



Making Water Conservation a California Way of Life

Implementing Executive Order B-37-16

FINAL REPORT
April 2017



This report was prepared by the California Department of Water Resources, State Water Resources Control Board, California Public Utilities Commission, California Department of Food and Agriculture, and California Energy Commission in response to Governor Edmund G. Brown Jr's Executive Order B-37-16 and to provide information to the California Legislature and the public.

This report is available in electronic form:
<http://www.water.ca.gov/wateruseefficiency/conservation/>

Edmund G. Brown Jr.

Governor
State of California

William Croyle

Acting Director
California Department of Water Resources

Felicia Marcus

Chair
State Water Resources Control Board

Michael Picker

President
California Public Utilities Commission

Karen Ross

Secretary
California Department of Food and Agriculture

Robert B. Weisenmiller

Chair
California Energy Commission

Executive Summary



The past five years have brought both historic drought and flooding to California – a reflection of the fact that California experiences the most extreme variability in yearly precipitation in the continental United States. Variability marks California water resources not just year to year, but also by season and location. Our water systems routinely move water hundreds of miles to serve large cities and immense agricultural productivity, but also must help sustain ecologically valuable river and estuary systems. Our population of nearly 40 million people is expected to grow, and climate change is expected to bring rising sea levels, reduced snowpack, and altered precipitation patterns that will affect our ability to maintain water supplies and wildlife habitat. Widespread, careful use of water will help us cope no matter how conditions change. We must always be prepared for extreme fluctuations and use water more wisely, eliminate waste, strengthen local drought resiliency and improve agricultural water use efficiency and drought planning.

The California Water Action Plan, first released in 2014 and updated in 2016, is the five-year roadmap used by the Brown Administration to bring resilience and reliability to our water systems and to restore important ecosystems. Ten principles define California’s Water Action Plan, including “Make Conservation a California Way of Life.”

In May of 2016 Governor Edmund G. Brown Jr. signed Executive Order (B-37-16) that instructed State agencies to help Californians adopt permanent changes to use water more wisely. The Executive Order laid out a framework for moving the state from temporary, emergency water conservation measures to a more durable approach customized to the unique conditions of each local water agency. This report builds upon the Executive Order and provides recommendations for how to implement long-term improvements to water supply management that support water conservation.

Building on Past Success

After Governor Brown called for a 25 percent reduction in urban water use in 2015, Californians rose to the challenge and saved an average of more than 24 percent during the twelve months the mandate was in place. Executive Order B-37-16 builds on that conservation success to establish long-term water conservation measures.

Key to the Executive Order is a requirement that the state’s 409 urban water suppliers meet new water use targets. Rather than measuring water savings as a percentage reduction from a chosen baseline, the new standards recognize past investments by water suppliers in advancing conservation, and take into account the unique climatic, demographic and land-use characteristics of each urban water agency’s service area. This approach allows regions to develop an approach best suited for their community.

Managing water under this framework will require the collective and concerted efforts of state and local governments, non-governmental organizations, businesses, and the public. All of these groups responded to the Governor’s call for mandatory water conservation efforts in 2015, and must continue the collaboration to implement the important actions laid out in the Executive Order and this report.

Preparing This Report and Key Recommendations

Five state agencies – the Department of Water Resources, the State Water Resources Control Board, the California Public Utilities Commission, the California Department of Food and Agriculture, and the California Energy Commission (collectively referred to as the “EO Agencies”) – were charged with implementing the Executive Order’s four inter-related objectives: using water more wisely, eliminating water waste, strengthening local drought resilience, and improving agricultural water use efficiency and drought planning.

The EO Agencies will undertake a suite of actions that can be implemented using existing authorities to implement the four objectives. These include rulemaking proceedings, expanded technical assistance, and evaluation and certification of new technologies. Where necessary, the EO Agencies also recommend additional actions and authorities needed to meet the goals of the Executive Order.



Using Water More Wisely

Emergency Conservation Regulations (Executive Order Item 1): The State Water Resources Control Board (Water Board) will rescind the emergency requirement for a water supply stress test or mandatory conservation standard for urban water agencies, but, to provide a bridge to permanent requirements, it will continue to require monthly reporting and to prohibit wasteful practices (see below).

New Water Use Targets (Executive Order Items 2 and 6): Upon statutory authorization, the EO Agencies will adopt a new urban water use target methodology. Urban water suppliers would, in turn, be required to calculate their unique water use targets based on those standards and local conditions.

Permanent Monthly Reporting (Executive Order Item 3): The Water Board will open a rulemaking process to establish permanent monthly urban water reporting on water usage, amount of conservation achieved, and any enforcement efforts.



Eliminating Water Waste

Water Use Prohibitions (Executive Order Item 4): The Water Board will open a rulemaking process to establish permanent prohibitions on wasteful water practices, such as hosing down sidewalks and watering lawns after rain. This will build on the current prohibited uses in the emergency regulation.

Minimizing Water Loss (Executive Order Items 5 and 6): Senate Bill 555 (Wolk, 2015) requires all urban retail water suppliers in the state to submit a completed and validated water loss audit annually to the Department of Water Resources. The EO Agencies will take additional actions to accomplish the directives in that law related to reducing water supplier leaks. These actions include establishment of rules for validated water loss audit reports, water loss performance standards, and technical assistance for water loss audits and minimizing leaks.

Innovative Water Loss & Control Technologies (Executive Order Item 7): The California Energy Commission (CEC) is evaluating various options for certification of water loss detection and control technologies at utility, household, and appliance levels. The CEC is also making investments in research and funding programs for water saving devices and technologies.



Strengthening Local Drought Resilience

Water Shortage Contingency Plans (Executive Order Items 8, 9, and 6): Upon statutory authorization, urban water suppliers will be required to submit a Water Shortage Contingency Plan, conduct a Drought Risk Assessment every five years, and conduct and submit a water budget forecast annually.

Drought Planning for Small Water Suppliers and Rural Communities (Executive Order Item 10): The EO Agencies' recommendations focus on working with small water suppliers and rural communities to continue to develop more specific drought vulnerability assessments and supplier readiness and responsiveness during drought.



Improving Agricultural Water Use Efficiency and Drought Planning

Strengthened Agricultural Water Management Plan Requirements

(Executive Order Items 11, 12, 13, and 6): Upon statutory authorization, the proposal described in this report would expand existing requirements to require agricultural water suppliers providing water to over 10,000 irrigated acres of land to prepare, adopt, and submit plans by April 1, 2021, and every five years thereafter.







Table ES-1 summarizes the organization of the conservation framework presented in this report and the corresponding Executive Order items.

Implementation

The Administration will work closely with the Legislature to implement the recommendations of this report. The EO Agencies hope that this report will advance our progress under the California Water Action Plan and help “Make Conservation A Way of Life.”

Table ES-1. Actions and Recommendations Summarized in this Report

Chapter Section and Title where Item is Addressed	Executive Order Items													Within Existing Authorities (Chapter 2)	Requires New Authority (Chapter 3)
	 Use Water More Wisely			 Eliminate Water Waste			 Strengthen Local Drought Resilience			 Improve Agricultural Water Use Efficiency & Drought Planning					
	1	2	3	4	5	6	7	8	9	10	11	12	13		
2.1 Emergency Water Conservation Regulations for 2017	●													✓	
2.2 Permanent Prohibition of Wasteful Practices			●	●										✓	
2.3 Reduced Water Supplier Leaks and Water Losses					●	●								✓	
2.4 Certification of Innovative Technologies for Water Conservation and Energy Efficiency							●							✓	
3.1 New Water Use Targets Based on Strengthened Standards		●				●									✓
3.2 Water Shortage Contingency Plans						●		●	●						✓
3.3 Drought Planning for Small Systems & Rural Communities										●					✓
3.4 Agricultural Water Management Plans						●					●	●	●		✓

Note: The Executive Order directs DWR, Water Board, and CPUC to develop methods to ensure compliance with the provisions of the order, including technical and financial assistance, agency oversight, and, if necessary, enforcement action by the Water Board to address non-compliant water suppliers. These are described in Chapters 2 and 3.

Contents

Chapter 1 – Introduction	1-1
1.1 Executive Order B-37-16	1-1
1.2 Evolution of Water Conservation in California	1-3
1.3 Framework for Realizing Conservation as a California Way of Life.....	1-8
Chapter 2 – Directives Implemented Within Existing Authorities	2-1
2.1 Emergency Water Conservation Regulations for 2017	2-1
2.2 Monthly Reporting and Permanent Prohibition of Wasteful Practices.....	2-2
2.3 Reduce Water Supplier Leaks and Water Losses	2-3
2.4 Certification of Innovative Technologies for Water Conservation and Energy Efficiency	2-7
Chapter 3 – Recommendations that Require New and Expanded Authorities to Implement	3-1
3.1 New Water Use Targets Based on Strengthened Standards.....	3-1
3.2 Water Shortage Contingency Plans	3-12
3.3 Drought Planning for Small Water Suppliers and Rural Communities	3-17
3.4 Agricultural Water Management Plans	3-19
Chapter 4 – Implementing the Conservation Framework.....	4-1
4.1 Conservation as an Integral Part of Water Management	4-1
4.2 Support for Framework Implementation	4-1
4.3 Implementation Considerations	4-3
4.4 Implementation Schedule	4-4
Attachment A – Executive Order B-37-16	
Attachment B – Public Outreach and Stakeholder Engagement	

Acronyms and Abbreviations

20x2020	20 percent reduction in urban per capita water use by 2020
20x2020 Plan	20x2020 Water Conservation Plan
AB	Assembly Bill
AU	Agronomic Use
AW	Applied Water
AWMP	Agricultural Water Management Plan
AWUF	Agronomic Water Use Fraction
AWWA	American Water Works Association
BMP	best management practice
CASGEM	California Statewide Groundwater Elevation Monitoring
CCF	centum cubic feet
CCR	California Code of Regulations
CCUF	Crop Consumptive Use Fraction
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CII	commercial, industrial, and institutional
CIMIS	California Irrigation Management Information System
CPUC	California Public Utilities Commission
CUWCC	California Urban Water Conservation Council
CWC	California Water Code
DWR	California Department of Water Resources
E	evaporation
EO	Executive Order B-37-16
EO Agencies	California Department of Water Resources, State Water Resources Control Board, California Department of Food and Agriculture, California Public Utilities Commission, California Energy Commission
EPIC	Electric Program Investment Charge
ET _o	Reference evapotranspiration
ET _c	evapotranspiration of crops
ETAF	Evapotranspiration Adjustment Factor

ETAW	Evapotranspiration of Applied Water
EU	Environmental Use
EWMP	Efficient Water Management Practice
GPCD	gallons per capita per day
GRC	General Rate Case
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
MOU	Memorandum of Understanding
MWELO	Model Water Efficient Landscape Ordinance
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RF	Recoverable Flows
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SRA	Shortage Response Action
SWRCB or Water Board	State Water Resources Control Board
TWUF	Total Water Use Fraction
USEPA	U.S. Environmental Protection Agency
UWMP	Urban Water Management Plan
Water Action Plan	California Water Action Plan
Water Loss TAP	California Water Loss Control Collaborative' s Technical Assistance Program
WET	Water Energy Technology
WMF	Water Management Fraction
WSCP	Water Shortage Contingency Plan

This page left blank intentionally.

Chapter 1 – Introduction



Water has been a scarce resource in California, and conservation must become a way of life for everyone. Much has changed in the past half century, and our technology, values, and awareness of how we use water have helped to integrate conservation into our daily lives. More can be done, however, and all Californians must embrace and make part of their daily lives the principles of wise water use.

Water has played a significant role in California’s history and development. Droughts have often marked critical shifts or tipping points in water resources management, altering how citizens and elected officials view and manage water. Over time, an awareness of water use and water conservation has evolved that has fueled best management practices, funding programs, and legislative and regulatory actions.

California droughts are expected to become more frequent and persistent, as warmer winter temperatures driven by climate change reduce water held in the Sierra Nevada snowpack and result in drier soil conditions. Current drought conditions, which severely impacted the State over the last several years, may persist in some parts of the State into 2017 and beyond. Recognizing these new conditions, permanent changes are needed to use water more wisely and efficiently, and prepare for more frequent, persistent periods of limited supply in all communities and for all water uses, including fish, wildlife, and their habitat needs.

This chapter describes Executive Order B-37-16 (EO), provides a brief summary of California’s evolving awareness of and actions relating to drought preparedness and response, and describes the proposed framework for realizing conservation as a California way of life.

1.1 Executive Order B-37-16

Moving to bolster California’s climate and drought resilience, Governor Edmund G. Brown Jr. issued the EO on May 9, 2016. The EO builds on temporary statewide emergency conservation

requirements and tasks State agencies with establishing a long-term framework for water conservation and drought planning, including permanent monthly water use reporting, new urban water use targets, reducing system leaks and eliminating clearly wasteful practices, strengthening urban drought contingency plans, developing new county drought plans to address the needs of rural communities and small water systems, and improving agricultural water management and drought plans.

The EO directs the California Department of Water Resources (DWR), State Water Resources Control Board (Water Board), California Department of Food and Agriculture (CDFA), California Public Utilities Commission (CPUC), and California Energy Commission (CEC) – collectively referred to as the “EO Agencies” – to summarize in a report a framework for implementing the EO and incorporating water conservation as a way of life for all Californians.

The framework described herein promotes efficient use of the State’s water resources in all communities, whether conditions are wet or dry, and prepares the State for longer and more severe drought cycles that will mark our future. The EO directs DWR, the Water Board, and CPUC to develop methods to ensure compliance with the provisions of the EO, including technical and financial assistance, agency oversight, and enforcement action by the Water Board to address non-compliant water suppliers, if necessary.

The full text of the EO is in Attachment A and at https://www.gov.ca.gov/docs/5.9.16_Attested_Drought_Order.pdf.

The actions directed in the EO are organized around four primary objectives: (1) use water more wisely, (2) eliminate water waste, (3) strengthen local drought resilience, and (4) improve agricultural water use efficiency and drought planning.



Use Water More Wisely

The EO calls for DWR and the Water Board to require monthly reporting by urban water suppliers on a permanent basis.¹ This includes information regarding water use, conservation, and enforcement.

It also directs DWR and the Water Board to develop new water use efficiency targets as part of a long-term conservation framework for retail urban water agencies – through a public process and working with partners such as urban water suppliers, local governments, and environmental groups. These targets are to go beyond the 20 percent reduction in per capita urban water use by 2020 that was embodied in Senate Bill (SB) X7-7², and are to be customized to fit the unique conditions of urban water suppliers.

The Water Board is also directed to adjust emergency water conservation regulations through the end of January 2017, in recognition of the differing water supply conditions across the State, and develop proposed emergency water restrictions for 2017 should the drought persist.

The “Use Water More Wisely” objective includes EO Items 1, 2, and 3.



Eliminate Water Waste

The EO calls for the Water Board to permanently prohibit wasteful practices, consistent with temporary, emergency prohibitions that were put in place in July 2014. These practices include hosing off sidewalks, driveways, and other hardscapes; washing

automobiles with hoses not equipped with a shut-off nozzle; and watering lawns in a manner that causes runoff.

The Water Board and DWR are also directed to take actions to minimize water system leaks across the State. DWR estimates that leaks in water distribution systems siphon away more than 700,000 acre-feet of water a year in California – enough to supply 1.4 million homes for a year. Audits of urban water systems have found that leaks account for an average loss of 10 percent of their total supplies.

The CPUC is directed to prepare a consistent resolution for implementation by its investor-owned utilities. The CPUC is not in a regulatory capacity; see Section 2.3 for information on this directive.

The “Eliminate Water Waste” objective includes EO Items 4, 5, 6, and 7.



Strengthen Local Drought Resilience

DWR is directed to consult with urban water suppliers, local governments, environmental groups and other partners to strengthen standards for local Water Shortage Contingency Plans (WSCP) that are part of the Urban Water Management Plans (UWMP) that urban water suppliers must submit every five years. These strengthened standards would promote planning for adequate actions to respond to droughts lasting at least five years, as well as more frequent and severe periods of drought. For areas not covered by WSCPs, DWR is directed to work with counties to improve drought planning for small water suppliers and rural communities.

The “Strengthen Local Drought Resilience” objective includes EO Items 8, 9, and 10.

¹ This applies to retail urban water suppliers only as they provide water directly to end users (as opposed to wholesalers that do not provide water directly to end users).

² The Water Conservation Act of 2009.



Improve Agricultural Water Use Efficiency and Drought Planning

Current law requires agricultural water suppliers serving

25,000 irrigated acres or more to file Agricultural Water Management Plans (AWMP). In the EO, DWR is directed to update existing requirements for these plans, including requiring suppliers of irrigation water to quantify their water use efficiency and plan for water supply shortages and periods of drought. DWR is directed to work with CDFA to seek public input on the updated requirements. The EO also increases the number of agricultural water suppliers that must file AWMPs by lowering the threshold to those water suppliers serving 10,000 irrigated acres or more.

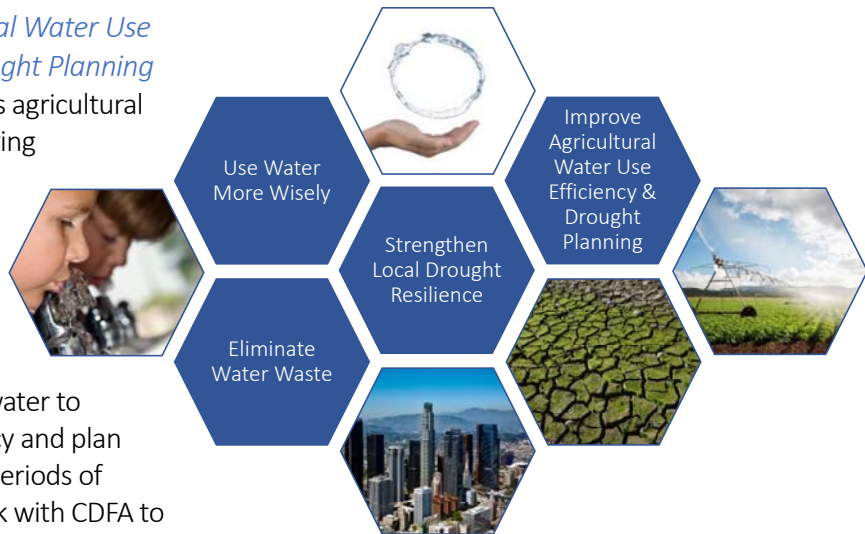
The “Improve Agricultural Water Use Efficiency and Drought Planning” objective includes EO Items 11, 12, and 13.

1.2 Evolution of Water Conservation in California

California has experienced several major droughts throughout its recorded history. In response to the State’s highly variable and seasonal climate, Californians have developed hundreds of water projects and programs – at local, regional, and statewide scales – while learning to adapt to periodic droughts and other hydrologic extremes. Growing awareness of the critical role water plays in the State’s economy, health and safety, and environment has precipitated legislative actions and funding programs that have fundamentally transformed the way California’s greatest resource – water – is managed.

