

CALIFORNIA  
**WATER** UPDATE 2013 **PLAN**

Investing in Innovation & Infrastructure

**VOLUME**  
The Strategic Plan





State of California  
Natural Resources Agency  
Department of Water Resources

CALIFORNIA  
**WATER** UPDATE 2013 **PLAN**  
Bulletin 160-13

Investing in Innovation & Infrastructure

VOLUME   
The Strategic Plan

**Edmund G. Brown Jr.**  
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State of California

**John Laird**  
Secretary for Natural Resources  
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**Mark Cowin**  
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# Foreword

The release of *California Water Plan Update 2013* (Update 2013) comes as severe drought leaves farms and communities across much of the state struggling to conserve and manage water supplies for basic needs. This drought is making news around the country and the world. Millions of Californians rank water as a top concern.

In crisis, there is opportunity. Even as we work to anticipate, mitigate, and document the effects of the current drought, we also must work with a longer view to build the relationships and policies that will help California survive the next inevitable drought — and flood — and safeguard the water supplies necessary to allow the state to thrive economically and ecologically.



Since 1957, the California Water Plan has served as the strategic plan for developing and managing the state's limited water resources. Update 2013 documents California's water management challenges and charts a strategic approach to moving forward, as with past updates, but it also echoes a call for action.

Update 2013 reflects the clear path Governor Edmund G. Brown Jr. forged with his *California Water Action Plan*. Released in January 2014, the five-year plan outlines a set of actions that together bring reliability, restoration, and resilience to California water resources, even as the state's population is expected to grow from 38 million to 50 million by 2049.

Three related themes distinguish Update 2013 from Update 2009. The past five years have only reinforced the value of integrated water management, and this plan closely examines the practices and policies that allow water managers to combine flood management, environmental stewardship, and surface water and groundwater supply actions to deliver multiple benefits across a region. Fundamental to that integrated approach is better alignment in the management of data, planning, policy-making, and regulation across local, State, tribal, and federal governments. Put simply, we need to do a better job of coordinating to achieve our goals.

Finally, Update 2013 features an in-depth discussion of principles and strategies for creating stable, effective sources of financing for water resources, so that funding is not haphazard or inconsistent, but instead encourages investment in innovation and infrastructure.

Drought is but one of many challenges facing California water resource managers today. Update 2013 seeks to create a common awareness of our many challenges. All Californians have a stake and must come together — from a planning and policy-making standpoint — to achieve balanced and effective solutions.

A handwritten signature in black ink, appearing to read 'Mark W. Cowin', written in a cursive style.

Mark W. Cowin, *Director*

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*(See complete listing of Topic-Based Caucus participants in Volume 4.)*

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### Water Quality

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Dan Young, co-chairs

### Water Technology & Science

Karl Longley, Bob Wilkinson,  
David Zoldoske, co-chairs

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## Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
ACEEE	American Council for an Energy-Efficient Economy
ACWA	Association of California Water Agencies
AFTF	Alluvial Fan Task Force
ALS	Agricultural Land Stewardship
AMI	Advanced Metering Infrastructure
ARB	California Air Resources Board
ARRA	American Recovery and Reinvestment Act of 2009
ASCE	American Society of Civil Engineers
AWE	Alliance for Water Efficiency
AWMP	agricultural water management plan
BDCP	Bay Delta Conservation Plan
BIA	Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BMPs	best management practices
BTEX	benzene, toluene, ethyl benzene, and xylene
BTH	California Business Transportation and Housing Agency
Cal EMA	California Emergency Management Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Governor's Office of Emergency Services
Cal/EPA	California Environmental Protection Agency
Cal-HR	California Department of Human Resources
California State Parks	California Department of Parks and Recreation
CALVIN	California Value Integrated Network Model
CalWEC	California Water and Energy Coalition
CalWEP	California Water and Energy Program
CASGEM	California Statewide Groundwater Elevation Monitoring
CAT	Climate Action Team
CBC	California Biodiversity Council
CCP	Center for Collaborative Policy
CCST	California Council for Science and Technology
CDFA	California Department of Food and Agriculture
CDPH	California Department of Public Health

