables/Timeline:

After DWR release the award list, DWR will sign Agreement with each grant recipient agency in which the Deliverables/Timeline will be specified.

Customers:

Agricultural water suppliers, irrigation districts, NGOs, universities, research institutions, etc.

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Federal Grant Programs

Sponsor/Program Manager	Executive
Project Manager	Jeanine Jones

Project Objective:

Seek federal funding where applicable for climate-related activities, particularly research activities
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Project Description:

Grant or Other Applications for Federal Funding

Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:	2008	Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">DATE</th> <th style="text-align: left; border-bottom: 1px solid black;">IN PROGRESS</th> <th style="text-align: left; border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
DATE	IN PROGRESS	N/A							
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External Partners:

Ocean Science Trust, Scripps Institution of Oceanography, USACE

Project Accomplishments for 2011:

Applied for a NOAA Climate Program Office Coastal & Ocean Program grant, in partnership with the Ocean Science Trust and Scripps, for a proposed project to incorporate sea level rise projections into coastal floodplain management pursuant to FEMA's national flood insurance program. Also sought federal cost-sharing from USACE for a follow-up workshop regarding data and monitoring needs associated with the NRC West Coast sea level rise report.

Project Deliverables/Timeline:

Funding decisions for the NOAA grant program would typically be made in spring 2013, but present uncertainties in the federal budget situation make it difficult to speculate when funding decisions might be announced. USACE has provided its cost-share for the follow-up NRC workshop to NRC; the workshop will be held in mid-2013.
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Customers:

DFM, DWR programs interested in SLR

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

National Scientific and External Coordination Committees

Sponsor/Program Manager	Executive
Project Manager	Jeanine Jones

Project Objective:

Represent DWR at interstate, national, and international levels on climate-related matters

Project Description:

During 2012, DWR staff again engaged with interstate and national climate change efforts. Jeanine Jones served on NOAA's Climate Working Group, a subcommittee of NOAA's Science Advisory Board, and on USEPA's State and Tribal Council, a federal climate change advisory committee. She also represented the Western States Water Council (WSWC) on a technical advisory committee to the federal Climate Change and Water Working Group (a coalition of multiple federal agencies including USBR, USACE, NOAA, and USGS). She chaired the WSWC Climate Subcommittee and served on an American Meteorology Society committee on water resources applications.

Funding Information:

Project Budget:	N/A	Funding Source:	N/A
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Project Start Date:		Project End Date:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">DATE</th> <th style="border-bottom: 1px solid black;">IN PROGRESS</th> <th style="border-bottom: 1px solid black;">N/A</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">X</td> <td></td> </tr> </tbody> </table>	DATE	IN PROGRESS	N/A		X	
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External Partners:

NOAA, USBR, USACE, USGS, NOAA RISAs

Project Accomplishments for 2012:

Co-sponsored two workshops with WSWC, one on extreme climate events and one on reauthorization of the National Integrated Drought Information System (NIDIS) legislation. Arranged for WSWC adoption of resolution in support of federal hydroclimate research and data collections programs, and prepared Council's associated congressional briefing materials. Co-sponsored second workshop with NOAA RISAs on climate change/extreme events, which is being used to prioritize potential research projects.

Project Deliverables/Timeline:

Continue to influence federal agency decisions regarding climate change programs, with a near-term focus on extreme events. In 2013, hold workshop on drought prediction with WSWC, and seek federal funding support for a climate analog years data project. Continue working with WSWC and WGA on congressional reauthorization of the

National Integrated Drought Information System legislation, and on funding support for the NOAA Hydrometeorology Testbed program.

Customers:

Other public agencies

PUBLIC OUTREACH

CLIMATE CHANGE PROGRAM PROJECT SUMMARY AND STATUS

Project Name:

Public Outreach on Climate Change

Sponsor/Program Manager	John Andrew
Project Manager	Elissa Lynn

Project Objective:

DWR is actively engaged in outreach efforts internal to the Department, as well as with multiple partners on the water resources impacts of climate change. The focus is on public awareness, partnerships, adaptation and mitigation strategies. DWR also maintains a climate change website which provides the opportunity for the general public to e-mail climate change inquiries to DWR staff.

Project Description:

Public Outreach – Exhibits

Planning continued in 2012 for the DWR-designed Fossil Discovery Center (FDC) exhibit on climate change and water in Madera. Discussions with the FDC regarding the exhibit text and contracting delays will push back the fabrication and set-up of the display to mid-2013.