1.2.1 Historical Droughts

One of the most extreme examples of drought in California occurred in 1976 and 1977, with the 1976 water year ranking as the driest on record and the 1977 water year ranking among the top



five driest in California’s recorded history. However, while the drought caused unprecedented shortages in the municipal, industrial, and agricultural water sectors, the 1976-1977 drought is often credited with initiating an era of water conservation awareness in California, the results of which are still evident today, including formation of a drought emergency task force and emergency conservation actions. The 1976-1977 drought also caused numerous legislative proposals to be submitted, all with the goal of increasing California’s drought responses and resiliency.

Other statewide droughts that have occurred in recent history include the 1987-1992 drought and the 2007-2009 drought. These droughts affected all communities and types of water users, and led to many of the requirements and guidelines in place during the recent drought. 2012 through 2014 are on record as California’s driest three consecutive years and 2013 was the driest single year of record in numerous communities across the State, triggering numerous emergency actions at State and local levels.

1.2.2 Resulting Statewide Water Conservation and Related Water Management Planning Efforts

The State’s arid climate and history of drought have prompted a variety of programs, actions, and efforts geared toward preparing for and responding

to periods of low water availability. The following highlights some of the key events and actions that have marked this evolution of conservation and water use efficiency in California in recent decades.

Water Conservation Act of 2009

California became the first state to adopt a water use efficiency target with the passage of SB X7-7 in 2009. SB X7-7 mandated the State achieve a 20 percent reduction in urban per capita water use by 2020. The reduction goal is also known as “20x2020.” SB X7-7 directed water suppliers to develop individual targets for water use based on an historical per capita baseline.

The 20x2020 Water Conservation Plan (20x2020 Plan) set forth a statewide road map to maximize the State’s urban water efficiency and conservation opportunities between 2009 and 2020, and beyond. The recommendations acknowledged that agricultural water use efficiency must also be improved.

What is Drought?

Drought can be defined in many ways, and there is no statutory process in California for defining or declaring a drought. Drought can be described in meteorological terms (a period of below normal precipitation), in hydrologic terms (a period of below average runoff), or in more qualitative terms (shortage of water for a particular purpose). Drought can be any length of time – spanning a single water year or multiple years – and rarely affects all water users or geographies equally. For example, one part of the State may experience severe drought conditions while another experiences a year of above normal rainfall. Drought is often considered a function of drought impacts to water users. Further, the economic, social, and environmental impacts of drought have changed over time as the State’s population has grown and our extensive system of water infrastructure has evolved.

Implementation of the 20x2020 Plan includes three phases: (1) completion of the 20x2020 Plan (2009 through 2010); (2) implementation, monitoring, evaluating, and making adjustments (2011 through 2020); and (3) performance evaluation based on improvements from established baseline values for each supplier.

Mandatory Conservation, Water Use Prohibitions, and Other Water Saving Measures during the Recent Drought

As a statewide drought progressed during 2014 and into 2015, California took unprecedented steps to preserve its water supply. With issuance of an emergency drought proclamation by the Governor in 2014, the Water Board was directed to collect monthly water use data from the State’s urban water suppliers. The proclamation also called on Californians to voluntarily conserve water, with a goal of reducing water use by 20 percent when compared to pre-drought water use in 2013. However, the collected data showed that voluntary statewide conservation efforts had reached 9 percent – an effort that saved billions of gallons of water, but was well short of the 20 percent goal.

With drought conditions worsening, and the 2014-2015 water year snowpack the lowest in the State’s history, the Governor’s April 1, 2015 Executive Order (EO B-29-15) directed the Water Board to develop emergency water conservation regulations to implement mandatory water reductions in cities and towns across California. EO B-29-15 also set a goal to reduce potable urban water usage by 25 percent statewide. The Water Board’s adoption of the May 2015 drought emergency regulation set mandatory reductions in potable urban water use between June 2015 and February 2016 by identifying a conservation tier for each urban water supplier, based on residential per capita water use for the months of July – September 2014. Conservation tiers ranged from 4 percent to 36 percent.

Under these emergency urban water conservation regulations, statewide cumulative savings from June 2015 to March 2016 totaled 23.9 percent

compared with the same months in 2013. Statewide average water use lowered to 66 residential gallons per capita per day (GPCD) in March 2016, saving nearly 1.3 million acre-feet of water from June 2015 through March 2016.

Recognizing persistent yet less severe drought conditions during the 2015-2016 water year, the Water Board modified and extended its emergency regulation in May 2016. This new approach allowed suppliers to replace their prior percentage reduction-based water conservation standard with a localized “stress test,” where they could demonstrate whether a supply shortfall would develop under three additional drought years. Mandatory conservation levels were set for suppliers with projected shortfalls following three additional dry years. Alternatively, suppliers could keep their pre-existing mandatory conservation standard rather than adopting a stress-test conservation standard.

In addition to State-mandated conservation standards, the Water Boards’ emergency regulations have specific prohibitions against certain water uses. Those prohibitions include watering down a sidewalk with a hose instead of using a broom or a brush, and overwatering a landscape such that water is running off the lawn, over a sidewalk, and into the gutter.

In total, the Water Board’s emergency regulations have resulted in conservation of over 2.15 million acre-feet of water, enough to supply over 10 million people for a year.

EO B-29-15 also called on DWR to establish additional water saving measures, including:

- A statewide initiative to replace 50 million square feet of lawns with drought tolerant landscapes.
- A time-limited statewide toilet replacement and appliance rebate program with the CEC.
- Updating the State Model Water Efficient Landscape Ordinance (MWELO).

- Additional requirements for AWMPs.

DWR quickly established rebate and direct installation programs for both lawn conversion and the replacement of older toilets with high efficiency toilets. In addition, DWR collaborated with nonprofits to provide over 230 workshops statewide on landscape and irrigation efficiency, turf replacement, high efficiency toilet replacement, water management planning for agricultural and urban water suppliers, and conveyance system audit and leak detection for small water systems, rural communities, agricultural water suppliers and tribal governments.



DWR developed and sponsored a key exhibit at the California State Fair, providing hands-on advice to homeowners on lawn conversion and water saving measures.

Indoor and Outdoor Water Use Efficiency

Landscaping typically accounts for over half of residential water demand, and was the focus of some of the State’s earliest efforts related to water use efficiency. Passed in 1990, Assembly Bill (AB) 325, the Water Conservation in Landscaping Act, directed DWR to develop MWELO. Initially drafted in 1992 and updated in 2010, the MWELO established a water budget for new construction and certain rehabilitated landscapes. Local agencies were required to adopt the MWELO or a local ordinance at least as effective as the State ordinance. The MWELO was updated in 2015 in response to EO B-29-15. AB 2515 requires DWR to update the MWELO every three years if needed.

Indoor water use has also prompted action at State and federal levels. The efficiency of water fixtures used in California residential dwellings and commercial buildings is being improved through updated requirements in the California Plumbing Code (Part 5 of the California Building Standards Code) per requirements in SB 407 of 2009 and AB 715 of 2007. In addition, new construction is subject to the requirements of the California Green Building Standards Code (Part 11 of the California Building Standards Code) that requires water fixture efficiency exceeding the existing national standards set forth by U.S. Environmental Protection Agency (USEPA) and U.S. Department of Energy. Concurrently, the CEC is updating its Appliance Efficiency Regulations to include stronger standards for fixtures sold in the State.

Water Management Planning and Funding

Conservation and water use efficiency are foundational water management tools that, along with diverse regional and statewide water portfolios, help to ensure adequate and reliable water supplies for all uses. Conservation and water use efficiency are prominent in State water management plans, integrated regional water management plans, the plans of urban and agricultural suppliers, and various associated funding programs.

The 2013 California Water Plan Update highlighted water conservation as one of 17 statewide water management objectives, and emphasized urban water conservation as a water management strategy that would be most effective at matching supply with demand. The plan recognized urban water conservation as the foundation for achieving the 20x2020 mandate.

Conservation and drought protection are also two of the focus areas of the 2014 California Water Action Plan (Water Action Plan)³ and Water Action Plan 2016 Update. Making water conservation a California way of life is the first action identified in

the plan and drought resiliency is the fifth action. These are part of a comprehensive approach to water management that includes actions related to integrated water management, Sacramento-San Joaquin Delta management, ecosystem restoration, storage, and flood protection. The Water Action Plan also calls for increasing operational and regulatory efficiencies and identifying sustainable, integrated financing opportunities.

California Water Action Plan

The Water Action Plan provides a roadmap for sustainable water management. It has guided the work of numerous State agencies and prioritized funding at the State level, and provided the groundwork for several important bills and legislation necessary to manage California's water supply during droughts.

Building on the 2014 plan, the 2016 Update describes 10 key actions to align State efforts and investments to ensure reliable water supplies in the future. The first action is to "make conservation a California way of life." To this end, the Water Action Plan includes several specific components:

- *Expand agricultural and urban water conservation and efficiency to exceed SB X7-7 targets*
- *Provide funding for conservation and efficiency*
- *Increase coordinated water energy efficiency and greenhouse gas reduction capacity*
- *Promote local urban conservation ordinances and programs*

The Water Action Plan also provides direction on planning activities to better prepare for droughts in the future, including preparation of drought contingency plans and water shortage contingency plans.

³ *California Water Action Plan*. California Natural Resources Agency. January 2014.

Water conservation in California has gained support from a series of State grant programs to provide important financial assistance required to implement conservation programs. Those State grant programs include funding from Proposition 13 (2000, \$565 million), Proposition 50 (2002, \$680 million), Proposition 84 (2006, \$1.2 billion), and Proposition 1 (2014, \$810 million).

Various federal agencies also provide conservation and drought funding, including the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) and the USEPA. Reclamation's Drought Response Program under WaterSMART provides assistance to water users for drought contingency planning, including climate change and actions that build towards long-term drought resiliency. USEPA provides funding for various infrastructure and conservation projects through the Clean Water State Revolving Fund and the Drinking Water State Revolving Fund, both of which are managed and administered by the Water Board in California.

Groundwater Sustainability

Groundwater is an important component of California's water supply, particularly in dry years. The Sustainable Groundwater Management Act (SGMA) requires development of specialized groundwater sustainability plans in each region to support a more reliable and resilient water supply portfolio for the State as a whole. It is common for rural communities, small systems, and agriculture to rely heavily on groundwater, including private wells, to meet their supply needs. Consequently, SGMA and its implementation could have significant effects on water conservation, water use efficiency, and long-term water supply reliability.

1.2.3 Recent Drought Actions and Effects

In recent years, dry conditions throughout the State have underscored the importance of water conservation and achieving greater climate and drought resilience and preparedness.

CONSERVATION versus EFFICIENCY

The terms water conservation and water use efficiency are often used interchangeably. As used in this report, water conservation is defined as a reduction in water loss, waste, or use. The general term water conservation may include water use efficiency, in which more water-related tasks are accomplished with lesser amounts of water.

2012 through 2014 are on record as California's driest three consecutive years with respect to statewide precipitation. 2013 was the driest on record in numerous communities across the State, including San Francisco, Sacramento, and Los Angeles. Parts of Northern California had no measurable precipitation for more than 50 consecutive days during winter months that historically see the year's highest precipitation totals. Reservoirs remained low in the spring, and groundwater pumping increased dramatically throughout the State as surface water supplies became limited or unavailable.

Persistent dry conditions prompted a series of Executive Orders from 2014 through 2016 that have guided California's drought response. The Governor proclaimed a State of Emergency on January 17, 2014. This drought proclamation directed State agencies to take specified actions and requested that Californians voluntarily reduce their water usage by 20 percent compared with the 2013 baseline. Following the 2014 emergency declaration, the Governor and State Legislature worked closely to secure and accelerate appropriation of funding for drought-related actions. Emergency drought legislation contained in Senate Bills 103 and 104 provided \$687 million to assist drought-stricken communities and implement projects to better capture, manage and use water resources. Over \$400 million was provided through Proposition 84 bond funds for grants to local agencies for integrated regional

water management projects, including projects that strengthened water conservation.⁴

Subsequent Executive Orders directed local urban water suppliers to immediately implement water shortage contingency plans, ordered the State's drinking water program to target communities in danger of running out of water, and supported the Water Board to administer various water rights actions, including curtailments and mandatory conservation (described earlier in this chapter).

In addition, the Water Action Plan provided guidance to State agencies to better align their priorities related to water resources management, including long-term drought resilience and response. The plan and its 2016 Update have facilitated the Governor and State Legislature's engagement in several key legislative efforts, subsequent bond initiatives, and state budgeting efforts.

The recent drought related actions and response activities culminated in Executive Order B-37-16 in May 2016. The EO builds on the conservation successes achieved in recent years to establish long-term water conservation measures and improve proactive drought planning and response.

The impacts of the current drought have been severe, characterized by limited or exhausted drinking water supplies in some communities, lost agricultural production and jobs, severely depleted groundwater basins, and significant harm to native habitats and species. Despite Californians responding to the call to conserve water, more frequent and extended dry periods are anticipated under our changing climate, which would be characterized by warmer winter temperatures and reduced water supplies held in mountain snowpack.

⁴ Additional drought funding was also included in subsequent State budgets (<http://www.ebudget.ca.gov/>).

Californians Respond

Californians demonstrated their inherent resilience and ability to conserve water and adapt to changing conditions. Between June 2015 and March 2016, urban water systems reduced water use by 23.9 percent, saving enough water to provide 6.5 million residents with water for one year.

"Californians stepped up during this drought and saved more water than ever before, but now we know that drought is becoming a regular occurrence and water conservation must be a part of our everyday life."

Governor Edmund G. Brown Jr.

The effects of drought are likely to intensify in the future as the State population continues to grow and competition for water resources intensifies. It is recognized that permanent reductions in per capita water use, and increases in water use efficiency across all sectors, will be needed to ensure long-term water supply reliability for the State. It is also acknowledged that new goals and targets will be needed that go beyond 2020 to support continued economic prosperity and healthy ecosystems, while adapting to a changing climate.

1.3 Framework for Realizing Water Conservation as a California Way of Life

This document was prepared in response to the Governor's directive to publish a framework for implementation of the EO. In support of water conservation, EO Agencies recognize that the legislature has, through California Water Code (CWC) Section 1011, deemed reductions in water use due to conservation as equivalent to reasonable beneficial use of that water. The proposed framework is not intended to affect or

otherwise limit any rights to water conserved under applicable law, including without limitation, water conserved consistent with CWC Section 1011.

This report was prepared to inform the Governor, the California Legislature, and the public of the actions and recommendations of the EO Agencies in implementing the EO. Water suppliers that may be affected by the EO may use this document to better understand the proposed requirements and when those requirements could go into effect.

This section describes the process used by EO Agencies in developing the conservation framework, including public and stakeholder engagement.

1.3.1 Executive Order B-37-16 Process

The EO Agencies have worked collaboratively to identify actions and recommendations that can satisfy the directives in the EO, and identify a timeline for their implementation. Underlying this process was the intent to provide:

- **Clarity** in the new requirements;
- **Flexibility** for retail water suppliers in carrying out their local responsibilities;
- **Transparency** in desired conservation outcomes and accountability; and
- A rational means for **tracking progress** over time.

The intent of the long-term conservation framework is to:

- Establish greater consistency in the elements of UWMPs, WSCPs, and AWMPs among water suppliers statewide.
- Enable water suppliers to customize water management strategies and plan implementation to regional and local conditions.

- Empower water suppliers to take a place-based response to water shortages caused by drought or other emergencies.

The EO Agencies coordinated closely in developing the recommendations for implementing the EO. This included forming cross-agency teams at agency leadership, management, and project staff levels. These teams met regularly to share progress, discuss proposals, and develop the report.

1.3.2 Public Outreach and Stakeholder Engagement

EO Agencies developed a collaborative program to formulate the long-term framework for water conservation and drought planning with extensive public outreach and stakeholder engagement (see also Attachment B).

Public Listening Sessions

The EO Agencies hosted a series of public listening sessions in Northern, Central, and Southern California in June 2016. These sessions provided an overview of the EO and solicited early stakeholder input.

Stakeholder Advisory Groups

The EO directs DWR, the Water Board, and CDFA to “consult with urban water suppliers, local governments, environmental groups, agricultural water suppliers and agricultural producers, and other partners” in carrying out several of the directives: Use Water More Wisely, Strengthen Local Drought Resilience, Eliminate Water Waste, and Improve Agricultural Water Use Efficiency and Drought Planning.

To this end, an Urban Advisory Group and an Agricultural Advisory Group were formed in July 2016 to advise the EO Agencies, solicit input on the recommendations and associated methodologies, and exchange information. Advisory Group members were invited to provide broad representation including urban water suppliers, agricultural water suppliers, local government, academia, professional organizations,

environmental advocates, and other interested parties.

1.3.3 Framework Components

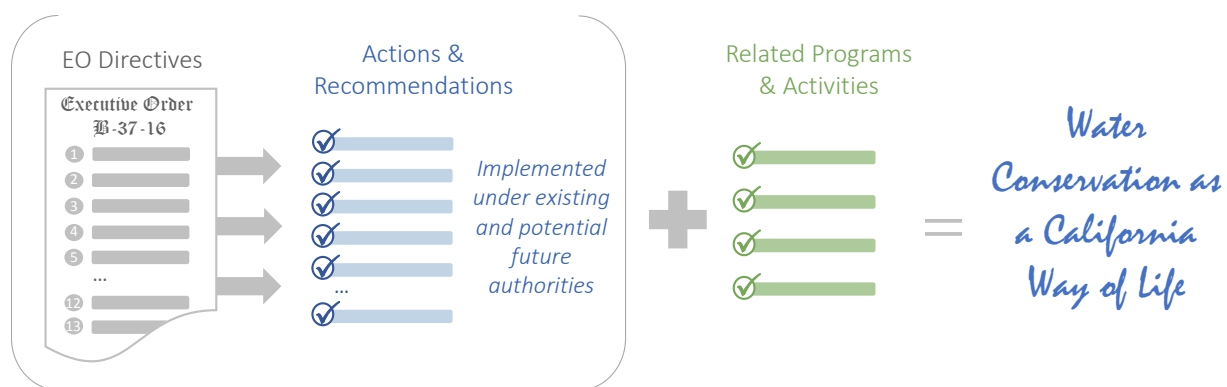
This report describes actions and recommendations for implementing the EO.

- **Actions** are efforts that have been or may be undertaken within existing authorities to implement portions of the EO. Actions that can be implemented under existing policy or regulatory authorities include potential 2017 emergency water conservation regulations, permanent restrictions on water waste, efforts to reduce water supplier leaks and system losses, and certification of innovative technologies for water and energy conservation.
- **Recommendations** are efforts proposed by the EO Agencies that may be undertaken to implement portions of the EO but that will require additional authorities. Recommendations include new water use targets,

water shortage contingency plans, drought planning for small systems and rural communities, and agricultural management plans.