*Acronyms and Abbreviations continued*

CEC	California Energy Commission
CEDEN	California Environmental Data Exchange Network
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFD	Community Facility District
CII	Commercial, Institutional, and Industrial
CIMIS	California Irrigation Management Information System
CLCA	California Land Conservation Act
CNRA	California Natural Resources Agency
COGs	Regional Councils of Governments
COPA	California Ocean Protection Act
CORP	California Outdoor Recreation Plan
CPUC	California Public Utilities Commission
CRB	Colorado River Board of California
CSLC	California State Lands Commission
CTP	California Transportation Plan
CUWCC	California Urban Water Conservation Council
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVP	Central Valley Project
CVPM	Central Valley Project Model
CWC	California Water Code
CWEMF	California Water and Environmental Modeling Forum
CWH	Council for Watershed Health
CWP	California Water Plan
CWSIF	California Water Sustainability Indicators Framework
DAC	disadvantaged community
DBCP	agricultural soil fumigant 1,2-dibromo-3-chloropropane
DBW	California Division of Boating and Waterways
Delta	Sacramento-San Joaquin Delta
DFW	California Department of Fish and Wildlife
DOC	California Department of Conservation
DOD	Department of Defense
DOI	U.S. Department of the Interior

*Acronyms and Abbreviations continued*

DPC	Delta Protection Commission
DPR	California Department of Pesticide Regulation
DRMS	Delta Risk Management Strategy
DRMS 2009	Delta Risk Management Strategy Phase I
DSC	Delta Stewardship Council
DSS	Decision Support System
DST	Decision Support Tool
DTSC	Department of Toxic Substances Control
DWR	California Department of Water Resources
EFT	environmental flow target
EGPR	Environmental Goals and Policy Report
EIR/EIS	environmental impact report/ environmental impact statement
EJ	environmental justice
EM	emergency management
EOCs	emerging organic contaminants
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ERP	Ecosystem Restoration Program
EWMPs	efficient water management practices
FAN	Water Plan Federal Agency Network
FCSSR	Flood Control System Status Report
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
Framework	Finance Planning Framework
FRAP	Fire and Resource Assessment Program
FRPA	Fish Restoration Program Agreement
FY	fiscal year
GAC	granular activated carbon
GGERP	Greenhouse Gas Emissions Reduction Plan
GHG	greenhouse gas
GIS	geographic information system
GO	General Obligation (bond)
GPCD	gallons per capita per day
GRACE	Gravity Recovery and Climate Experiment

*Acronyms and Abbreviations continued*

GWMP	groundwater management plan
ICWT	International Center for Water Technology
IFR	instream flow requirement
IHS	Indian Health Services
IPCC	Intergovernmental Panel on Climate Change
IRWM	integrated regional water management
IRWM Strategic Plan	Strategic Plan for the Future of Integrated Regional Water Management in California
ISI forecasting	interannual climate forecasting
IWM	integrated water management
IWRIS	Integrated Water Resources Information System
IX	ion exchange
KSA	knowledge, skills, and abilities
LEED	Leadership in Energy & Environmental Design
LID	low-impact development
LPA	local primacy agency
maf	million acre-feet
MCL	maximum contaminant level
mgd	million gallons per day
MPa	megapascal
MTBE	methyl tertiary butyl ether
MWh/af	million watt-hours per acre-foot
NAHC	Native American Heritage Commission
NASA	National Aeronautics and Space Administration
NAWCA	North American Wetlands Conservation Act of 1989
NEPA	National Environmental Policy Act
NGO	nongovernmental organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRC	National Research Council
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NWIS	National Water Information System

*Acronyms and Abbreviations continued*

NWQI	National Water Quality Initiative
O&M	operations and maintenance
OPC	Ocean Protection Council
OPR	California Governor’s Office of Planning and Research
OWOW2.0	One Water One Watershed 2.0
OWTS	onsite wastewater treatment systems
P3s	public-private partnerships
PGI	plant growth index
PIER	Public Interest Energy Research Program
POE	point-of-entry
POU	point-of-use
PPCPs	pharmaceuticals and personal care products
PRC	Public Resources Code
psig	pounds per square inch gauge
RAP	Regional Acceptance Process
RCD	Resource Conservation District
RCRA	Resource Conservation and Recovery Act
RDM	Robust Decision-Making
RMS	resource management strategy
RWQCB	regional water quality control board
SAWPA	Santa Ana Watershed Project Authority
SB	Senate Bill
SCG	Strategic Growth Council
SCS	Sustainable Communities Strategy
SEMS	Standardized Emergency Management System
SHMP	State Multi-Hazard Mitigation Plan
SHMP 2010	Enhanced State of California Multi-Hazard Mitigation Plan
SIWRO	Secretary’s Indian Water Rights Office
SLR	sea level rise
SMP	Suisun Marsh Habitat Management, Preservation, and Restoration Plan
SMUD	Sacramento Municipal Utility District
SNC	Sierra Nevada Conservancy
SPFC	State Plan of Flood Control