A new permanent exhibit on climate change and California Water, designed by DWR, opened at the Buena Vista Natural History Museum in Bakersfield in August. A presentation on 'Climate Change & California Water' was held on August 15.

The DWR climate change exhibit at Long Beach Aquarium held several water and climate change presentations:

January 25 -- Climate Change and Extreme Weather Events

February 29 – Climate Change & Coastal Inundation

April 26 -- Climate Change and California Water Supply

November 28-29 -- Aquatic Forum co-sponsored with Long Beach Aquarium – 'Is Southern California Prepared for Extreme Weather Events?'

Public meetings

DWR staff made numerous public presentations on climate change in 2012 (a list is provided in the Accomplishments section), and attended many public meetings on behalf of the climate change program.

Workshops

Jan 31. DWR workshop – ‘Climate Change, Extreme Weather, and Southern California Floods,’ held in follow-up to Governor’s 2011 conference on extreme events. Held at Los Angeles County Department of Public Works.

Feb 14. DWR workshop – ‘Climate Change, Extreme Weather, and Central Valley Floods,’ held in follow-up to Governor’s 2011 conference on extreme events. Held at DWR’s West Sacramento office.

July 30 – Aug 1. Workshop co-sponsored with Western States Water Council; ‘Extreme Weather Events,’ San Diego.

Oct 29 – 30. Workshop co-sponsored with University of Arizona on behalf of the Southwest Climate Science Center; ‘Hydrologic Extremes and Water Management in a Warmer World,’ California Perspectives, held at Scripps Institution of Oceanography, La Jolla.

Nov 15 – 16. DWR Winter Outlook Workshop, held at Scripps Institution of Oceanography, La Jolla.

Reports/Articles

The Climate News Digest is a compilation of articles, reports, blogs, legislative updates, and other resources related to climate change that is intended to keep DWR staff members up to speed on a variety of current climate change-related issues. Current and archived Climate News Digests are available to the public approximately every three weeks at <http://dwrclimatechange.water.ca.gov/digest.html> .

Messele Zewdie Ejeta. 2012. Step toward a deterministic solution of the paradoxical hydrological stationarity problem. Journal of Hydrologic Engineering (March).

Huang, G., T. Kadir, and F. Chung. 2012. Hydrological response to climate warming: The upper Feather River watershed. Journal of Hydrology (February).

Project Accomplishments for 2012:

DWR Climate Literacy Training Classes were held in the Sacramento Training Center on *January 19 (201), August 28 (101) and 29 (201), and in the Northern Regional Office on September 25 (101) and 26 (201). Attendance averaged 25 persons per class; providing training to numerous DWR employees on the impacts of climate change to the water sector.*

Climate Literacy Class 101 is designed to inform DWR staff about the climate and climate change issues that relate to water management in California. Introductory level presentations will be given on the weather and climate of California; hydrologic change measurement and analysis; Greenhouse gas emissions, Internet resources and literature; impacts to California water management; DWR's climate change responses, strategies and activities; state and federal regulations; and research and science updates. A group activity will bring together individual experience and course training, to put climate change into context for the various regions of the State. In addition to background information, participants will engage in discussions about climate change and receive resources that facilitate both their work and their ability to impart reliable information to society at large.

New in 2012 was Climate Literacy Class 201. This course is designed for the DWR staff member who understands the climate and climate changes issues facing the State, and the Department’s role in adapting water management strategies and mitigating for CO₂. This course will provide advanced presentations on the topics of stewardship and

land use as relate to climate change, sustainability, CEQA, the Department's Climate Action Plan, climate change resources for project managers as well as those available to the public, modeling approaches and assumptions, and activities within and outside of DWR related to climate data and tools. In addition, participants will receive internet and agency resources to help them keep up with rapidly advancing science, and state and federal mitigation and adaptation efforts. A group activity will help them put course materials and their experience together to craft management-level decision-making related to climate change in California. It is the goal of the 201 course to provide DWR staff practical support and context for their work, as well as training to be able to impart reliable information on the topic to society at large.

Presentations on Climate Change by DWR Staff in 2012:

Jamie Anderson

"Climate Change Information for Ecological Modeling", annual meeting of the California Water and Environmental Modeling Forum, April 18, Folsom.

"Practical Approaches to Including Climate Change Science and Uncertainty in the Management of CA's Water Resources", workshop on Climate Change and California's Water Supply, May 15, University of California at Davis.