In addition to the actions and recommendations specific to meeting the directives of the EO, the EO Agencies are engaged in various other programs and activities related to water conservation, water use efficiency, and planning for droughts and other water emergencies. These ongoing efforts encompass technical assistance, funding mechanisms, guidance documents, rulemaking, and enforcement. Related programs and activities are critical to achieving the State’s water use efficiency and conservation goals.

The EO actions and recommendations, along with other related State programs and activities, constitute the framework for making conservation a California way of life (Figure 1-1), as described in the EO and in the Water Action Plan.



Many of the needed actions and recommendations in this report cannot be implemented without new or expanded authorities. This document describes the additional steps and legislative authority that will be needed. The actions and recommendations herein, together with existing State programs and activities related to conservation and water use efficiency, represent a statewide framework for making conservation a California way of life.

Figure 1-1. Framework for Making Water Conservation a California Way of Life

Table 1-1. EO Actions and Recommendations Summarized in this Report

Chapter Section and Title where EO Item is Addressed	EO Item													Within Existing Authorities (Chapter 2)	Requires New Authority (Chapter 3)
	 Use Water More Wisely			 Eliminate Water Waste				 Strengthen Local Drought Resilience			 Improve Agricultural Water Use Efficiency & Drought Planning				
	1	2	3	4	5	6	7	8	9	10	11	12	13		
2.1 Emergency Water Conservation Regulations for 2017	●													✓	
2.2 Monthly Reporting and Permanent Prohibition of Wasteful Practices			●	●										✓	
2.3 Reduced Water Supplier Leaks and Water Losses					●	●								✓	
2.4 Certification of Innovative Technologies for Water Conservation and Energy Efficiency							●							✓	
3.1 New Water Use Targets Based on Strengthened Standards		●				●									✓
3.2 Water Shortage Contingency Plans						●	●	●							✓
3.3 Drought Planning for Small Systems & Rural Communities									●						✓
3.4 Agricultural Water Management Plans						●				●	●	●			✓

Note: The EO directs the DWR, the Water Board, and CPUC to develop methods to ensure compliance with the provisions of the EO, including technical and financial assistance, agency oversight, and, if necessary, enforcement action by the Water Board to address non-compliant water suppliers.

1.3.4 Organization of this Report

This report describes proposed State actions and recommendations associated with the 13 items included in the EO, as summarized in Table 1-1.

Figure 1-2 illustrates the organization of this report. **Chapter 1** provides introductory and background information setting the context for current efforts to improve conservation within the State of California, including a description of the directives

in the EO. **Chapters 2 and 3** describe how the directives contained in the EO are being and would be implemented. **Chapter 4** provides a summary and timeline for implementing the identified actions and recommendations as part of the long-term framework for making conservation a California way of life. **Attachment A** includes the full language of the EO, and **Attachment B** summarizes the public outreach and stakeholder engagement conducted to support framework development.

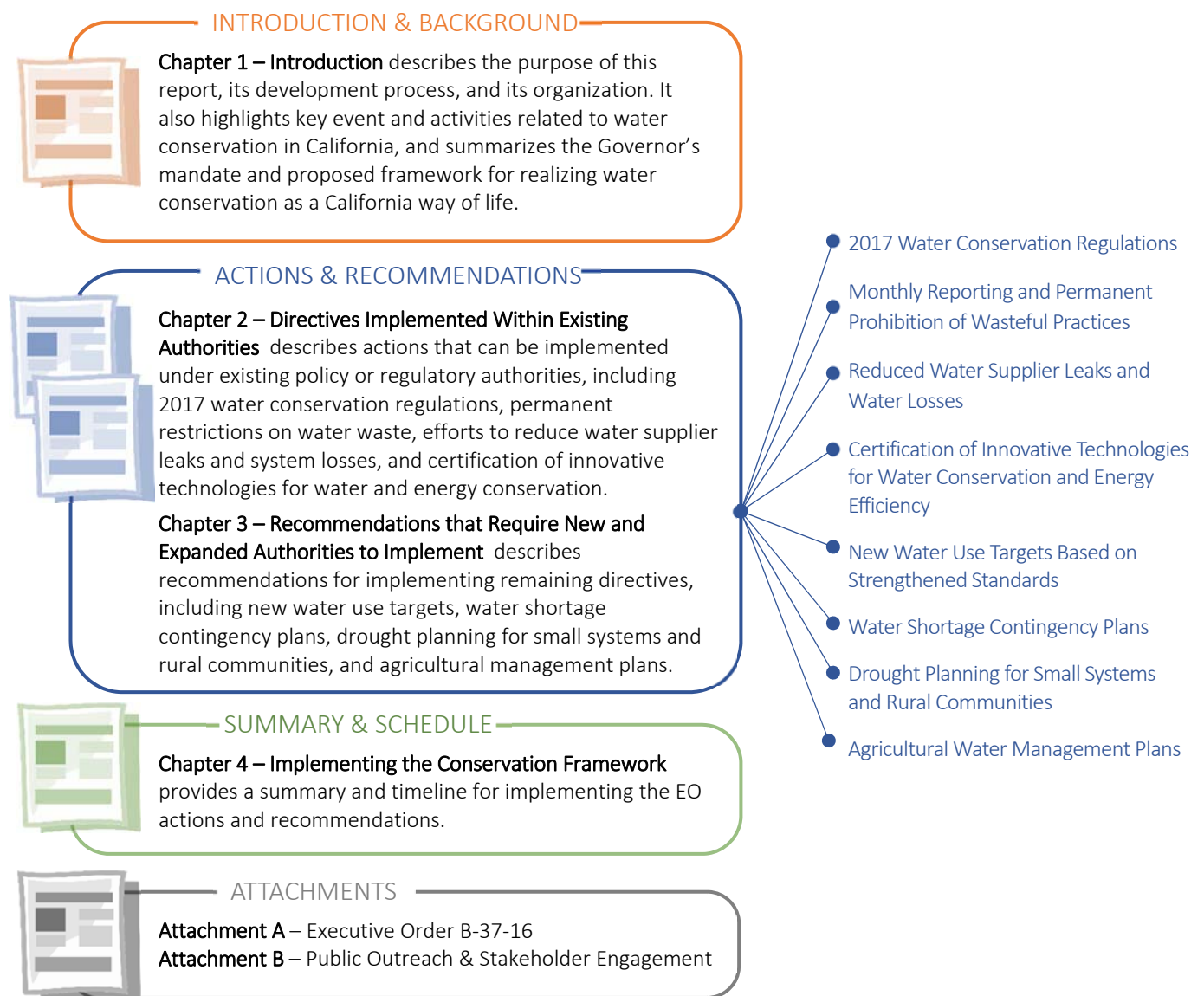
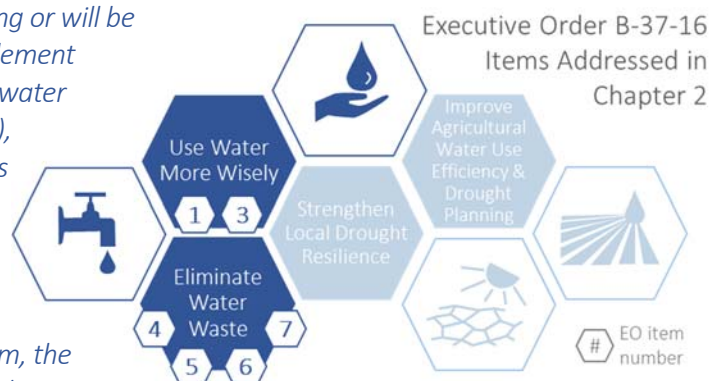


Figure 1-2. Report Organization

Chapter 2 – Directives Implemented Within Existing Authorities

This chapter describes actions that are ongoing or will be undertaken within existing authorities to implement portions of the EO. These include emergency water conservation regulations for 2017 (EO Item 1), monthly reporting and permanent restrictions on water waste (EO Items 3 and 4), efforts to reduce water supplier leaks and system losses (EO Items 5 and 6), and certification of innovative technologies for water and energy conservation (EO Item 7). For each item, the chapter includes descriptions of the need for change, the directive as stated in the EO, and implementation considerations. A summary of implementation activities and schedule are included in Chapter 4.



2.1 Emergency Water Conservation Regulations for 2017

2.1.1 Need for Change

The current emergency regulation for statewide urban water conservation is set to expire on November 25, 2017. However, water supply conditions have markedly changed since the start of the drought. In addition, the Water Board was further directed to permanently maintain reporting requirements and certain types of water use prohibitions as part of the EO.

2.1.2 EO Directive

Water conservation regulations for 2017 address **EO Item 1** that states:

The State Water Resources Control Board (Water Board) shall, as soon as practicable, adjust emergency water conservation regulations through the end of January 2017 in recognition of the differing water supply conditions across the state. To prepare for the possibility of another dry winter, the Water Board shall also develop, by January 2017, a proposal to achieve a mandatory reduction in potable urban water usage that builds off the

mandatory 25% reduction called for in Executive Order B-29-15 and lessons learned through 2016.

2.1.3 Implementation

Recognizing persistent yet less severe drought conditions due to precipitation near historical averages, the Water Board extended the emergency water conservation regulation on May 18, 2016. Although water conditions had improved by the middle of the 2016/2017 water year, final supply conditions were still uncertain. The Water Board extended the emergency conservation regulations on February 8, 2017 given uncertainty over continued precipitation levels during the late winter and spring of 2017. The current regulation requires locally developed conservation standards based upon each local water agency's specific circumstances. It replaces the prior percentage reduction-based water conservation standard with a localized "stress test" approach. These standards require local water agencies to ensure a three-year supply assuming three more dry years like the ones the State experienced from 2012 to 2015. Water agencies that would face shortages under three additional dry years are required to meet a state-mandated conservation standard equal to the

amount of shortage. A majority of urban water suppliers determined that they have sufficient potable water supplies using the supply reliability test from the May 2016 regulation.

As the precipitation season draws to a close in 2017, reservoirs are near peak capacity and the snow pack is well above average, and the drought emergency has been lifted for most of the state. As a result of improved water supply conditions, the Water Board will rescind the emergency requirement for a water supply stress test or mandatory conservation standard for urban water agencies, but, to provide a bridge to permanent requirements, it will continue to require monthly reporting and to prohibit wasteful practices (see below).

2.1.4 Reporting, Compliance Assistance, and Enforcement

Under the existing emergency regulations, urban water suppliers submit monthly reports to the Water Board on water production, program implementation, and local enforcement activities. The Water Board tracks progress and works with water suppliers to achieve compliance and enforce as needed. The Water Board shares supplier reports and water savings information on its website. These emergency reporting requirements and enforcement activities will cease when the emergency requirements are rescinded.

2.2 Monthly Reporting and Permanent Prohibition of Wasteful Practices

2.2.1 Need for Change

California faces decreasing water supplies through a combination of climate change, increasing population, and economic growth. To thrive as a state and make conservation a way of life in California, we must use our water resources efficiently and stop wasteful practices. Regular and consistent supplier reports have been in place for several years and are an invaluable tool for

understanding urban water supplier responses to policy changes and for statewide water management. EO items 3 and 4 direct DWR and the Water Board to extend some provisions in the emergency regulations to become permanent practices.

2.2.2 EO Directive

EO Item 3 establishes continued reporting and data collection requirements by urban water suppliers, and it states:

The Department and the Water Board shall permanently require urban water suppliers to issue a monthly report on their water usage, amount of conservation achieved, and any enforcement efforts.

EO Item 4 focuses on prohibiting waste of potable water:

The Water Board shall permanently prohibit practices that waste potable water, such as:

- *Hosing off sidewalks, driveways and other hardscapes;*
- *Washing automobiles with hoses not equipped with a shut-off nozzle;*
- *Using non-recirculated water in a fountain or other decorative water feature;*
- *Watering lawns in a manner that causes runoff, or within 48 hours after measureable precipitation; and*
- *Irrigating ornamental turf on public street medians.*

2.2.3 Implementation

The Water Board will be conducting a rulemaking process to establish permanent monthly reporting requirements and prohibitions on wasteful water practices, building on what currently exists in the emergency regulations. This process will run through 2017. The Water Board plans to hold

public workshops to solicit public comments during the rulemaking process.

The Water Board will implement these EO items using its rulemaking process with the following basic steps:

- Water Board staff gather data on potential impacts of the proposed prohibitions and prepare draft regulatory documents.
- The Water Board solicits stakeholder input through workshops and comment periods, responds to stakeholder input, and revises draft regulations as needed. There may be multiple iterations of this step.
- The Water Board adopts the final regulatory package of documents, including final regulations and conformance to California Environmental Quality Act requirements and submits to the Office of Administrative Law for approval.

2.2.4 Reporting, Compliance Assistance, and Enforcement

With permanent monthly reporting requirements in place, urban water suppliers will continue to submit monthly reports to the Water Board on water production, program implementation, and local enforcement activities. The Water Board will continue to track progress and work with water suppliers to achieve compliance, and enforce as needed. The Water Board will continue to post this information publicly on its website.

2.3 Reduce Water Supplier Leaks and Water Losses

2.3.1 Need for Change

Existing studies suggest that water losses, including leaks and breaks in water systems, account for about 10 percent of total urban water production, and in some cases 30 percent or more. DWR estimated almost 700,000 acre-feet per year of water lost at the utility level. Cost-effective water

loss reduction represents a potentially significant source of conservation savings.

Water Loss

There are two types of water loss – real (physical losses such as leaks or breaks) and apparent (nonphysical losses such as meter errors, and unauthorized consumption such as theft).

2.3.2 EO Directive

EO Items 5 and 6 address minimizing system leaks and losses as well as accelerating data collection:

5. *The Water Board and the Department shall direct actions to minimize system leaks that waste large amounts of water. The Water Board, after funding projects to address health and safety, shall use loans from the Drinking Water State Revolving Fund to prioritize local projects that reduce leaks and other water system losses.*
6. *The Water Board and the Department shall direct urban and agricultural water suppliers to accelerate their data collection, improve water system management, and prioritize capital projects to reduce water waste. The California Public Utilities Commission shall order investor-owned water utilities to accelerate work to minimize leaks.*

2.3.3 Implementation

The EO Agencies will meet the requirements of EO Items 5 and 6 through implementation of SB 555, and additional actions to satisfy the EOs directives related to reducing water supplier leaks. Signed in October 2015, SB 555 focuses on identifying real and apparent losses in urban retail water suppliers' distribution systems. It requires the following:

- Annual reporting by urban retail water suppliers

- DWR to perform rulemaking for validated water loss audits
- DWR and the Water Board to provide assistance to retail water suppliers
- The Water Board to set water loss standards between 2019 and 2020

Implementing the water loss audit program as required by SB 555 is a first step towards minimizing system leaks that waste water. As urban retail water suppliers evaluate and identify distribution system water losses, steps can be taken to address those losses.

The SB 555 regulations for water loss audit standards validation and reporting are scheduled to be adopted by the California Water Commission in 2017.

Requirements Related to Urban Water Suppliers

DWR. DWR is preparing rules for water suppliers to follow in preparation of their validated water loss audits. Setting audit standards will improve the reliability of water loss audit data.

By January 1, 2017, DWR must adopt rules for:

- Conduct of standardized water loss audits
- Process for validating a water loss audit prior to submission to DWR
- Technical qualifications and certification requirements for validators
- Method of submitting a validated audit report
- Audit review

DWR must also provide technical assistance to guide water loss detection programs, and update adopted rules within 6 months of the release of subsequent editions of the American Water Works Association's Water Audits and Loss Control Programs, Manual M36.

DWR will identify urban retail water suppliers with high water losses, based on evaluation of the water loss audits submitted in October 2017. Suppliers ranked with high losses will be prioritized for technical assistance. Beginning in 2018, DWR will offer either workshops or one-on-one meetings to these suppliers. The aim of these interactions will be to assist the suppliers in preparing and implementing water loss reduction plans. DWR will provide guidance to suppliers on prioritizing their investments in water loss repair.

DWR will serve as a public information source for water loss data received with UWMPs and the annual water loss audit reporting. A public portal has been established,⁵ and in 2017 this website will be enhanced to make the water loss audit reporting data accessible.

Water Board. No earlier than January 1, 2019, and no later than July 1, 2020, the Water Board must adopt rules requiring urban retail water suppliers to meet performance standards for water loss volumes. In adopting these rules, the Water Board will employ life-cycle cost accounting to evaluate the costs of meeting the performance standards. The Water Board will identify compliance and enforcement mechanisms for water loss standards when the standards are adopted. These standards will be utilized for calculating the water targets discussed in Section 3.1 of this report.

As part of implementing SB 555, the Water Board is funding the California Water Loss Control Collaborative's Technical Assistance Program through the California-Nevada Section of the American Water Works Association to further the preparation of consistent and high quality water loss audits. The program has held several technical assistance workshops in 2016 and will continue to offer technical assistance on water loss audits in 2017.

⁵ <https://wuedata.water.ca.gov/>

The Water Board will also evaluate whether to require urban water suppliers to conduct component analyses⁶ to identify cost-effective investments in water loss control ahead of the standards' rulemaking in 2019.

The Water Board will make water loss data available publicly.

CPUC. The CPUC will comply with EO Item 6 by ordering its investor-owned water utilities to accelerate work to minimize leaks to further the EO goal of eliminating water waste.

Since the CPUC requires reporting of water loss by investor-owned utilities, the CPUC will use this data to identify how reductions in non-revenue water can be made. The CPUC adopted Resolution W-5119 on December 1, 2016 acknowledging the progress Class A⁷ investor-owned water utilities have made in keeping non-revenue water percentages stable since the Rate Case Plan Decision⁸ was adopted. The CPUC in Resolution W-5119 also encourages further work to accelerate actions to minimize leaks, recognizing that system leaks are one component of non-revenue water.

⁶ A leakage component analysis disaggregates the total volume of real losses calculated in a water audit into its three base components: background leakage, unreported leakage, and reported leakage. Water suppliers can use the component analysis, in combination with an evaluation of least cost loss reduction strategies, to identify the most economical means of reducing leakages in their systems.

⁷ Class A Water Utilities are defined as utilities having greater than 10,000 service connections.

⁸ The Rate Case Plan Decision adopted a schedule for the investor-owned utilities to file General Rate Case applications with the CPUC. The Decision also ordered the utilities to submit Minimum Data Requirements as part of their applications including information on efforts to reduce non-revenue water for the previous five years; a water loss audit in accordance with American Water Works Association; information on number of leaks in the last five years; a description of a utility's leak detection program; and various other metrics for supply and distribution infrastructure status and planning.