*Acronyms and Abbreviations continued*

STORET	U.S. Environmental Protection Agency, STOrage and RETrieval Data Warehouse
SVP	Shared Vision Planning
SWAMP	Surface Water Ambient Monitoring Program
SWAN	Statewide Water Analysis Network
SWP	State Water Project
SWRCB	State Water Resources Control Board
taf	thousand acre-feet
TMDL	total maximum daily load
UC Davis	University of California, Davis
Update 2005	California Water Plan Update 2005
Update 2009	California Water Plan Update 2009
Update 2013	California Water Plan Update 2013
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USDA Forest Service	U.S. Department of Agriculture Forest Service
USDA RD	Rural Development (U.S. Department of Agriculture)
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWMP	urban water management plan
Water PIE	Water Planning Information Exchange
WaterSMART	Sustain and Manage America's Resources for Tomorrow
WDR	waste discharge requirement
WEAP	Water Evaluation and Planning
WERF	Water Environment Research Foundation
WETCAT	Water-Energy Team of the Climate Action Team
WGA	Western Governors' Association
WQP	Water Quality Portal
WRDA	Water Resources Development Act
WRI	Water Resources Institute
WRIMS	Water Resource Integrated Modeling System (formerly known as CALSIM)
WST Notice	Interim Well Stimulation Treatment Notice
WSWC	Western States Water Council

Metric Conversion Factors

Quantity	To Convert from Metric Unit	To Customary Unit	Multiply Metric Unit By	To Convert to Metric Unit Multiply Customary Unit By
Length	millimeters (mm)	inches (in)	0.03937	25.4
	centimeters (cm) for snow depth	inches (in)	0.3937	2.54
		feet (ft)	3.2808	0.3048
	meters (m)	miles (mi)	0.62139	1.6093
Area	kilometers (km)			
	square millimeters (mm <sup>2</sup> )	square inches (in <sup>2</sup> )	0.00155	645.16
	square meters (m <sup>2</sup> )	square feet (ft <sup>2</sup> )	10.764	0.092903
	hectares (ha)	acres (ac)	2.4710	0.40469
Volume	square kilometers (km <sup>2</sup> )	square miles (mi <sup>2</sup> )	0.3861	2.590
	liters (L)	gallons (gal)	0.26417	3.7854
	megaliters (ML)	million gallons (10)	0.26417	3.7854
	cubic meters (m <sup>3</sup> )	cubic feet (ft <sup>3</sup> )	35.315	0.028317
	cubic meters (m <sup>3</sup> )	cubic yards (yd <sup>3</sup> )	1.308	0.76455
Flow	cubic dekameters (dam <sup>3</sup> )	acre-feet (af)	0.8107	1.2335
	cubic meters per second (m <sup>3</sup> /s)	cubic feet per second (ft <sup>3</sup> /s)	35.315	0.028317
	liters per minute (L/mn)	gallons per minute (gal/mn)	0.26417	3.7854
	liters per day (L/day)	gallons per day (gal/day)	0.26417	3.7854
	megaliters per day (ML/day)	million gallons per day (mgd)	0.26417	3.7854
Mass	cubic dekameters per day (dam <sup>3</sup> /day)	acre-feet per day (af/day)	0.8107	1.2335
	kilograms (kg)	pounds (lbs)	2.2046	0.45359
Velocity	megagrams (Mg)	tons (short, 2,000 lb.)	1.1023	0.90718
	meters per second (m/s)	feet per second (ft/s)	3.2808	0.3048
Power	kilowatts (kW)	horsepower (hp)	1.3405	0.746
Pressure	kilopascals (kPa)	pounds per square inch (psi)	0.14505	6.8948
	kilopascals (kPa)	feet head of water	0.32456	2.989
Specific capacity	liters per minute per meter drawdown	gallons per minute per foot drawdown	0.08052	12.419
Concentration	milligrams per liter (mg/L)	parts per million (ppm)	1.0	1.0
Electric conductivity	microsiemens per centimeter (µS/cm)	micromhos per centimeter (µmhos/cm)	1.0	1.0
Temperature	degrees Celsius (°C)	degrees Fahrenheit (°F)	(1.8X°C)+32	0.56(°F-32)