"Climate Change Information for Lake Management in California", annual meeting of the California Lake Management Society, October 4, San Diego.

Michael Anderson

Climate, Climate Change, and CoCoRaHS, Grass Valley Master Gardeners, February 8, Grass Valley.

Climate Change and Water Resources of Sierras, EWRI, February 15, Sacramento.

Climate Change and Flooding, Floodplain Management Association, May 17, Sacramento.

Climate Change and Flood Management, Delegation from Japan Ministry of Construction, February 24, Sacramento.

John Andrew

Water Law Symposium, January 28, Berkeley.

College of Environmental Design Symposium, February 8, UC Berkeley.

Environmental Science, Policy, and Management 102D, March 6, UC Berkeley.

Wise Use of Floodplains: Adaptation in America and Europe (Moderator), March 9, UC Berkeley.

Civil Engineering 251, April 24, CSU Sacramento.

Beahrs Environmental Leadership Program, July 10, UC Berkeley.

GHG Emissions Law Seminar, July 27, San Francisco.

California Environmental Dialogue Plenary, September 21, Sacramento.

Bay Delta Science Conference (Moderator), October 16, Sacramento.

Water Boards Delta Tour, October 30, Ryde.

California Water Law and Policy Class, November 6, UC Santa Cruz.

California Environmental Law and Policy Class, November 20, UC Davis, King School of Law, Davis.

Board Meeting, California Utilities Emergency Association, December 12, Rancho Cordova.

Erin Chappell

"Climate Change and Water Resources in California", delegation from Africa, March, Sacramento.

"Climate Change Adaptation at the Department of Water Resources", delegation from Singapore, April, Sacramento. (organized by Natural Resources Agency)

Climate Change in Water Planning panel member, Sierra Water Workgroup Summit, July, Lake Tahoe.

Pete Coombe

"A Rain Gauge at Every School," CoCoRaHS for the Whiskeytown Environmental School, with representatives from Project WET, October 27, Whiskeytown.

Elissa Lynn

"Adaptation and Mitigation Strategies," for Climate Change, Water and Society Graduate Hydrology class, November 7, UC Davis.

Lauma M. Jurkevics

"Climate Change at DWR: What We're Doing to Mitigate and Adapt," Santa Ana River Watershed Climate Change

Workshop, Santa Ana Watershed Project Authority, February, Fountain Valley.
 "California, Water, and Climate Change: Overview of Climate Change and IRWM Planning Processes," Central and Southern California: IRWMP Planning and Climate Change Workshop, Watersheds Coalition of Ventura County, Santa Barbara County, and Upper Santa Clara River Watershed, March, Ventura.
 Poster presentation; 2012 Environmental Scientist Workshop Planning Committee and the Green Team
 "Doing Our Part to Be Sustainable," DWR 20th Annual Environmental Scientist Workshop, September, Folsom.
 Poster Presentation with Andrew Schwarz; "Using DWR's Greenhouse Gas Emissions Reduction Plan (GGERP)," DWR 20th Annual Environmental Scientist Workshop, September, Folsom.

Maury Roos

"Contrasting Trends in the Sierra Snowpack," Western Snow Conference, May, Anchorage, AK.
 Poster presentation, "Contrasting Trends in the Sierra Snowpack," Bay-Delta Conference, October, Sacramento.

Andrew Schwarz

"California Water Management: The Future Ain't What it Used to Be," EBMUD Water Conservation Showcase, March 20, San Francisco.
 "Climate Change Handbook for Regional Water Planning". OPR Conference on Confronting Climate Change: A Focus on Local Government Impacts, Actions and Resources, April 9, Los Angeles.
 "Development of the Climate Change Handbook for Regional Water Planning," Association of Clean Water Administrators' Climate Adaptation Committee, May 15 (Conference Call).
 "Climate Change Analyses: Looking Back and Looking Ahead," Southern California Groundwater & Climate Change Workshop February 24, Riverside.
 "Multi-level governance and adaptation: Emerging lessons from Integrated Regional Water Management in California," International Adaptation Futures Conference, May 29-31, Tucson, Arizona.
 "Climate Change Impacts on California's Water Resources," Mediterranean Cities Conference, June 25-27, Los Angeles.
 "DWR's Climate Action Plan" California Climate Action Team- Water Energy Subgroup (WET-CAT), August 13 Sacramento.
 Testimony to the State Water Resources Control Board at Bay-Delta Plan Workshop 2, September 5, Sacramento.
 "California Department of Water Resources Climate Change Water Management," presentation to visiting Delegation from The Netherlands, September 11, Sacramento.
 "DWR's Greenhouse Gas Emissions Reduction Plan: What you need to know for your next CEQA document" DWR ES Workshop, September 19, Sacramento.
 "DWR Greenhouse Gas Emissions Reduction Plan," All-Staff GHG Emissions Reduction Plan Workshop, October 1, Sacramento.
 "Climate Change Impacts on California's Water Resources," Guest Lecture at California State University-Sacramento, Environmental Management Class, November 6, Sacramento.
 "Climate Change and Greenhouse Gases Two Sides of the Same Coin: Heads its Complicated, Tails its really Complicated". CEQA Continuing Legal Education Conference. December 13-14 San Francisco.