Class A Water Utilities have been reporting non-revenue water metrics through each of their General Rate Case (GRC) Applications in accordance with the prescribed American Water Works Association (AWWA) methodology. This non-revenue water metric can be broken down further, as defined by AWWA in Table 2-1.

As evidenced in Table 2-1, non-revenue water is made up of multiple components, with system leaks being one component. Not all of the Class A Water Utilities currently have the capability to break down their non-revenue water number into the components as defined by AWWA⁹, instead reporting this number as a total percentage using AWWA's water loss audit software. However, Class A Water Utilities provide several additional metrics related to system leaks in their GRC applications, including the following:

- Identifying non-revenue water in centum cubic feet (CCF) and percentage of total water production for the last authorized test year, last five years recorded data, and proposed test year amounts.
- Submitting the results of a water loss audit performed no more than 60 days in advance of the submission of the application. The audit report will be prepared using the free Audit Software developed by the AWWA and available on the AWWA website.
- In connection with the water loss audit described above, the utility shall conduct and submit the results of a cost/benefit analysis for reducing the level of non-revenue water reported in the water loss audit. If non-revenue water is more than approximately seven percent for each district or service area, the utility shall submit a plan to reduce non-revenue water to a specific amount.

⁹ Based on the Governor's Executive Order B-37-16 Information Request Response from the Class A Water Utilities to Terence Shia, CPUC, dated September 15, 2016.

Table 2-1. AWWA Water Balance

System Input Volume (corrected for known errors)	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption (including water exported)	Revenue Water	
			Billed Unmetered consumption		
		Unbilled Authorized Consumption		Unbilled Metered Consumption	Non-Revenue Water
				Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses		Unauthorized Consumption	
				Customer Metering Inaccuracies	
				Systematic Data Handling Errors	
		Real Losses		Leakage on Transmission and Distribution Mains	
				Leakage and Overflows at Utility's Storage Tanks	
				Leakage on Service Connections up to point of Customer Metering	

Note: All data in volume for the period of reference, typically one year.

- Identifying specific measures taken to reduce non-revenue water in the last five years and proposed test year of the GRC application.
- Identifying the number of leaks in the last five years.
- Describing its leak detection program.
- Providing leak repair time and cost statistics for the last five years.
- Identifying specific measures taken to reduce number of leaks in the last five years and proposed test year.

This information expands on the efforts the CPUC's Class A Water Utilities have spent on minimizing leaks and keeping non-revenue water percentages stable.

The CPUC's Water Division has compiled⁶ statistics on non-revenue water percentages from each Class A Water Utility since the Rate Case Plan Decision was adopted in 2008. This data indicates that Class A Water Utilities generally maintain non-revenue

water percentages below 10 percent, with some averaging around 4 to 7 percent. Given these numbers, the CPUC acknowledges the work the Class A Water Utilities have done in keeping non-revenue water percentages stable and encourages further work to accelerate actions to minimize leaks. Actions that may be proposed by investor-owned utilities to reduce non-revenue water and minimize leaks include, but are not limited to: water loss audits; accelerated meter and main replacement programs; increased inspections of service connection meters and mains; installation of leak-detection sensors in the distribution system; timely and efficient pipeline repairs; pressure management; and deployment of advanced meter infrastructure.

Although the CPUC's Class B Water Utilities⁷ do not have a defined Rate Case Plan and are not under the same reporting requirements as Class A utilities, these utilities shall propose methods to accelerate actions to minimize leaks in their next General Rate Case filings in order to comply with the EO. Class B Water Utilities provide metrics on

⁶ Ibid.

⁷ Class B Water Utilities are defined as utilities having greater than 2,000 but less than 10,000 service connections.

water loss in Schedule D of their annual reports. Testing data and the number of meters tested is provided in Schedule D-6 of the annual report, and total water delivered to metered customers is provided in Schedule D-7 of the annual report. With the focus on minimizing leaks and reducing water loss, Class B Water Utilities shall continue to track this valuable information and provide the CPUC with this data in annual reports. In addition, the CPUC recommends that these utilities propose methods to accelerate actions to minimize leaks in each of their next General Rate Case filings, where a cost/benefit analysis for reducing water loss can be conducted.

Urban Retail Water Suppliers. By October 1, 2017, and annually thereafter, urban retail water suppliers must submit validated water loss audit reports to DWR. These reports will be made available for public viewing. Performing regular audits will help inform water suppliers about the extent of water losses in their service areas.

Financial Assistance. To incentivize urban retail water suppliers to comply with the requirement to submit validated water loss audit reports, DWR will revise its funding guidelines to state that water suppliers that do not submit reports are ineligible for DWR grants and loans.

The Water Board will offer financial assistance in 2017 to small water systems that have faced water shortages and required emergency assistance during the drought through the Drinking Water State Revolving Fund.

Other financial assistance programs that can be utilized for water loss reduction include the California Infrastructure and Economic Development Bank's revolving loan fund programs and the California Lending for Energy and Environmental Need Center's Program that offers low interest loans of \$500,000 to \$30 million for water conservation projects. The program is available to non-profit water agencies such as municipalities.

In addition, the CPUC may grant financial incentives for minimizing leaks during the review of each investor-owned utility's upcoming general rate case or by separate applications where further scrutiny can be conducted by interested parties considering the cost/benefit analysis of reducing the levels of non-revenue water.

Requirements Related to Agricultural Water Suppliers

Reducing water waste for agricultural water suppliers will be addressed through new AWMP requirements that include quantifying measures to increase efficiency, developing a water balance that can identify and prioritize water loss, identifying ways to improve water system management, and drought planning (see Section 3.4).

2.3.4 Reporting, Compliance Assistance, and Enforcement

Beginning in 2017, urban retail water suppliers must submit validated water loss audit reports to DWR. Those not in compliance will not be eligible for State grant and loan funding.

Upon completion of the Water Board's rulemaking related to SB 555 water loss standards in 2020, reporting, compliance assistance, and enforcement information will be available (see Section 3.1 for further detail).

2.4 Certification of Innovative Technologies for Water Conservation and Energy Efficiency

2.4.1 Need for Change

Reducing the amount of water used by appliances can result in water savings. Setting water efficiency standards can help reduce the level of water use across the State. In addition, technologies are in various states of development and deployment that aim to find underground leaks and leaks past the utility meter. As leak detection and reduction technologies advance, water loss control measures may become more cost-effective.

2.4.2 EO Directive

EO Item 7 focuses on water conservation and energy efficiency technologies, and states:

The California Energy Commission shall certify innovative water conservation and water loss detection and control technologies that also increase energy efficiency.

2.4.3 Implementation

EO Item 7 builds on Executive Order B-29-15 that incentivizes promising new technology to make California more water efficient. This item directed the CEC to:

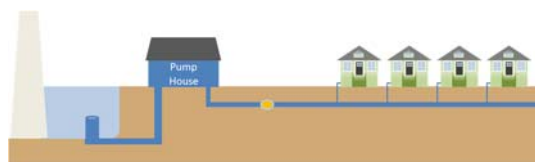
- Implement an appliance rebate program to replace inefficient household devices jointly with DWR and the Water Board.
- Adopt emergency regulations establishing standards to improve the efficiency of water appliances.
- Implement a Water Energy Technology (WET) Program to deploy innovative water management technologies.
- Expedite applications or petitions for power plant certifications to secure alternate water supply necessary for continued power plant operation by delegating, as appropriate, approval to the Executive Director.

Approaches to Water Conservation and Water Loss Detection and Control Technologies

Various options for water loss detection and control are described briefly below.

Utility Level. Utility level technologies discover leaks in water distribution infrastructure prior to delivery to the customer. Some utilities have devised approaches varying from listening for the sounds from leaks to surveys from aircraft or satellites. Some utilities have begun monitoring and controlling a system's water pressure in an

effort to prevent the formation of leaks and minimize water loss.



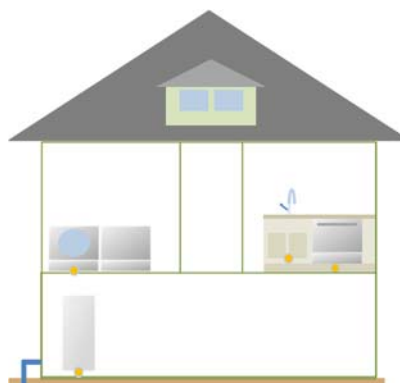
Distribution level loss detection.

House Level. Several companies are developing devices intended to monitor whole house water usage and report leaks. A typical device clamps to a house's main water supply and identifies the type of water usage by the signature of the water flow. These devices provide information to occupants via the internet.



Household level loss detection.

Appliance Level. Consumers may place a device near an appliance such as a faucet, clothes washer, water heater or dishwasher to detect leaking water. The device may alert the user through an audible alert or through a message sent to their internet connected device.



Appliance level loss detection.

CEC Research and Development Division Activities

The CEC's Electric Program Investment Charge (EPIC) Program follows an energy innovation pipeline program design, funding applied research and development, technology demonstration and deployment, and market facilitation to create new energy solutions, foster regional innovation, and bring clean energy ideas to the marketplace.

EPIC-Funded Utility Level Leak Prevention and Water Loss Detection Study. The EPIC Program is currently funding studies that will demonstrate correlating continuous acoustic monitoring, satellite imagery leak detection, district metered areas, and flow-sensitive pressure reducing valve technologies to reduce the formation of leaks and aid in the detection of leaks at four California municipal utilities. The goal is to demonstrate and improve the technologies to move them closer to commercial adoption.

CEC Efficiency Standards

Section 25402(c)(1) of the California Public Resources Code mandates that the CEC reduce the inefficient consumption of energy and water on a statewide basis by prescribing efficiency standards and other cost-effective measures for appliances that require a significant amount of energy and water to operate. Such standards must be technologically feasible and attainable and must not result in any added total cost to the consumer over the designed life of the appliance. Manufacturers must certify to the CEC that their appliances meet or exceed the applicable minimum efficiency standards.

The CEC assesses the technical feasibility of proposed standards as part of the appliance rulemaking process. Technical feasibility means determining whether technologies currently exist or will exist that can achieve the efficiency goals of the proposed standard.

In determining cost-effectiveness, the CEC considers the value of the water or energy saved, the effect on product efficacy for the consumer,

and the life-cycle cost of complying with the standard to the consumer. The CEC assesses the cost effectiveness of a proposed appliance standard by surveying and comparing the cost and operation of compliant and non-compliant appliances. Any increased costs must be offset by water and energy savings due to the increase in appliance efficiency.

The CEC recently concluded a rulemaking to increase the efficiency of toilets, urinals, faucets, and showerheads that will result in saving over 150 billion gallons of water per year after full replacement. The CEC looks to further water savings by exploring appliance standards for landscape emitters and landscape irrigation controllers.

The CEC maintains a database of appliances certified by manufacturers as meeting the Appliance Efficiency Standards. The public may search the database for compliant products and use the performance data to identify appliances that use water and energy most efficiently.

Informational Proceeding Workshop. In early October 2016, the CEC conducted a public workshop to gather information on innovative water conservation and water loss detection and control technologies from industry, stakeholders, and the public.

The workshop included presentations from the Efficiency Division, the Research and Development Division, DWR, and the Water Board. The comments gathered provided viewpoints and proposed solutions related to the Commission's direction specifically, and the drought generally. Comments may be viewed at the Energy Commission Docket 16-OII-01.⁸ In attendance were the California investor-owned utilities, water utilities, Plumbing Manufacturers International, and developers of water loss and leak detection

⁸ Energy Commission Docket 16-OII-01, located at <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=16-OII-01>.

and control technologies. The comment period closed in late October 2016.

At the workshop and in written comments, the CEC received information about a variety of water loss and leak detection and control technologies. These technologies were generally applicable at the utility level, such as automated water meters, data analytics to find apparent system losses and meter inaccuracies, acoustic monitoring systems, scanning technologies to pinpoint distribution system losses, and aerial imaging for agricultural water distribution.

The CEC will continue to evaluate technologies for water loss detection and control. To date, existing technologies are tailored for specific uses. The CEC will continue to work with EO agencies and stakeholders to provide information about innovative water loss control technologies as technologies mature and more information about their performance and use becomes available. Water loss detection and control technologies are available in both commercial and pilot forms, and different technologies may be appropriate for different systems or issues, depending on the needs and programs in place for each water district.

The CEC recommends continuing the WET program and guidance to begin investments based on workshop results and feedback. Research would support the development of test methods and device testing and could highlight successful case studies in the application of water loss and control technologies. Research could also advance innovative pre-commercial technologies that would result in water and energy savings and overcome barriers to large scale deployment.

The CEC recommends continuing to study landscape irrigation controllers and emitters for possible efficiency standards to capture significant water savings through cost-effective and technologically feasible improvements in these products. This would continue the CEC's work on drought efficiency measures to save water that the

CEC began with its toilet, faucet, urinal, and showerhead standards. These standards are expected to save Californians 150 billion gallons of water each year after all inefficient products are replaced with ones that meet the standards.

The CEC recommends that it continue to have manufacturers certify and add their toilets, faucets, urinals, and showerheads to the Modernized Appliance Efficiency Database System which will help the CEC to ensure compliance with the applicable water efficiency standards while also providing a tool for individuals and businesses to search for and compare water-conserving products.

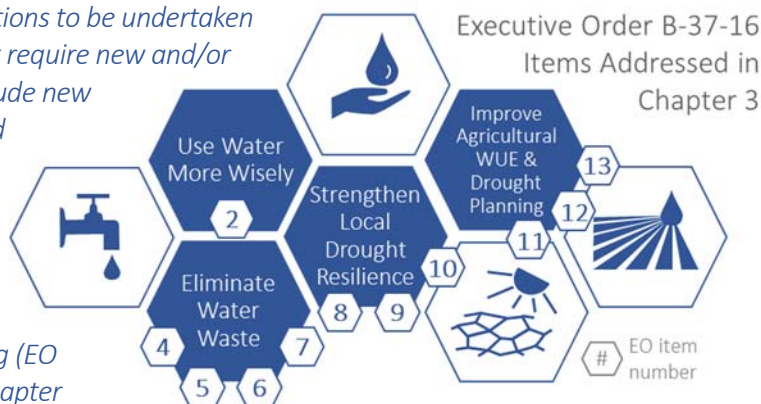
WET Program. The CEC, jointly with DWR and the Water Board, plans to implement the WET Program to provide funding to accelerate the deployment of innovative water and energy saving technologies and reduce greenhouse gas emissions.

2.4.4 Reporting, Compliance Assistance, and Enforcement

Reporting, compliance assistance, and enforcement do not apply to the actions associated with certification of innovative technologies for water conservation and energy efficiency.

Chapter 3 – Recommendations that Require New and Expanded Authorities to Implement

This chapter describes recommended actions to be undertaken to implement portions of the EO but that require new and/or expanded statutory authority. These include new water use targets based on strengthened standards (EO Items 2 and 6), water shortage contingency planning (EO Items 6, 8, and 9), drought planning for small water suppliers and rural communities (EO Item 10), and agricultural water management planning (EO Items 6, 11, 12, and 13). For each, the chapter includes: a description of the current status and need for change; the directive as stated in the EO; and a description of reporting, compliance assistance, and enforcement. A summary of implementation activities and their schedules are included in Chapter 4.



3.1 New Water Use Targets Based on Strengthened Standards

3.1.1 Current Status and Need for Change

Urban water conservation and efficiency has been a key California water management strategy over the past 25 years starting with programs implemented during or shortly after the 1988 to 1992 drought, including MWEL0 and plumbing code and appliance standards. In 1991, 120 urban water suppliers⁹, environmental groups and other interested parties signed a historic Memorandum of Understanding (MOU) agreeing to develop and implement comprehensive water conservation Best Management Practices (BMP). The MOU called for the creation of the California Urban Water Conservation Council (CUWCC) to oversee

the implementation of the BMPs. Roughly half of urban water suppliers voluntarily joined the CUWCC in 1993, and more followed since then.

The CUWCC has played a key role in the history of urban water conservation in California, successfully creating a collaborative forum for water suppliers and the environmental community to work together to advance urban water conservation throughout the State. This voluntary documentation of conservation efforts by reporting on BMPs by water suppliers has continued through 2016. In 2009, the State conditioned grant funding eligibility for urban water suppliers on compliance with demand management measures which were defined as the CUWCC’s 14 BMPs. This requirement was in place until July 1, 2016 when retail urban water suppliers’ eligibility for State loan and grant funding changed to compliance with the 20x2020 urban water use targets (California Water Code (CWC) Section 10608.56).

At the end of the 2007 to 2009 drought and as part of a package of legislation relating to Sacramento-San Joaquin Delta management, the State set a

⁹ Urban water suppliers are defined by CWC Section 10617 as a “supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.”

statewide goal of reducing urban per capita water use by 20 percent by 2020, with a 10 percent interim goal in 2015. Known as the Water Conservation Act of 2009, SB X7-7 required urban water suppliers to calculate baseline water use and set water use targets for 2020, with interim targets by 2015. Suppliers were required to report on target compliance in their UWMPs. Urban water suppliers reported a statewide average baseline water use of 199 gallons per capita per day (GPCD) for the ten-year period from 1996 to 2005, with baseline water use amongst individual suppliers showing significant variation. The statewide interim target was 179 GPCD and the final statewide 2020 target was 159 GPCD.

SB X7-7 provided several options for how suppliers could achieve higher levels of water conservation by allowing each water supplier to choose one of four methods¹⁰ for determining their own water use target for 2020 (and interim targets for 2015). These options were designed to address regional diversity use practices, climate, history of investment in water conservation and reductions in urban water use. SB X7-7 also permitted water suppliers to join with others to meet the targets regionally. Finally, it permitted urban water suppliers to increase the use of recycled water to meet their targets.

¹⁰ As outlined in DWR's *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (2010, & updated in 2016), the four methods to set 2020 per capita water use targets are as follows:

- *Method 1:* Eighty percent of the water supplier's baseline per capita water use.
- *Method 2:* Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use based on MWEL0; and a 10% reduction in CII water use.
- *Method 3:* Ninety-five percent of the applicable State hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Plan.
- *Method 4:* An approach developed by DWR and reported to the Legislature in February 2011 that identifies per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020.

SB X7-7 directed DWR to develop technical methodologies and criteria to ensure the consistent implementation of the Act and to provide guidance to urban water suppliers in developing baseline and compliance water use.¹¹

The current historical drought (2013 – 2017) has placed an even greater emphasis on urban water conservation and efficiency. In January 2014, Governor Brown issued an emergency drought proclamation, and on April 1, 2015, the Governor issued an Executive Order directing the Water Board, for the first time, to enact statewide mandatory conservation requirements to achieve a 25 percent reduction in statewide urban water use. As a result of these mandatory conservation requirements, urban water suppliers reported an average per capita water use of 133 GPCD in 2015, a 33 percent reduction from the baseline conditions for SB X7-7 implementation of 199 GPCD (see Figure 3-1). In 2013, prior to the imposition of statewide mandatory conservation requirements, DWR estimated that average statewide per capita use had already declined to about 160 GPCD, an 18 percent reduction from the SB X7-7 baseline.

The current drought has accelerated urban water conservation, exceeding 20x2020 goals well in advance of 2020. To build on the conservation and efficiency momentum achieved during the current drought, and to “make water conservation a California way of life” on a permanent basis, the EO directs the EO Agencies to develop new water use targets that go beyond the “20x2020” targets based on strengthened water use efficiency standards.

¹¹ DWR developed methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use. These are published in *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (DWR 2010, updated in 2016).

The EO calls for new water use targets based on strengthened water use efficiency standards, rather than a percentage reduction in urban water use. This approach builds off one of the four SB X7-7 methods urban water suppliers

could use to achieve their 2020 targets (Method 2). A water use efficiency standards-based approach provides several advantages when compared with other previously used percent reduction approaches in SB X7-7. Mandatory percentage reductions may be more difficult for suppliers that have already achieved a high level of efficiency and conservation, as their overall water use may be low. Further, an efficiency approach removes negative incentives for consumers to use more water than needed during normal (non-drought) conditions such that, if required to conserve due to an emergency, it would be easier to achieve reduction targets. An efficiency-based approach also recognizes supplier efforts to reduce overall water use, including indoor water use efficiency and turf-replacement programs and development of more drought resilient water supplies, such as recycled water. An efficiency standards-based approach eliminates uncertainty or inequity associated with percent reduction from a baseline.

While the Water Boards’ mandatory conservation requirements were effective in reducing urban water use, those requirements function best as a short-term, interim solution. A long-term transition to conservation as a way of life must take into

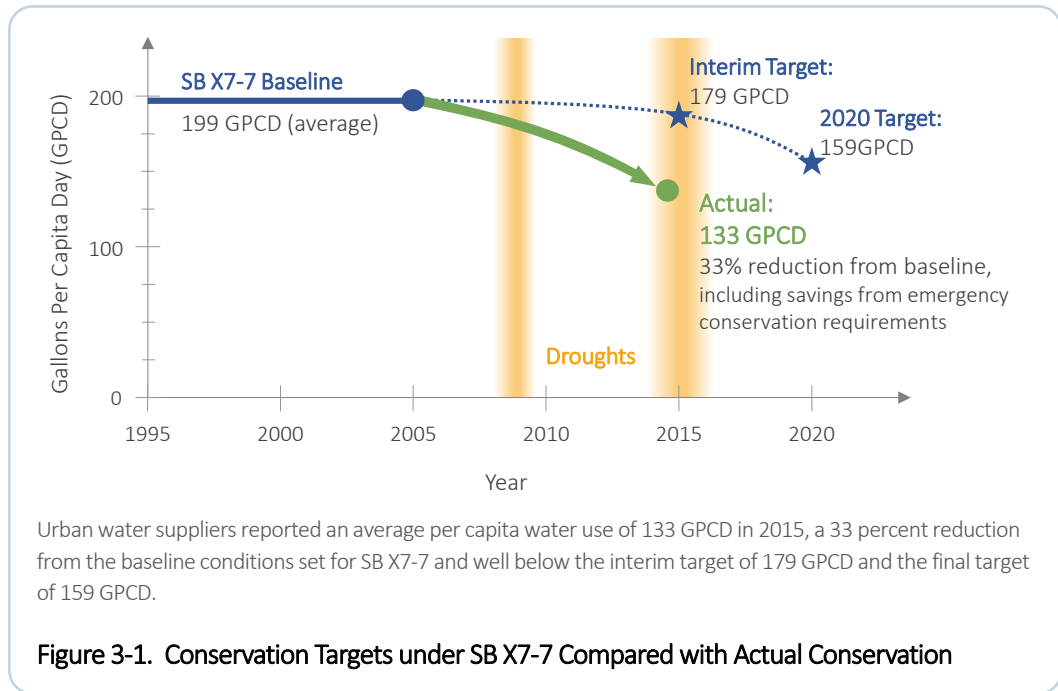


Figure 3-1. Conservation Targets under SB X7-7 Compared with Actual Conservation

account the climatic, landscape, and demographic conditions unique to each supplier in a more precise manner. The approach described in this Framework will recognize the unique geographies of the State by incorporating supplier-specific climate, population, and other settings.

3.1.2 EO Directive

New water use targets based on strengthened standards address **EO Item 2**, which states:

The Department of Water Resources (Department) shall work with the Water Board to develop new water use targets as part of a permanent framework for urban water agencies. These new water use targets shall build upon the existing state law requirements that the state achieve a 20% reduction in urban water usage by 2020. (Senate Bill No. 7 (7th Extraordinary Session, 2009-2010)). These water use targets shall be customized to the unique conditions of each water agency, shall generate more statewide conservation than existing requirements, and shall be based on strengthened standards for:

- a. Indoor residential per capita water use;

- b. *Outdoor irrigation, in a manner that incorporates landscape area, local climate, and new satellite imagery data;*
- c. *Commercial, industrial and institutional water use; and*
- d. *Water lost through leaks.*

The Department [DWR] and Water Board shall consult with urban water suppliers, local governments, environmental groups, and other partners to develop these water use targets and shall publicly issue a proposed draft framework by January 10, 2017.

EO Item 6, which addresses data collection and improved water system management, also relates to the implementation of new targets and standards directed in EO Item 2. EO Item 6 states:

The Water Board and the Department [DWR] shall direct urban and agricultural water suppliers to accelerate their data collection, improve water system management, and prioritize capital projects to reduce water waste.

See also Table 1-1 in Chapter 1 for a summary of the relationship between the EO items described in this chapter.

3.1.3 Recommendations

The EO Agencies recognize that improved water use efficiency on a statewide scale will take time, and recommend setting interim targets until refined standards are adopted no later than 2021, with a path of increasing progress toward achieving final compliance in 2025. This will allow time for the EO Agencies to collect data sufficient for establishing new standards, and allow water suppliers and users to plan for and adjust to the change in approach. The EO Agencies will identify and formally adopt (revised) final standards no later than 2021. Retail urban water suppliers would then calculate new water use targets, with the goal of achieving full compliance with the final standards by 2025.

The standards recommended by the EO Agencies encompass residential indoor water use, outdoor irrigation water use, water system losses, and commercial, industrial and institutional uses. The EO Agencies anticipate that the greatest water efficiency savings will be achieved through changes in outdoor landscape water use, due to the relatively high use of water in this sector compared with others.

The following describes the standards framework, and the processes needed to implement the water use target directive. The discussion is divided into three parts: (1) the process for setting a water use target, (2) the process for setting standards (including provisional outdoor and indoor water use, water loss, and commercial and industrial measures), and (3) a summary of the anticipated schedule for water use standards development.

In support of water conservation, the legislature has, through CWC Section 1011, deemed reductions in water use due to conservation as equivalent to reasonable beneficial use of that water. The proposals in this report are not intended to affect or otherwise limit any rights to water conserved under applicable law, including without limitation, water conserved consistent with CWC Section 1011.

In addition, the California Water Action Plan calls for increasing the use of recycled water as part of the State's larger strategy to develop a more resilient water supply and increase regional self-reliance. It is therefore imperative that new water use targets be compatible with the goal of expanding recycled water supplies. The proposed efficiency standards would allow higher water application volumes for outdoor use of non-potable recycled water to provide an incentive for its use. The EO agencies are proposing that water suppliers that utilize recycled, for either potable or non-potable uses, continue to be incentivized within the targets or through their implementation.

Setting a Water Use Target

Under the EO Agencies’ proposed framework, each retail urban water supplier will be required to annually calculate an overall water use target and implement commercial, industrial, and institutional (CII) performance-based measures. The proposed target framework recommendations are specific to retail urban water suppliers and the recommendations are not intended to apply to wholesale urban water suppliers.

The EO Agencies’ proposed framework improves on the SB X7-7 Method 2 approach, but differs in several respects. First, under SB X7-7 Method 2, the water use target was the sum of an indoor and outdoor performance based standard and a 10 percent reduction in CII water use, and water loss was not addressed. Under the proposed framework, water loss is now included as part of the supplier’s Water Use Target. Given the substantial diversity in businesses and institutions throughout California, a better approach to the CII sector would be to institute performance measures rather than a volumetric standard or budget, at this time. Data collection associated with the CII performance measures may support industry standards and volumetric approaches in the future.

The water use targets will be calculated as the sum of a retail supplier’s residential indoor, outdoor irrigation, and distribution system water loss budgets. Each of these budgets is calculated through the application of a water use efficiency standard, described later in this section.

$$\text{Indoor Water Use Budget} + \text{Outdoor Water Use Budget} + \text{Water Loss Budget} = \text{Supplier Water Use Target}$$

Compliance will be based on the supplier’s total water use target, rather than on the individual budgets. Interim targets based on residential indoor and outdoor standards will be set by water suppliers in 2018, and final targets based on indoor, outdoor and water loss standards will set by water suppliers in 2021. The interim targets will be gradually reduced over time to create a path of

increasing progress toward achieving final compliance in 2025. Water suppliers that are not on track to meet interim or final standards-based targets may be provided with additional compliance assistance and/or face enforcement actions from the Water Board.

The following provides an example **water use target** calculation using hypothetical budgets for residential indoor water use, outdoor irrigation water use, and distribution system water loss. For illustrative purposes, the budgets are presented in three units: gallons per capita per day (GPCD), acre-feet, and centrum cubic feet (CCF).

Example Water Use Target Calculation

Sector	Budget ¹ (GPCD)	Budget Volume	
		(acre-feet)	(CCF)
Residential Indoor Water Use	55	10,492	4,570,315
Outdoor Irrigation Water Use	45	8,584	3,739,190
Water Loss	6	1,144	498,326
Target	106	20,220	8,830,380

Notes:

- Budget calculations based on the following:
 Service area population = 170,319
 Days per year = 365

Water suppliers will also calculate **compliance volume** by subtracting water delivered to the CII sector from total water production:

$$\text{Compliance Volume} = \text{Total Water Production} - \text{CII Deliveries}$$

On the following page is an example compliance volume calculation for a hypothetical water supplier. To be in full compliance, (1) the water supplier’s compliance volume must be less than or equal to the water use target, and (2) the supplier must document full implementation of the CII

performance measures (as described more fully later in this section).

Example Compliance Volume Calculation

Supplier's Water Use:

Total water production: 26,136 acre-feet
CII deliveries: 7,240 acre-feet
Target (see prior example): 20,220 acre-feet

$$\begin{aligned}\text{Compliance volume} &= \text{total production} \\ &\quad - \text{CII deliveries} \\ &= 26,136 - 7,240 \\ &= 18,896 \text{ acre-feet}\end{aligned}$$

The supplier is in compliance because the compliance volume of 18,896 acre-feet is less than the water use target of 20,220 acre-feet.

A supplier's water use target will change each year because, although the standards are set, the targets are based on variable metrics (population, landscape area, evapotranspiration) that change from year to year. Consequently, post-submittal changes or adjustments will not be needed to account for weather or other factors. The process and methodology for setting the standards is described in the following section.

Setting Water Use Efficiency Standards

The following describes the recommended provisional standards for residential indoor water use, outdoor irrigation, and distribution system water loss, and the performance measures standard for CII water use.

Residential Indoor Water Use Standard

This standard is defined as the volume of residential indoor water used by each person per day, expressed in GPCD. The indoor residential standard will be used to calculate the residential indoor budget of a supplier's water use target, which is a function of the total service area population.

For example:

$$\begin{aligned}\text{Residential Indoor Water Use Budget} &= \\ &(\text{Service area population}) \times (\text{residential indoor} \\ &\text{standard}) \times (\text{number of days in a year})\end{aligned}$$

Until the 2025 standard for residential indoor water use is established, the existing 55 GPCD standard based on SB X7-7¹² will apply.

A recent national study¹³ conducted by the Water Research Foundation suggests that the national residential indoor water use average is about 59 GPCD. Many experts believe California's average residential indoor use to be lower. DWR is currently conducting a study to estimate average statewide residential indoor GPCD. A DWR-commissioned study¹⁴ to support the standard development suggests that compliance with the provisional residential indoor water use standards could likely be facilitated through plumbing code changes and continued appliance replacements with higher efficiency units. This study suggests that the effects of toilet replacement through SB 407¹⁵ and continued enforcement of federal clothes washing machine water use efficiency standards would lower residential indoor water use by roughly 6 GPCD by 2030 and by 9 GPCD by 2040. This estimated level of reduction is generally consistent across all counties in California.

DWR and the Water Board will continue gathering additional data on current indoor water use to support future revisions of the existing standard downward to reflect the increased use of efficient fixtures and appliances. The updated standards will be available in 2018, with a timeline for interim and final compliance by 2025. Afterward, the EO

¹² SB X7-7 defined 55 GPCD as a provisional standard for residential indoor water use. See CWC Section 19608.20(b)(2)(A).

¹³ Water Research Foundation (2016). Residential End Uses of Water Study, Version 2: Executive Report.

¹⁴ Mitchell, D., 2016. Projected Statewide and County-Level Effects of Plumbing Codes and Appliance Standards on Indoor GPCD, for Department of Water Resources, August.

¹⁵ California Civil Code Section 1101 et seq.

Agencies will reevaluate the standard for potential revision every five years, beginning in 2025.

Outdoor Irrigation Standard

The proposed outdoor irrigation water use standard will be defined as percentage of reference evapotranspiration (ET_o). ET_o is an estimate of the evapotranspiration¹⁶ of well-watered cool season grass and is expressed in inches of water per day, month, or year. ET_o will vary across the State based on climatic factors such as solar radiation, temperature, humidity and wind. Landscape water requirements are expressed as a percentage of ET_o and encompass the plant water requirements and the irrigation system efficiency. Lawns and recreational fields can require 100% of ET_o or greater while low water use landscapes can require 20 to 30% of ET_o. The outdoor irrigation standard will be a fraction of ET_o.

Table 3-1 shows the existing SB X7-7 standards (Method 2¹⁷) for outdoor water use. These existing,

provisional standards will guide and assist water suppliers in their outdoor water use planning efforts until such time as the EO Agencies identify and adopt final standards (as described later in this section).

Table 3-1 Existing SB X7-7 Standards for Outdoor Water Use

Category		% of ET _o
Residential Landscape by Parcel Development Date	Before 2010	0.8
	Between 2010 and 2015	0.7
	After 2015	0.55
Commercial Landscape		0.45
Landscapes Irrigated by Recycled Water		1.0
Special Landscape Areas (e.g., Parks and Fields)		1.0

Note that irrigation use for commercial properties without a dedicated account or meter will be subject to the CII performance measures, as described later.

For the purpose of the provisional standards displayed in Table 3-1, areas irrigated with recycled water are considered special landscape areas and assigned an Evapotranspiration Adjustment Factor (ETAF) of 1.0, recognizing the higher salinity levels of recycled water. The EO Agencies will review local community characteristics and consider how the proposed efficiency standards can best reflect local variances in geography and climate when developing the permanent standards by 2021. The EO Agencies’ consideration will be based on lessons learned from the land use pilot project and on data received following implementation of interim targets in 2018.

¹⁶ Evapotranspiration is the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants.

¹⁷ In describing Method 2, CWC Section 10608.2 (b)(2) specifies that the 2020 per capita water use target is, “The per capita daily water use that is estimated using the sum of the following performance standards:

- (A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department’s 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.
- (B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficiency Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of, the year of the landscape’s installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

- (C) For CII uses, a 10-percent reduction in water use from the baseline CII water use by 2020.”

The total outdoor water use budget for a water supplier is calculated as the sum of the individual budgets for all categories of outdoor water use within its service area. Because ETo and landscape area can change from year to year, the resulting outdoor water use budget also changes.

As described previously, the outdoor irrigation budget is calculated based on the landscape area within a water supplier's service area. Currently, few water suppliers have measured or collected data on the landscape area within their service area. To facilitate the transition to the new standards-based approach, the EO Agencies will develop landscape area estimates for each urban retail water supplier in the State. The State's landscape area measurement project will focus on the water supplier service aggregate landscape area. Suppliers may contract with the vendors individually to obtain parcel level landscape area measurements.

The EO Agencies will develop landscape area data in several steps. First, the EO Agencies will form an urban landscape area workgroup to provide technical guidance and input on this project. This work will include developing definitions for irrigated and irrigable landscape area. Next, pilot projects will be conducted to ensure that the process used for measuring landscape area is accurate. The landscape area workgroup will also provide input and guidance in reviewing the pilot projects' results. Accuracy assessments will be conducted for each of the pilot projects.

Based on lessons learned from the pilot projects, the EO Agencies will measure the landscape area for the remaining urban retail water suppliers. It is anticipated that this statewide landscape area measurement project will be completed in 2018. At the end of the project, in 2018, the service area landscape area data will be made available to water suppliers.

Using both the supplier service area landscape area data measured in the pilot and statewide projects and water suppliers' aggregate water delivery data,

the EO Agencies will estimate service area, regional, and State average applied irrigation water levels. There will be ample opportunity for public input and workgroups to help shape this implementation going forward, and DWR will also consider data provided by water agencies.

In 2018, using the statewide estimates of applied irrigation water use, DWR and/or the Water Board will evaluate the existing SB X7-7 outdoor water use standards (Table 3-1) and develop final recommended standards that would begin to be phased in starting in 2018 and need to be fully applied by 2025. At this time, in setting the landscape standards the EO Agencies will determine whether the irrigated landscape area or the irrigable (developed landscape area that could be irrigated) landscape area is used as the basis for the standard. The EO Agencies will also reevaluate the inclusion of recycled water in the outdoor water use standard. The final outdoor standards will be set to increase the efficiency of outdoor water use and achieve water savings beyond SB X7-7 implementation.

By 2021 the EO Agencies will adopt the final outdoor landscape standards. Starting with 2021 (reported on in 2022), urban water suppliers must start showing sufficient progress towards meeting the water use targets based on the 2025 standards. Water suppliers will be required to meet their water use targets by 2025.

Every five years thereafter, the EO Agencies will review the outdoor water use standard; at these times, they may consider further reducing the ETAFs for some or all categories, or making other adjustments to the standard and budget calculation. Landscape area data will also be updated periodically.

Distribution System Water Loss Standard

The standard for water system loss will be established through the SB 555 process¹⁸ and may be expressed as volume per capita or volume per connection, accounting for relevant factors such as infrastructure age and condition. The water loss standards will include system losses and leaks, as well as other non-revenue water used for system maintenance and public safety purposes.

Per SB 555, the Water Board will establish the water loss standard by 2020 for compliance in 2025. The Water Board will reevaluate the water loss standard for potential update every five years, beginning in 2025.