Michelle Selmon

"Climate Change at the Department of Water Resources," California Planning Roundtable, February, UC Davis
 "San Joaquin Valley Ecosystems in a Changing Climate," San Joaquin Valley Natural Communities Conference , March, Bakersfield
 "Climate Change Adaptation," UC Davis Extension course co-lecturer, March, Sacramento
 "Protecting and Sharing our Planet," Dailey Elementary 2nd grade students, November, Fresno
 "Using Vulnerability Assessments to Inform Agency Decisions," USFWS-National Conservation Training Center Vulnerability Assessment Training speaker, November, Sacramento

Funding Information:

Project Budget:	\$100,000	Funding Source:	Prop 84
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**Project Start
Date:**

2007

**Project End
Date:**

DATE	IN PROGRESS	N/A
	X	

External Partners:

Long Beach Aquarium, Buena Vista Natural History Museum, Fossil Discovery Center, DWR Training Office

Customers:

Public, DWR

Office of the California State Climatologist

Dr. Michael Anderson-

The California Office of the State Climatologist (OSC) is housed in the California Department of Water Resources (DWR) Division of Flood Management. Interacting with other divisions within DWR which composes the state climate office (SCO) and the California Climate Data Archive (CalClim) at the Western Regional Climate Center (WRCC), the OSC provides a growing range of climate services for California.

Work continued on many fronts over the past year. NOAA completed its update to its rainfall frequency product for California with release in March. California's Bulletin 195, a compilation of depth-duration-frequency curves, continues to be updated with the help of retired State Climatologist, Jim Goodridge. Efforts are underway to bring the Jim's computational methods into an automated structure within DWR and examine ways to address climate change in Bulletin 195. Both of these products will be used in an effort to produce hydrologic information for floodplain mapping and other hydrologic and hydraulic studies associated with California's [FloodSAFE](#) program.

Collaboration with NOAA and Scripps Institution of Oceanography continues on the development of an extreme precipitation monitoring network that will include stations to monitor atmospheric water vapor, soil moisture sensors, and vertically pointing radar to detect freezing level in the atmosphere. The project, born out of NOAA's Hydrometeorological Testbed work in the American River watershed, is a five-year effort to outline the initial components of a statewide monitoring network to improve precipitation forecasts and increase lead time for flood mitigation actions. The final configuration of the initial investment of the network is shown in Figure 1. Network installation should be complete by April 2014. A second MOU with NOAA's Earth Systems Research Laboratory and Scripps Institute of Oceanography is being developed to continue efforts on the development of this network.

The California State Climatologist is also partnering with NOAA for a National Interagency Drought Information System (NIDIS) pilot project in California. This effort will include participation from several federal agencies, DWR, the California-Nevada Applications RISA and Western Region Climate Center. Four pilot projects are in progress: a Central Valley effort looking at satellite derived estimates of fallowed land, a Klamath Basin effort to organize the multitude of data sources into a single data portal for the user community, the Southern California Urban pilot which is focusing on the potential for drought early warning and forecasting, and the Russian River pilot which is looking at data coordination and communication improvements.

California is now in year five of the Community Collaborative Rain, Hail & Snow Network (CoCoRaHS). Over 990 volunteers have signed up with NWS Weather Forecast Offices taking the lead as regional coordinators with help from some DWR personnel. Observers are located in 53 of California's 58 counties. Approximately 12,000 reports are submitted per month from California's CoCoRaHS volunteers. A summary of activity is provided in the State Climatologist monthly summaries.