Commercial, Industrial, and Institutional Performance Measures

There is substantial diversity in businesses and institutions throughout California, resulting in a wide range of water use within the commercial, industrial, and institutional sector. Consequently, the EO Agencies will not establish a volumetric standard and budget for CII water use at this time. Instead, CII water suppliers will be required to implement the following three performance measures:

1. Convert all landscapes over a specified size threshold that are served by a mixed-meter CII account to dedicated irrigation accounts, either through the installation of a separate landscape meter or the use of equivalent technology.
2. Classify all CII accounts using the North American Industry Classification System (or another similar classification system selected by the EO Agencies). Where feasible, CII subsector benchmarks will be developed to assist water suppliers in identifying CII accounts with the potential for water use efficiency improvements.

3. Conduct water use audits or prepare water management plans for CII accounts over a specified size, volume, or percentage threshold.

By December of 2018, the EO Agencies would develop regulations and guidelines for the implementation of the CII performance measures. This guidance will include methods for classifying CII accounts, landscape size thresholds for dedicated metering, direction on implementing CII water audits, and guidance for preparing water management plans. The regulation and guidelines will be established through a public process, with the advice and input of a new CII workgroup to be established by the EO Agencies. Every five years, the EO Agencies will review the outcomes of performance measure implementation and consider updates, if appropriate. In the future, the EO Agencies may consider establishing industry-specific benchmarks or other means to improve water use efficiency in the CII sector.

Schedule for Water Use Standards Development, Review and Revision

The timeline on the following page summarizes anticipated EO Agencies actions and schedule for developing, reviewing, applying, and revising the water use standards.

¹⁸ See Section 4.3 of this report for information on SB 555, water loss audits, and water loss standards.

Water Use Standards Development Timeline

- 2017** DWR completes pilot projects on landscape area measurements
- 2018** DWR completes statewide landscape area measurements to support development of outdoor landscape standard
 - EO Agencies estimates service area, regional, and State average applied irrigation levels
 - EO Agencies recommend final 2025 compliance standards for indoor and outdoor water use
 - EO Agencies set provisional indoor and outdoor residential standards, and water suppliers set interim targets
 - EO Agencies develop regulations and guidelines for the implementation of CII performance measures
 - DWR provides urban water suppliers with the service area landscape area data
- 2019** EO Agencies provide guidance and methodologies for all standards
- 2020** EO Agencies complete rulemaking and adopt final 2025 water loss standards
- 2021** EO Agencies complete rulemaking and adopt final 2025 indoor and outdoor standards
- 2025** EO Agencies review and consider updates to the standards, starting in 2025 and every five years thereafter; revisions will follow the requirements for rulemaking and provide opportunity for public comment and input

3.1.4 Reporting, Compliance Assistance, and Enforcement

Specific reporting and compliance dates are subject to EO Agencies requisite actions as described above. Compliance dates would be extended as necessary to accommodate any serious delays in completion of those actions.

Reporting

Beginning in 2019, water suppliers must submit annual progress reports for residential water use, and implementation of the recommended CII performance measures.

Starting in 2022, the annual progress report for the prior year will address all water use standards and will include the following three elements:

1. Calculation of progress towards meeting the water use standards based on prior year target developed using 2025 standards and annual production data.
2. Documentation of CII performance measures implementation.
3. A narrative description of refined actions to be taken by the supplier to ensure compliance by 2025.

Water suppliers will submit annual progress reports every year from 2022 through 2025, documenting annual water production relative to the water use targets and CII performance measure implementation for the previous year. In 2026, water suppliers will submit a concluding annual compliance report documenting accomplishments and outcomes in complying with the 2025 water use targets.

Suppliers will continue to submit annual compliance reports in 2026 and thereafter, repeating the 5-year reporting cycle and using updated standards adopted by the EO Agencies, as applicable. Additionally, suppliers will continue to submit monthly and annual water use data, per existing requirements.

The 5-year cycle for water suppliers to update their UWMPs is similar to the 5-year cycle for the EO Agencies to update the water use standards; it is expected that updated standards will be available six months to a year prior to the July deadline for submitting UWMPs. Reporting in future UWMP updates will, therefore, incorporate the water use efficiency standards and supplier accomplishments in meeting them.

Assistance and Compliance

The EO Agencies propose that compliance will be assessed on total water use in comparison to a supplier's total water use target, rather than on the individual water budgets by sector (indoor, outdoor, and water loss). Full compliance will be met when the supplier's total water use is less than or equal to the standard, and the supplier has implemented the CII performance measures.

The EO Agencies will review the monthly and annual reports and data submitted by water suppliers for completeness and progress in achieving interim targets starting in 2018 and compliance with final targets by 2025. Where necessary, DWR or the Water Board may provide feedback, direction, or suggestions for water suppliers to improve their compliance and progress. The Water Board may also issue formal Enforcement or Informational Orders to suppliers not on track to meet interim or final targets, as explained below under *Enforcement*.

DWR will provide technical assistance to suppliers in preparing their annual progress reports and will continue to revise UWMP guidance, as needed, to reflect updated standards and water use compliance requirements. The EO Agencies will actively communicate the need for the water use standards and their implementation through public outreach and engagement, sharing the responsibility for public education with water suppliers.

Water suppliers must be in compliance with the new standards-based water use targets by 2025 to be eligible for State grant and loan funding.

Enforcement

Water suppliers that are not in compliance with the new standards-based water use targets by 2025 may be provided with additional compliance assistance and/or face enforcement actions from the Water Board. This could include:

- Informational orders
- Conservation orders
- Cease and desist orders
- Administrative civil liability penalties (such as fines)

The EO Agencies will conduct enforcement only at the retail supplier level, not at the individual customer level, based on compliance with the total water use target for the entire service area and associated performance measures for CII water use. Water suppliers may implement discretionary actions of their choosing on individual water accounts or users to ensure that their overall water use efficiency targets are met.

Water suppliers are required to continue submitting monthly water use reports to the Water Board for their water use, amount of conservation achieved, and any enforcement efforts, as directed in EO Item 3.

Water suppliers failing to submit annual reports for standard compliance, UWMPs, or monthly reports for water use per the schedule will be subject to earlier enforcement action.

MWELo Updates and Standards

DWR may consider updating the MWELo to better align the model ordinance language with the water use efficiency standards. Better alignment will provide land use agencies with tools to implement complementary actions that assist water suppliers in complying with the standards.

3.2 Water Shortage Contingency Plans

3.2.1 Current Status and Need for Change

Current Status

Current statutes direct urban suppliers¹⁹ to provide a water shortage contingency analysis as a component of their UWMPs, which are updated every five years. Some urban water suppliers have exceeded the existing shortage contingency analysis requirements, documenting them in official WSCPs; these plans are used to satisfy the UWMP requirements submitted to DWR. However, this is not a requirement under current guidance²⁰, and suppliers have used varying assumptions in their analyses. Consequently, WSCPs are varied in their form, approach, and functionality, in part due to the lack of statewide standards.

Need for Change

During the on-going historical drought, some water suppliers that had inadequately assessed the risk of water shortage were unprepared to effectively respond to the realized supply shortages. However, many other suppliers showed high levels of resiliency due to their adequate planning and well-defined contingency actions.

Supplier experiences during the current drought have prompted the need to elevate water shortage contingency planning for urban water suppliers throughout the State. Water shortage contingency planning is important because water shortages can affect the basic health and safety of California residents. It can also be very costly for both the

¹⁹ UWMPs are only prepared by urban water suppliers, defined as a “supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually” (CWC Section 10617). According to DWR, there are approximately 440 wholesale and retail urban water suppliers in the State that must prepare UWMPs.

²⁰ 2015 Urban Water Management Plan: Guidebook for Urban Water Suppliers, DWR, January 2016.

State and local communities to engage in last minute, emergency efforts to alleviate water supply crises when they happen.

Urban water suppliers should evaluate the potential impacts on their water supplies considering the full range of plausible water supply and demand conditions in order to properly assess their potential risk and exposure to shortage in frequency, severity, and potential consequences. Each water supplier establishes its accepted tolerance for risk that varies based on many intertwined technical, legal, economic, and political considerations. It is critical that water suppliers inform their customers of the accepted risk and potential consequences.

As these factors are often changing, a supplier must diligently assess them in a manner that allows confident management in accordance with its risk tolerance.

3.2.2 EO Directive

The water shortage contingency planning discussed in this section focuses on the requirements for DWR to develop measures to strengthen local drought resilience. Specifically, **EO Items 8** and **9** state:

8. *The Department [DWR] shall strengthen requirements for urban Water Shortage Contingency Plans, which urban water agencies are required to maintain. These updated requirements shall include adequate actions to respond to droughts lasting at least five years, as well as more frequent and severe periods of drought. While remaining customized according to local conditions, the updated requirements shall also create common statewide standards so that these plans can be quickly utilized during this and any future droughts.*
9. *The Department [DWR] shall consult with urban water suppliers, local governments, environmental groups, and other partners*

to update requirements for Water Shortage Contingency Plans. The updated draft requirements shall be publicly released by January 10, 2017.

EO Item 6, which relates to accelerated data collection for urban water suppliers, also has ties to EO Items 8 and 9, above. See also Table 1.1 in Chapter 1.

3.2.3 Recommendations

DWR recommends strengthening local drought resilience through improved planning and annual assessments. In addition, the proposed planning and assessment methods will allow for local control in defining the risk tolerance, with improvements in information dissemination to both customers and the State during drought conditions. This could lead to reductions in long-term impacts on customers in the wake of more frequent and severe drought conditions under climate change.

The EO Agencies established the following primary objectives in the design of the recommendations:

- Assure that an urban water supplier has adequately planned for, and can quickly respond with adequate, pre-determined actions, to droughts lasting at least five years, as well as during more frequent and severe periods of drought; and
- Provide DWR with information necessary to evaluate specific urban supplier responses throughout the State to drought conditions, to allow focused attention where necessary and forestall overarching mandates that may conflict with existing adequate local plans and responses.

To achieve these objectives, DWR recommends the following requirements for urban water suppliers and EO Agencies:

Wholesale and Retail Urban Water Suppliers

Each wholesale and retail urban water supplier will prepare a Drought Risk Assessment that evaluates

plausible worst-case supply conditions for a period of at least five years. These will be reported in the UWMP.

Updated Contents of the Urban Water Management Plans

Updated contents for suppliers' UWMPs include the following:

1. 5-Year Drought Risk Assessment – Define the methodology, data requirements, and basis for one or more plausible supply shortage conditions necessary to conduct a 5-year drought risk assessment that examines shortage risks for the next five or more consecutive years. Drought resilient, hydrologically independent supplies such as potable reuse, recycled water, and desalination are considered fully reliable under all historical drought hydrology and plausible climate change effects, and should be considered.
2. Evaluation Criteria – Define a set of evaluation criteria that will be used to conduct the 5-year drought risk assessment. The evaluation criteria will be locally applicable and include, but not be limited to, the following factors:
 - a) Historical drought hydrology
 - b) Plausible climate change effects for existing supplies and demands (e.g. precipitation or ETo changes)
 - c) Plausible regulatory changes that can affect existing supplies and demands (e.g., Water Use Efficiency emergency regulations)
 - d) Demand projections
3. Conduct a Drought Risk Assessment – Suppliers will conduct a drought risk assessment at a minimum of every five years, per the procedures set forth in the urban water management plan.

Each urban water supplier will prepare and adopt an updated WSCP and submit it to DWR for review as part of the UWMP. A key component of the

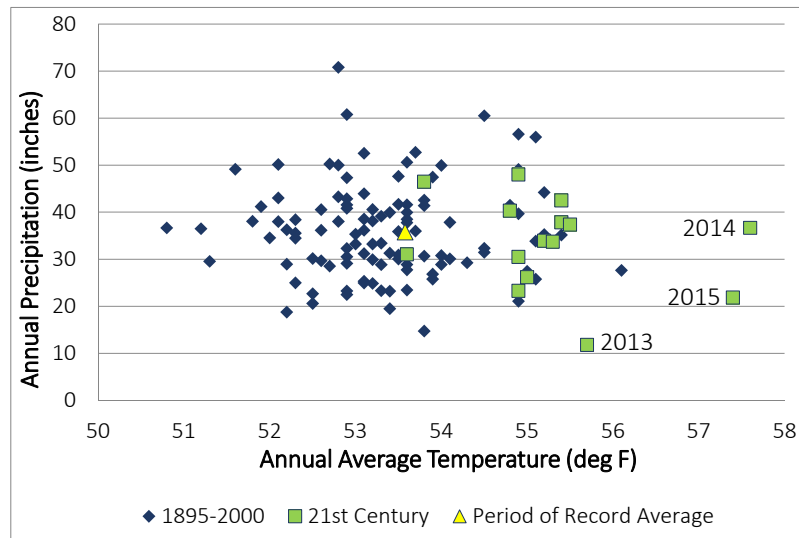
WSCP will be establishing the methodologies, data requirements, and policy considerations for an annual assessment of shortage risks in the current year plus one or more dry years. Following the procedures detailed in the adopted WSCP, the supplier will annually assess its actual or potential water shortage condition, respond accordingly, and report pertinent information to DWR.

Contents of the Water Shortage Contingency Plan

The supplier’s WSCP must provide details for each of the following standard sections:

1. Annual Water Budget Forecast Procedures – Define the process, data inputs, and water year schedule to generate the Annual Water Budget Forecast.
2. Annual Water Budget Assessment Methodology – Define the methodology necessary to conduct an Annual Water Budget Forecast assessing shortage risks for the current year and one or more dry year(s), assuming a dry year triggers Shortage Response Actions.
3. Annual Water Budget Evaluation Criteria – Define a set of evaluation criteria that will be used to conduct the Water Budget Forecast. The evaluation criteria will be locally applicable and include, but not be limited to these factors:
 - a) Current year unconstrained demand, considering weather, growth or other influencing factors, such as policies to

When developing a WSCP, water suppliers should consider the potential risks associated with climate conditions that are outside of the historical norm. As evidenced in the graphic below for the Sacramento River Basin, the recent drought (shown in data points for 2013, 2014, and 2015) is unusually warm and dry relative to other data in the period of record.



Source: NOAA Climate Division Site Calendar Year Data, compiled by Michael Anderson, DWR Climatologist

manage current supplies to meet demand objectives in future years, as applicable.

- b) Current year available supply, considering hydrologic and regulatory conditions in the current year and an additional dry year, as appropriate for the current supply sources.
 - c) Existing infrastructure and operational capabilities and plausible constraints.
4. Shortage Levels – WSCPs must include six standard shortage levels, representing the actual shortage, or predicted shortage determined by the Annual Water Budget Forecast, defined as:
 - Shortage Level 1: Up to 10 percent shortage
 - Shortage Level 2: Up to 20 percent shortage
 - Shortage Level 3: Up to 30 percent shortage
 - Shortage Level 4: Up to 40 percent shortage
 - Shortage Level 5: Up to 50 percent shortage
 - Shortage Level 6: Greater than 50 percent shortage

5. Shortage Response Actions (SRA) – For each Shortage Level, define a progressive series of SRAs that include a locally appropriate mix of short-term water efficiency and/or demand reduction actions, supply augmentation, and/or operational changes necessary to respond to actual or predicted shortage conditions. The SRAs must include actions necessary to respond to shortages.
6. Communication Plan – Describe the planned communications approach and anticipated actions intended to quickly inform customers, the public, and regional and State interests, about current shortages or predicted shortages as determined by the Water Budget Forecast, expected implementation of SRAs, and other necessary communications.
7. Customer Compliance, Enforcement, and Appeal/Exemption Procedures – Describe methods and procedures in place to (1) gain customer compliance with triggered SRAs – especially with actions requiring mandatory demand reductions, (2) enable enforcement to assure compliance, and (3) enable a customer appeal/exemption process that allows unique circumstances to be accommodated.
8. Implementation Authorities – Demonstrate that necessary authorities are in place to quickly implement SRAs. Identify specific ordinances, resolutions, or other authorities, and address compliance with CWC Section 350 et seq. Should a water supplier enter into Shortage Level 4 or higher, as described herein, there should be a water shortage emergency declaration and all appropriate actions described in CWC Section 350 et seq., must be implemented. Should SRA's be sufficient to effectively move the water supplier out of a shortage condition there may be no need for an emergency declaration.
9. Financial Plan for Drought Conditions – Describe management of revenue and expense

variances when SRAs are triggered, including but not limited to, customer rate adjustments, or use of financial reserves. Specifically describe compliance with SB 814 (CWC Section 365 et seq.).

10. Monitoring and Reporting Requirements and Procedures – Outline internal and external monitoring and reporting procedures to assure appropriate data are being collected, tracked, and analyzed for purposes of monitoring customer compliance, and to meet DWR reporting requirements.
11. Re-evaluation and Improvement Process – Identify procedures for monitoring and systematically evaluating the functionality of a WSCP to assure shortage risk tolerance is adequate, and appropriate mitigation strategies are available.

Implementing Water Shortage Contingency Plans

As articulated in the WSCP, the supplier will follow its prescribed procedures to assess current year and one or more dry year water supply reliability conditions. Specifically, the supplier will:

1. Annually conduct a Water Budget Forecast per the procedures set forth in the WSCP.
2. Depending on the results of the Water Budget Forecast, appropriate SRAs will be triggered corresponding to the projected Shortage Level.

EO Agencies

The EO Agencies will set forth planning and reporting criteria, evaluate submitted data, support compliance and enforcement, and provide technical assistance. The EO Agencies anticipate that suppliers that conduct thorough shortage planning will continue to do so under the new requirements, while those that do not will be prompted to improve their planning to levels that limit or eliminate the need for State intervention in drought response.

DWR would take the following types of actions:

1. Prepare Compliance Criteria – DWR would prepare necessary documents (and regulations, if necessary) detailing the WSCP and annual assessment compliance criteria that must be met by water suppliers. The criteria will include articulating the necessary data and information that must be submitted by suppliers (1) every five years, and (2) annually. Failure to comply will result in to-be-defined enforcement measures.
2. Develop Information Submittal Tools – DWR would prepare new or augment existing reporting procedures and websites to facilitate supplier reporting. Existing requirements for data and information reporting will be utilized where feasible in order to minimize additional reporting burdens on suppliers.
3. Evaluate Statewide Water Supply Conditions – On an as-needed basis, DWR would assess regional and statewide water supply conditions – such as those created by prolonged or severe hydrologic drought – to understand the likelihood and degree that urban suppliers would be implementing SRAs.
4. Review and Assess Supplier-Reported Information – DWR would review supplier-specific data and information submitted for compliance with stated criteria. The review will also allow DWR to evaluate local shortage conditions compared to the statewide water supply conditions, and prepare necessary reports for the Governor’s Office and the Legislature.
5. Compliance and Enforcement – A key factor to strengthen local drought resilience is to hold suppliers accountable for being prepared to quickly respond to long-lasting and potentially more frequent and severe supply shortages. By requiring suppliers to submit adopted WSCPs and perform and submit annual assessments, the EO Agencies will have supplier-specific

information that can be used to assess compliance with overall objectives. As part of recommendations, the State would define the compliance assistance and enforcement protocols.

6. Technical and Financial Assistance – To facilitate improved drought planning for all urban water suppliers, the EO Agencies would continue to offer technical and financial assistance through various existing programs and seek additional funding. Additionally, DWR would update its 2008 Drought Guidebook to incorporate the strengthened WSCP recommendations, provide further details for the recommended components and definitions, provide example drought risk assessment methods and supply shortage scenarios, and suggest various SRAs.

3.2.4 Reporting, Compliance Assistance, and Enforcement

The reporting and compliance processes described in this section will result in transparent communication of effective planning by local water suppliers and will provide the EO Agencies with an effective monitoring tool. The end result of data reporting and collection should be in a data exchange system with a public-facing GIS application that allows policy makers, water managers, and the public to view actual or predicted shortage conditions and SRAs in any part of the State.

The water supplier will follow the reporting procedures set forth in its WSCP and UWMP. The following reporting cycle is anticipated:

- Every five years
 - Submit the adopted WSCP to DWR, including the associated Drought Risk Assessment in the UWMP and supporting data.
 - Make the WSCP available to customers (website, hardcopy at desk).

- Annually
 - Submit Water Budget Forecast results and selected SRAs to DWR in May of each year, including an indication of the shortage reduction anticipated to occur with the selected SRAs.
 - Communicate Water Budget Forecast results and selected SRAs to customers (website, hardcopy at desk).

DWR would review submitted data for completeness and adequacy, using criteria to be developed by DWR, in consultation with the Water Board and CPUC, for further assistance and potential enforcement actions, where applicable. The Water Board may need expanded authority for full compliance actions. DWR will receive the WSCPs and the associated reports and make them available to the public.

3.3 Drought Planning for Small Water Suppliers and Rural Communities

3.3.1 Current Status and Need for Change

Current Status

Small water suppliers and rural communities are not covered by established water shortage planning requirements, which apply to large urban water suppliers and larger agricultural suppliers (see sections 3.2 and 3.4). Often, small suppliers and rural communities lack resources and mechanisms to compel drought planning efforts. Drought planning helps to identify potential shortage conditions and justify local expenditures and measures to provide sufficient safe water.

Counties have legal and fiduciary responsibilities to assist with the general well-being of their citizens and provide for the health and safety of their citizens; they are, however, limited in enforcing any water curtailment or conservation policies. Currently most counties do not address water shortages or do so minimally in their General Plan or the Hazard Mitigation Plan. Since a water

shortage is an emergency, a drought plan should be contained in a Hazard Mitigation Plan.

Many State agencies have regulatory responsibilities and technical and financial assistance programs targeting rural communities and small water suppliers. Examples include the Water Board's Division of Drinking Water and their requirements for safety consideration of public water systems, and CPUC's jurisdiction over small investor-owned utilities on their operation and maintenance.

In addition, SGMA could have significant effects on management and long-term water supply reliability. SGMA applies to 127 high and medium-priority groundwater basins (as defined by DWR's California Statewide Groundwater Elevation Monitoring, or CASGEM, program). Any local agency that has water supply, water management, or land use responsibilities within a groundwater basin may elect to be a "groundwater sustainability agency" (GSA) for that basin. However, if a basin (or portion thereof) is not within the management area of a GSA, the county within which the basin is located will be presumed to be the GSA for that basin or portion. The county, when preparing a water shortage or drought plan, should work with applicable GSA(s) to coordinate appropriate drought planning and response measures. If the county declines its SGMA responsibilities, leaving unmanaged areas in a high or medium-priority basins, the State may be required to intervene and directly manage groundwater resources in the basin.

Need for Change

The ongoing drought has brought attention to the reality that many small water suppliers and rural communities are struggling to meet demands with significantly reduced water supplies – or even running out of water altogether.

The fundamental difference in customer relationships and access to resources between large and small water suppliers, self-supplied

systems and counties requires unique approaches to facilitating improved drought planning.

California became the first state to legally recognize the human right to water with the signing of AB 685 in September 2012. This law aims to ensure universal access to safe, clean, affordable, and accessible water. When communities run out of water, State and local emergency measures must be taken and these measures are expensive to implement.

Recent policy and legislative efforts have focused on trying to assure sustainable potable water supplies exists to meet the health and safety needs of the citizens. In conjunction with these efforts, the EO directs DWR to work with counties throughout the State to facilitate improved drought planning for rural communities and small water suppliers.

3.3.2 EO Directive

EO Item 10 focuses on improved drought resiliency to small water suppliers and rural communities. The State's primary intent of this directive is to assure the availability and reliability of potable water supplies to meet the health and safety needs of citizens not otherwise receiving water from designated urban water suppliers. EO Item 10 states:

For areas not covered by a Water Shortage Contingency Plan, the Department [DWR] shall work with counties to facilitate improved drought planning for small water suppliers and rural communities.

3.3.3 Recommendations

Recommendations in this section focus on improved drought planning for small water suppliers and rural communities throughout every county in California.

EO Agencies are considering various actions to satisfy EO Item 10. The recommendations described below are intended to illustrate options currently under consideration and to describe the

types of activities underway. This process to develop recommendations will continue into 2017.

The intent of these recommendations is for the EO Agencies and counties to collectively:

- Improve assessment of drought vulnerability to understand relative risks and prioritize actions.
- Take proactive actions to reduce drought vulnerability when and where appropriate.
- Improve availability and readiness of appropriate responses for when drought impacts do occur, including financing when and where appropriate.
- Recognize the existence of established small water system drought planning and work to develop flexibility for the incorporation of these plans into the county drought planning process.

The EO Agencies recommend the following efforts as a pathway to developing recommendations:

1. Improve engagement with cities and counties, as well as stakeholders such as the League of California Cities, the California State Association of Counties, the Rural County Representatives of California, the Community Water Center, tribal governments, and others.
2. Demonstrate commitments from the EO Agencies for continued engagement, for initial data collection and analysis, and for improved communications and outreach.
3. Continued engagement by the EO Agencies to work with stakeholders through a public process in 2017 to develop a countywide drought plan and recommendations.
4. All counties incorporate drought planning into their Hazard Mitigation Plans.

Although conversations and work among EO Agencies, counties, and interested and affected parties have been preliminary, the EO Agencies anticipate more specific, functional recommendations would address the following:

1. Reporting and Data Recording – Improved data collection, management, analysis, sharing, and transparency at all levels is foundational to the ability to plan. Data analysis will allow for better coordination among stakeholders and improve on both long-term actions as well as immediate responses to drought risks, especially in rural communities.
2. Communications Planning – Improved monitoring and communications among stakeholders, from the State, through the counties, and to the water suppliers and citizens.
3. County Demonstration of Drought Planning – While some portion of a county’s citizenry may be covered by an urban supplier’s WSCP or a small suppliers’ drought plan (not required), there is nothing currently available to demonstrate that drought risk is being addressed for all county citizens. To address this need, counties may submit drought planning information to the EO Agencies through documents such as:
 - a) Drought-specific protocols defined in a county (or multi-jurisdictional) Hazard Mitigation Plan.
 - b) A County Drought Plan.
4. Roles and Responsibilities – Defined State Agency and county roles, responsibilities, and funding mechanisms.
5. Coordination – The EO Agencies and the county, working with stakeholders, should coordinate with SGMA efforts to assure drought planning and responses are reflected in Groundwater Sustainability Plans (where applicable).

3.3.4 Reporting, Compliance Assistance, and Enforcement

As the recommendations for satisfying EO Item 10 are still under development, no reporting, compliance assistance, or enforcement actions have been identified at this time but will be considered as development progresses.

3.4 Agricultural Water Management Plans

3.4.1 Current Status and Need for Change

Current Status

SB X7-7 requires agricultural water suppliers that provide water to more than 25,000 irrigated acres²¹ to (1) adopt and submit AWMPs to DWR, and (2) implement Efficient Water Management Practices (EWMP) including the measurement and volumetric pricing of water deliveries, both on or before December 31, 2012. AWMPs must be updated on December 31, 2015, and every five years thereafter (CWC Section 10820 (a)).

Agricultural water suppliers that provide water to 10,000 and up to 25,000 irrigated acres²² are currently not required to prepare and submit plans unless State funds are available to support the planning efforts (CWC Section 10853). SB X7-7 permits water suppliers that are contractors under the Reclamation Reform Act or Central Valley Project Improvement Act requirements to submit their federal plans in lieu of a plan meeting the SB X7-7 criteria. Those suppliers must also provide additional information on water measurement and pricing to meet the SB X7-7 requirements of CWC Section 10608.48 and California Code of Regulations (CCR) Section 597. DWR’s *Guidebook to Assist Agricultural Water Suppliers to Prepare a 2015 Agricultural Water management Plan* (June 2015) describes how federal plans can be

²¹ Excluding acreage irrigated with recycled water.

²² Excluding acreage irrigated with recycled water.

supplemented to satisfy the CWC and CCR requirements.

Agricultural water suppliers are required to describe certain elements such as service area and infrastructure, the quantity and quality of water resources, water uses, previous water management activities and planned implementation of EWMPs, and an analysis on the effect of climate change under SB X7-7.

CWC Section 10608.48(d) requires that an agricultural water supplier include in its AWMP:

...a report on which EWMPs have been implemented or are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and ten years in the future. If a supplier determines that a EWMP is not locally cost-effective or technically feasible, the supplier shall submit information documenting that determination.

CWC Section 10608.48(a) requires that agricultural water suppliers implement EWMPs pursuant to CWC Sections 10608.48(b) and (c). Two critical EWMPs must be implemented by the agricultural water supplier serving 25,000 or more irrigated acres (CWC Section 10608.48(b)):

1. Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section CCR Section 531.1016.
2. Adopt a pricing structure for water customers based at least in part on quantity delivered.

CWC Section 10608.48(c) requires implementation of 14 EWMPs if locally cost-effective and technically-feasible. Agricultural water suppliers must adopt the plan by December 31, 2012, and update it by December 31, 2015, and every five years thereafter, and submit the plan to DWR

within 30 days of adoption (CWC Section 10820 (a)). Since July 1, 2013, an agricultural water supplier subject to the SB X7-7 requirements must submit an AWMP and implement applicable EWMPs to be eligible for a water grant or loan awarded or administered by the State (CWC Section 10608.56(b) and 10852). Agricultural water suppliers not implementing all of the applicable EWMPs may become eligible for State grants and loans if agricultural water suppliers provide a schedule, financing plan, and budget for the implementation of the required EWMPs (CWC Section 10608.56(d)). Grant or loan funds may be requested to implement EWMPs to the extent the grant or loan proposal is consistent with the water fund eligibility requirements (CWC Section 10608.56(d)).

AWMPs adopted by agricultural water suppliers and updated every five years are meant to be planning documents to better manage water provided for irrigation and increase the efficiency of water use in agriculture. To make AWMPs better planning documents, EO B-29-15 of April 1, 2015, required that the 2015 AWMPs include a detailed drought management plan and quantification of water supplies and demands in 2013, 2014, and 2015, to the extent that data is available. EO B-29-15 also required that agricultural water suppliers that supply water to 10,000 to 25,000 acres of irrigated lands develop AWMPs and submit their plans to DWR by July 1, 2016.

Need for Change

The EO recognizes that further improving water conservation in California will require progress in all sectors, including agriculture, and that there is a fundamental need for updating existing agricultural water management planning requirements to help advance the efficiency of agricultural water use and better prepare for periods of limited supply. This would entail updating AWMP requirements to include a drought planning component, as well as quantifiable measures to increase agricultural water use efficiency. To promote adequate drought planning across the agricultural sector, the EO

requires more agricultural water suppliers to comply with the requirements by lowering the threshold of application to water suppliers with 10,000 acres of irrigated land. The EO Agencies also recognize the strong nexus of adequate agricultural water management strategies and implementation of SGMA, and propose a consistent methodology focusing on a supplier's overall water budget that can contribute to compliance for both purposes.

3.4.2 EO Directive

EO Items 11, 12, and 13 state:

11. *The Department [DWR] shall work with the California Department of Food and Agriculture to update existing requirements for Agricultural Water Management Plans to ensure that these plans identify and quantify measures to increase water efficiency in their service area and to adequately plan for periods of limited water supply.*
12. *The Department [DWR] shall permanently require the completion of Agricultural Water Management Plans by water suppliers with over 10,000 irrigated acres of land.*
13. *The Department [DWR], together with the California Department of Food and Agriculture, shall consult with agricultural water suppliers, local governments, agricultural producers, environmental groups, and other partners to update requirements for Agricultural Water Management Plans. The update draft requirements shall be publicly released by January 10, 2017.*

EO Item 6 requires EO Agencies to accelerate data collection and improve water system management and prioritize capital projects to reduce water waste. This applies to agricultural water suppliers as well and is covered in this section.

3.4.3 Recommendations

To satisfy the EO directive, DWR recommends that water suppliers comply with the following: (1)

develop annual water budget for the agricultural water supplier's service area, (2) identify agricultural water supplier's water management objectives and implementation plan, (3) quantify measures to increase water use efficiency, (4) develop an adequate drought plan for periods of limited supply, and (5) extend the updated requirements to more water suppliers. The following discussion provides additional details in these five recommendation areas. This information would be included as components of a supplier's AWMP.

Develop Annual Water Budget for the Agricultural Water Supplier's Service Area

To make AWMPs more effective as planning tools and to help water suppliers identify areas where water efficiency improvements can be made, the proposed updated AWMP requirements would require suppliers to include in their plans annual water budgets that account for inflows to and outflows from the water supplier's service area. Including water budgets as part of the AWMP provides the following benefits:

- Better quantifies the flows and uses of water within the supplier's service area and better estimates unmeasurable flows, such as deep percolation.
- Provides the data necessary to quantify water management efficiency within the service area.
- Helps identify and prioritize water loss.
- Aligns AWMP reporting with implementation of SGMA.

As a part of estimating water budget, water suppliers would be required to report all water inflow and outflow components from their service area. The water budget includes two components:

- **Water Budget Inflow.** This includes surface inflow, groundwater pumping in the service

area (including private groundwater pumping), and effective precipitation.

- **Water Budget Outflow.** This includes surface outflow, deep percolation and evapotranspiration (E and Etc).²³

Agricultural water suppliers are currently required (CWC Section 10826) to describe the quantity and quality of their water resources, water uses within the agricultural water supplier's service area, overall water budget, and water use efficiency information. However, the CWC does not currently require actual quantification of all components sufficient to develop a water budget.

To develop a service area water budget, the proposed revisions to the AWMP requirements would require agricultural water suppliers to quantify all currently reported components and to report on the quantity of two additional components: precipitation and private groundwater pumping.

The annual water budgets for the five year AWMP planning cycle would be reported in the supplier's AWMP on a water year basis (beginning October 1 and ending September 31) to align with SGMA reporting requirements (CCR Section 350 et seq.).

The State, through the Agricultural Water Management Program or the Sustainable Groundwater Management program, may provide tools and resources to assist suppliers in developing

and quantifying existing and new components.

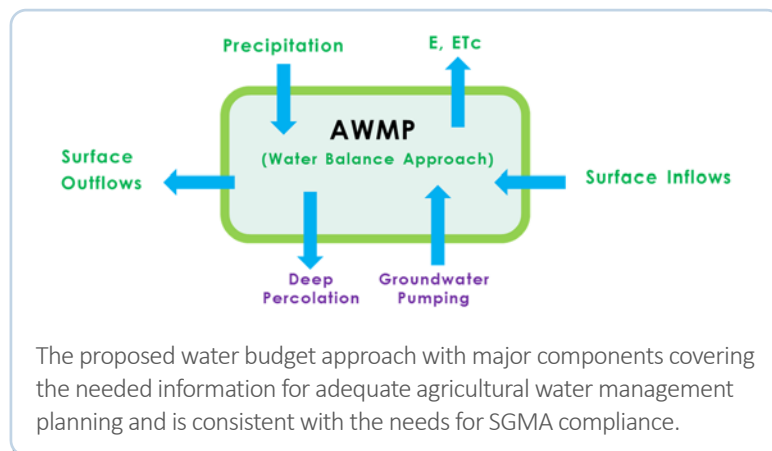
Identify Water Management Objectives and Implementation Plan

The EO Agencies recommend an objective-based planning approach as part of the AWMP, in which water management objectives are identified along with actions to meet these objectives. From the water budget, agricultural water suppliers would identify and select supplier-specific water management objectives to improve water use efficiency or to meet other water management objectives. The proposed water budget approach would help agricultural water suppliers identify and prioritize water loss and identify ways to improve water system management.

In the AWMP, the supplier's objectives or intended results are identified (e.g., decrease percolation to saline ground, provide greater flexibility in irrigation deliveries), then specific efficient water management practices or measures are selected and implemented to achieve the results. Practices implemented to reduce water losses, improve water use efficiency, and attain other water management objectives would be included in an implementation plan as part of the overall AWMP.

Quantify Measures to Increase Water Use Efficiency

The proposed updates to the AWMP requirements would also require agricultural water suppliers to quantify the efficiency of agricultural water use within their service area. Agricultural water suppliers would choose the appropriate method(s) from amongst four efficiency quantification methods provided in the 2012 DWR report to the Legislature titled, "A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use." These methods can be used to calculate the ratio of beneficial water uses to amount of applied water and include the Crop Consumptive Use Fraction (CCUF), the Agronomic Water



Use Fraction (AWUF), the Total Water Use Fraction (TWUF), and the Water Management Fraction (WMF). While having the flexibility to choose the appropriate water use fraction to determine water use efficiency, the agricultural water supplier needs to ensure that all water uses are taken into account including crop water use, agronomic water use, environmental water use, groundwater recharge, and recoverable surface flows.

The proposed water use fractions (described below) are practical methods for quantifying the efficiency of agricultural water use by irrigated agriculture and other beneficial uses that can help agricultural water suppliers evaluate current conditions and strategies for improving agricultural water management. All four methods described below are applicable for use at the basin- and supplier-scale. At the field-scale, only the first three methods are applicable.

i. Crop Consumptive Use Fraction

$$CCUF = ETAW/AW$$

Evapotranspiration of Applied Water (ETAW) is crop evapotranspiration minus the amount of precipitation evapotranspired by the crop.

Applied Water (AW) is the total volume of water that is applied within a boundary (e.g., field, supplier service area, or basin) in order to meet the crop evapotranspiration, agronomic, and environmental uses from any source such as surface water (including tailwater²⁴ reuse), groundwater (public or private), and the initial soil moisture in the soil profile that is not from precipitation.

ii. Agronomic Water Use Fraction

$$AWUF = (ETAW + AU)/AW$$

Agronomic Use (AU) is the portion of applied water used for water management applications essential for crop production. Examples of essential water management applications include salinity management, frost control, and winter flooding for straw decomposition.

iii. Total Water Use Fraction

$$TWUF = (ETAW + AU + EU)/AW$$

Environmental Use (EU) is the portion of applied water directed to environmental purposes, including water to produce and/or maintain wetlands, riparian, or terrestrial habitats.

iv. Water Management Fraction

$$WMF = (ETAW + RF)/AW$$

Recoverable Flows (RF) is the amount of water leaving a given area as surface flows to non-saline bodies or percolation to usable groundwater that is available for supply or reuse.