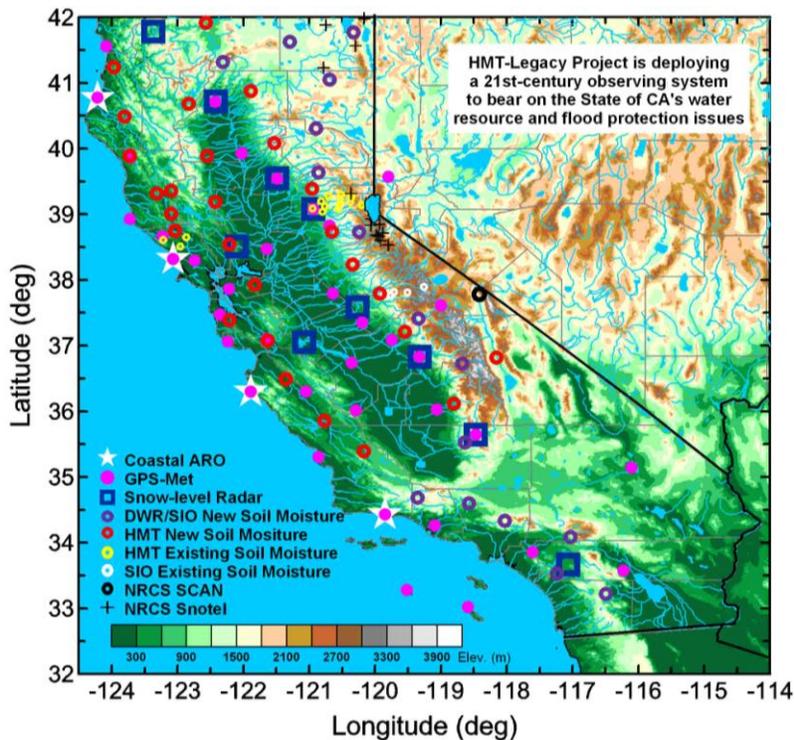


Figure 1. Final buildout plan for 21st Century Observing Network project with NOAA ESRL and Scripps.

Efforts to improve data serving for California climate data continues on multiple fronts. The Department's volunteer observer network is being migrated to CoCoRaHS, old data is being cataloged and efforts will be made to digitize it, and efforts are in progress to continue development of the California Climate Data Archive at Western Region Climate Center.

Travel and presentations were prominent again this past year. Presentations and/or session moderating duties included meetings for the California Water and Environment Modeling Forum, California Cooperative Snow Surveys Annual Meeting, invited talks at different locations within California including workshops hosted by the Western States Water Council.

The State Climatologist participated in the development of the Southwest Climate Assessment which is a regional effort that is part of the National Climate Assessment. As an outcome of that effort, the State Climatologist has been invited to participate in the monitoring metrics for climate change subgroup of the National Climate Assessment.

The annual "WERA-102" Committee meeting, composed of western State Climatologists, the Western Region Climate Center, and federal resource agency partners, was hosted by the Oregon State Climate Office. Discussions were held on data collection, state of the National Climate Service, and climate change work being carried out in different states. The use of observed data and gridded data sets were the subject of special presentations by the PRISM group.

The State Climatologist has also been involved in the Department's Climate Change Matrix Team and FloodSafe's Central Valley Hydrology Study and Central Valley Flood Protection Plan. The matrix team meets quarterly to discuss all things climate change related to the Department. The Central Valley Hydrology Study is developing new design hydrology data to help the Department's floodplain mapping and flood project studies activities. This effort will include a climate change component in which the State

Climatologist will be taking a lead role. The Central Valley Flood Protection Plan (CVFPP) is a five-year plan that presents the flood protection project activities that need to be implemented for the Central Valley. A climate change working group developed a threshold method to account for climate change in flood management planning. The document is available on the CVFPP website.

Twenty-four task orders have been approved for the climate services contract with the University of California system. Activity ranges from water year outlook workshops to modeling studies for flood management to field monitoring installation programs. The contract greatly expands the capabilities of project execution for the State Climate Office. It will be up for renewal in 2014.

Looking ahead to the coming year, the California OSC plans to continue coordination of activities with the CalClim Group and the WRCC, and continue development of the website and its capabilities to improve data serving. The State Climatologist will also continue efforts to engage climate researchers active in the State and continue collaborative efforts with NOAA personnel and others on NIDIS, extreme events, and metrics for monitoring climate change.

Climate Change Matrix Team

Executive Sponsor (in 2012): Gary Bardini	Rich Juricich
John Andrew, Chair	Lauma Jurkevics
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Jamie Anderson	Kathy Kelly
Michael Anderson	Abdul Khan
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