Components of these fractions may be empirical (measured or observed), modeled (calculated or estimated), or a combination, based on data availability and system complexity.

Develop a Drought Plan for Periods of Limited Supply

The proposed updates to the AWMP requirements would also require agricultural water suppliers to include a Drought Plan. The Drought Plan should detail how the water supplier would prepare for droughts and manage water supplies and allocations during drought conditions. Some components or actions may require detailed review of conditions, policy changes, or long-term capital improvements. Additionally, as conditions change and new technology and knowledge becomes available, opportunities and constraints will change.

²⁴ Tailwater refers to surface water runoff from a boundary. Tailwater may be captured and reused within (returned to) the boundary.

The Drought Plan should be prepared to provide adaptive management for and during periods of water shortages. Agricultural water suppliers would consider all items under each component and include a description of applicable items in their Drought Plan.

The Drought Plan would include a resilience component and an action plan, described below.

Resilience Component

The resilience component of the Drought Plan will include the following:

1. A description of what hydraulic levels or conditions (reservoir levels, stream flows, groundwater, snowpack etc.) are or should be monitored and measured to determine the water supply available and to identify levels of drought severity.
2. The supplier's policy or process for declaring a water shortage and for implementing the water shortage allocations and related actions.
3. A description and analysis of the agricultural water supplier's customers' vulnerability to drought (e.g., potential for crop idling, availability of multiple water sources and resilience of each source, existing water storage options).
4. A description of potential opportunities and constraints to improve drought resilience (e.g., improved groundwater or surface water storage potential, acres of permanent crops, environmental use requirements, overdrafted groundwater basin).
5. A description of actions implemented or planned for implementation to improve drought resilience (e.g., potential for improved on-farm water use efficiency measures, groundwater and surface water conjunctive use management, crop idling, and development of alternative supplies such as recycled water or tailwater reuse).

6. Discussion of the potential, if possible, for the supplier to obtain or use additional water supplies during drought conditions. These supplies could include transfers from another water agency or supplier, the use of recycled water and desalination of brackish groundwater or drainage water.
7. A description of the cost for implementing the resilience plan.

Action Plan

The Action Plan will include the following:

1. Allocation Policies – A description of the water shortage allocation policies as required by the Water Code. Water suppliers would describe their program or process for how water is allocated during a water shortage in the Drought Plan or attach a copy of their water shortage allocation policy to their AWMP.
2. Operational Adjustments – Changes in supplier water management and operations to respond to drought, including canal and reservoir operations and groundwater management.
3. Demand Management – Policies and incentives in addition to the water shortage allocation plan to lower on-farm water use.
4. Coordination and Collaboration – Include a description on how coordination and collaboration with other local suppliers, water agencies, or regional groups will be used in drought response.
5. Revenues and Expenditures – Describe how the drought and lower water allocations will affect the supplier's revenues and expenditures.

Extend Requirements to More Agricultural Water Suppliers

The proposed updates to the AWMP requirements would extend the requirement for AWMPs to include agricultural water suppliers supplying water

to more than 10,000 acres of irrigated land, excluding recycled water.

3.4.4 Reporting, Compliance Assistance, and Enforcement

Reporting

All agricultural water suppliers providing water supplies to 10,000 or more irrigated acres, excluding recycled water, would be required to prepare and adopt an AWMP on or before April 1, 2021, and every five years thereafter. Agricultural water suppliers would continue to be required to submit their plans to DWR within 30 days of adoption. A water supplier that provides both urban and agricultural supplies, and is subject to both UWMP and AWMP reporting, may satisfy the AWMP requirements by adopting an UWMP that accounts for its agricultural water use and meets both requirements.

Reclamation Reform Act and Central Valley Project water suppliers that submit water conservation plans to Reclamation may still submit those plans to DWR, along with supplemental information, including: a Drought Plan for all suppliers, and water measurement and volumetric pricing for those water suppliers providing water to 25,000 irrigated acres or more, excluding recycled water (CCR Section 597.1(a) and CWC Section 10608.48(b)).

AB 1404 (Statutes of 2007, Chapter 675) requires that all agricultural water suppliers supplying 2,000 acre-feet or more of surface water annually for agricultural purposes or serving 2,000 or more acres of agricultural land must submit an annual aggregated farm-gate delivery report to DWR. Per AB 1404, an agricultural water supplier will:

- Provide DWR with monthly or bimonthly aggregated farm-gate deliveries on an annual basis, along with information on their farm-gate measurement program or practices to document that they are using "Best Professional Practices;" or

- Provide DWR with information that documents that the implementation of a program or practices to measure farm-gate deliveries using Best Professional Practices is not locally cost effective.

For the purpose of aligning agricultural water supplier annual reporting with SGMA reporting requirements, EO Agencies recommend that the annual aggregated farm-gate delivery reporting requirements for agricultural water suppliers providing water to over 10,000 irrigated acres only, be detailed by groundwater basin within the supplier's service area, if applicable.

Compliance Assistance

DWR would assist agricultural water suppliers in several ways:

1. AWMP Guidebook – DWR would update the AWMP Guidebook and provide an updated AWMP template to help agricultural water suppliers better understand the CWC AWMP requirements and assist them in developing an AWMP. The Guidebook would also describe how water conservation plans submitted to Reclamation can be supplemented to satisfy the CWC and Agricultural Water Measurement Regulation requirements.
2. AWMP Workshops – Prior to finalizing the AWMP Guidebook, DWR would release a draft and hold public workshops to give opportunity for stakeholders to comment on the draft guidelines. Additional workshops would be conducted after releasing the final Guidebook.
3. California Irrigation Management Information System – DWR would continue to support and update the California Irrigation Management Information System (CIMIS) to provide climate data and resources (e.g., precipitation, crop use coefficients) necessary for calculating components of the water budget and water use efficiency fractions.

4. Water Use Efficiency Calculator – DWR would make available the water use efficiency calculator being developed and tested by the University of California through Proposition 50 and Proposition 1 grants.

The EO Agencies further recommend that DWR, through the Agricultural Water Management Program or the Sustainable Groundwater Management Program, consider providing additional tools and resources to assist suppliers in quantifying water budget components pertaining to evapotranspiration of applied water and private groundwater pumping. Examples of these tools and resources include remote sensing for measurement of actual evapotranspiration, and models or tools for calculating deep percolation to groundwater.

DWR would lead the compliance review for submitted plans, data, and information, which are due by April 1 starting in 2021. The compliance schedule is outlined below:

1. DWR would provide an updated list of agricultural water suppliers required to submit plans to CDFA and the Water Board by March 1, 2021, and every five years thereafter.
2. DWR would continue to review each plan for meeting the requirements, including the updated and new components, as they are received. However, DWR will expedite the review if an agricultural water supplier is seeking a State grant or loan with a specific deadline. DWR may coordinate with the Water Board and CDFA on the review.
3. DWR would inform the Water Board and CDFA of the plan submittal status and review status, and post the information on DWR's website for public reference.
4. If a plan has not been submitted by July 1, 2021, and every five years thereafter or is incomplete following review, DWR would notify the agricultural water supplier, and would work with the supplier to develop a plan for corrective actions and completing the plan.
5. If the agricultural water supplier fails to submit a plan by October 31, 2021, and every five years thereafter or does not submit a plan within the negotiated plan and schedule for completion, DWR would notify the Water Board and CDFA of non-compliance for enforcement actions.

Enforcement

Water suppliers would continue to be required to have a current AWMP that has been reviewed by DWR and found to have addressed all the required elements to be eligible for State grant and loan funding.

The Water Board, in addressing agricultural suppliers that have not submitted AWMPs or have not revised AWMPs to correct identified deficiencies, may consider further enforcement actions including potential fines and civil penalties.

Chapter 4 – Implementing the Conservation Framework



The heightened awareness of water scarcity and the severity of our current drought have prompted Californians to achieve new levels of conservation and resiliency. When implemented along with necessary statutory authorities and resources, the proposed conservation framework will provide the foundation needed to transform these emergency accomplishments into a long-term, sustainable water use practice for all Californians. The Administration is proposing legislation for water conservation

standards and reporting, urban water shortage contingency planning, and agricultural water management planning.

4.1 Conservation as an Integral Part of Water Management

Conservation alone cannot ensure a long-term sustainable water supply and drought protection for all Californians; however, a deep-rooted conservation ethos is fundamental to changing individual and societal behaviors and making progress toward these desired outcomes.

The framework presented in this report is designed to be part of the broader, multi-faceted implementation of the Water Action Plan. Conservation and drought protection are but two of the focus areas of the Water Action Plan, along with integrated water management, Sacramento-San Joaquin Delta management, ecosystem restoration, storage, and flood protection. The Water Action Plan also calls for increasing operational and regulatory efficiencies and identifying sustainable, integrated financing opportunities.

The EO Agencies will continue to work collaboratively, while maintaining open and transparent dialogue and technical exchange throughout implementation.

4.2 Support for Framework Implementation

As described below, several components are critical to enabling implementation of the recommended framework outlined herein.

4.2.1 Legislation and Regulatory Rulemaking

Many recommendations of the EO Agencies will require new and/or expanded authorities to execute. For those recommendations that fall within the existing authorities of the EO Agencies, rulemaking processes may still be needed to formalize requirements.

For recommendations related to existing authorities, the EO Agencies will conduct rulemaking processes that provide opportunities for input and comment from stakeholders, interested parties, and the public.

For recommendations requiring new and expanded authorities, the EO Agencies will coordinate with the Governor's Office and the Legislature in seeking amendments to existing codes. Code amendments to support framework implementation may include the following:

- **Establish New Water Use Standards and Targets:** CWC sections 10610-10656 for UWMPs; a new section added to CWC to establish and implement standards and water use targets, with associated changes in

CWC Section 10608 related to existing conservation requirements.

- **Strengthening Water Shortage Contingency Planning:** CWC sections 350-359 regarding emergency declaration; CWC sections 10631, 10632, and 10635 for required information reporting.
- **Improve Drought Planning for Small Water Suppliers and Rural Communities:** To be determined through continued collaboration of the EO Agencies and stakeholders, potentially requiring new language in the CWC.
- **Strengthening Requirements for Agricultural Water Management:** CWC sections 10800-10845 for AWMPs; CCR sections 597-597.4 and CWC sections 531-531.10 for aggregated farm-gate delivery reporting.

4.2.2 Continued Collaboration on Water Use Standard Development

The EO Agencies are committed to continued collaboration with stakeholders on water use standard development and implementation of the actions discussed below.

In implementing this proposed conservation framework, the EO Agencies will establish water standards for implementation by 2021. The EO Agencies have proposed the roles and responsibilities described below.

Data Collection and Management

DWR and the Water Board are committed to streamlined reporting, elimination of redundant data submittals, and open access to data collected by each agency. Furthermore, each agency relies on data collected by the other to conduct important regulatory and planning efforts, including development of the California Water Plan, Urban Water Management Plan review, Division of Drinking Water information, and urban conservation data. To facilitate better data management, DWR and the Water Board will

jointly develop an approach each agency could take to streamline the data submittal and collection processes. The approach will include key data needs, describe how agency coordination could reduce regulatory overlap.

Data on monthly water usage, amount of conservation achieved, and enforcement efforts will be submitted to the Water Board. The Water Board will update monthly reporting requirements and to make those reporting requirements permanent.

DWR will collect data related to UWMPs, WSCPs, and AWMPs. DWR would also receive annual reports on water use target progress and compliance, beginning in 2019.

Setting Standards

DWR would lead technical work related to setting standards, methodologies, and protocols, working in conjunction with the Water Board.

DWR and Water Board staff will propose standards to the Water Board for adoption, and will base the proposed standards on the technical research and outreach efforts. The Water Board will be responsible for adopting the standards through a regulatory proceeding.

Enforcement

DWR will refer compliance issues related to submittals and requirements for UWMPs, WSCPs, and AWMPs to the Water Board for enforcement.

DWR and the Water Board will work together to develop compliance criteria and review target compliance. DWR would provide technical assistance to suppliers to help them reach compliance. The Water Board will retain independent enforcement discretion. The Water Board will identify and determine enforcement measures for suppliers that are not meeting their water targets. Between 2022 and 2025, the Water Board may issue Informational Orders or Conservation Orders to assist water suppliers with compliance. Beginning in 2026, the Water Board may also issue Administrative Civil Liability or Cease

and Desist Orders to water suppliers that have failed to meet their targets. Water suppliers not meeting targets may not be eligible for state funding programs.

Recognizing that water use efficiency is one component of sustainable water management, the EO Agencies will seek to balance the need for conservation with the need for water suppliers to continue investing in water supply portfolio diversification, including direct and indirect water reuse, storage and conjunctive use, stormwater capture and reuse, sustainable groundwater use, and desalination, where appropriate.

Public Input, Processes, and Feedback

Upon direction to develop standards from the Legislature, the EO Agencies will continue to collaborate with stakeholders and subject matter experts to ensure adequate progress is made in standard development and that the resulting standards will be reasonable and fair. Additionally, there will be numerous opportunities for public and stakeholder input as the standards are developed. Opportunities for public and stakeholder input may include, but are not limited to, the following:

- Stakeholder meetings and public workshops to report progress and solicit input on development of indoor and outdoor efficiency standards, including specific activities like the landscape area pilot project.
- Continued Urban Advisory Group engagement, at least twice a year through 2021.
- A CII Technical Workgroup to assist with development of appropriate CII classifications and corresponding performance measures.

In addition, any rulemaking process resulting from implementation of the proposed framework would include the following:

- Public written comment on draft regulations
- A public workshop
- Public adoption meeting

EO Agency staff typically hold scoping meetings throughout the regulatory development process in order to receive stakeholder feedback before going forward with draft regulatory language.

4.3 Implementation Considerations

The EO Agencies appreciate the long-term commitment and investment required by water suppliers throughout California to implement the proposed long-term framework. To facilitate successful implementation, the EO Agencies recognize the importance of the following considerations when necessary authority and resources are provided.

- **Coordination, Collaboration, Messaging, and Outreach:** The EO Agencies recognize the importance of continued coordination and collaboration to ensure that the framework is implemented as envisioned, providing improved drought protection for all communities and embodying water conservation in every aspect of our daily lives.

The extraordinary conservation accomplished during the current drought was attributable in part to a strong, persistent, and active campaign and outreach led by the EO Agencies to promote conservation, combined with mandatory conservation requirements imposed by the Water Board. Active messaging and outreach efforts on conservation by the EO Agencies and suppliers will provide strong support to water suppliers in their efforts to promote conservation. Water use education and conservation programs must continue after the drought emergency is lifted.

- **Water Rates and Proposition 218:** The EO Agencies recognize that State financial assistance, when available, will never be sufficient for water suppliers to implement all necessary actions to comply with the requirements outlined in the framework. It will be important that water suppliers have the ability to generate funding for their investment needs and stable revenue for steady improvements.

The EO Agencies acknowledge the challenges water suppliers face in generating sufficient local funding to support continued conservation efforts and other needed investments due to Proposition 218. While the framework does not contain requirements on rate structures, the EO Agencies encourage water suppliers to consider the effect of drought on revenue generation and incorporate measures for rate stabilization. Each water supplier should customize its rate structure with full consideration of its cost of service and with long-term financial sustainability as the goal.





- **Coordination with Land Use Agencies and Other Jurisdictions:** The EO Agencies recognize that land use agencies (i.e., cities and counties) have direct responsibilities and jurisdictions over zoning and land development, landscape requirements, and various ministerial and discretionary permits that can positively influence direct conservation and efficiency actions. Where appropriate, the EO Agencies may facilitate communications and collaboration with local governments throughout implementation.

4.4 Implementation Schedule

The schedule for implementation of the proposed actions and recommendations identified in Chapters 2 and 3 is summarized in Figure 4-1.

Any new and/or expanded authorities required for framework implementation may be addressed during the 2017 and 2018 legislative sessions. Note that the implementation process outlined in the proposed framework is subject to change based on updated information, or subsequent legislation and rulemaking.

Figure 4-1. Anticipated Implementation Timeline for EO Directives

Executive Order Items	Timeline for Actions and Implementation					
	2017	2018	2019	2020	2021	Beyond
 Using Water More Wisely						
Emergency Conservation Regulations (EO Item 1)						
Conservation Requirements	█					
New Water Use Targets (EO Items 2 and 6)						
Data, Legislative Action, & Rulemaking	█	█	█	█	█	
Targets Reporting			█	█	█	
Full Compliance Achieved						2025
Permanent Monthly Reporting (EO Item 3)						
Rulemaking	█					
 Eliminating Water Waste						
Water Use Prohibitions (EO Item 4)						
Rulemaking	█					
Minimizing Water Loss (EO Items 5 and 6)						
Annual Water Loss Audits		█	█	█	█	█
Water Loss Rulemaking	█			█		
Innovative Water Loss & Control Technologies (EO Item 7)						
Scope Development	█					
Continued Research		█	█	█		
 Strengthening Local Drought Resilience						
Water Shortage Contingency Plans (EO Items 8, 9, and 6)						
Legislative Action & Rulemaking	█	█	█	█		
Requirements in Effect				█	█	█
Drought Planning for Small Water Suppliers & Rural Communities (EO Item 10)						
Development schedule to be determined	█					
 Improving Agricultural Efficiency and Drought Planning						
Strengthened Agricultural Water Management Plan requirements (EO Items 11, 12, 13, 6)						
Guidelines development, Legislative Action & Rulemaking	█	█	█	█		
Reporting requirements					█	█

This page left blank intentionally.

ATTACHMENT A:

Executive Order B-37-16

This page left blank intentionally

Executive Department

State of California

EXECUTIVE ORDER B-37-16 MAKING WATER CONSERVATION A CALIFORNIA WAY OF LIFE

WHEREAS California has suffered through a severe multi-year drought that has threatened the water supplies of communities and residents, devastated agricultural production in many areas, and harmed fish, animals and their environmental habitats; and

WHEREAS Californians responded to the drought by conserving water at unprecedented levels, reducing water use in communities by 23.9% between June 2015 and March 2016 and saving enough water during this period to provide 6.5 million Californians with water for one year; and

WHEREAS severe drought conditions persist in many areas of the state despite recent winter precipitation, with limited drinking water supplies in some communities, diminished water for agricultural production and environmental habitat, and severely-depleted groundwater basins; and

WHEREAS drought conditions may persist in some parts of the state into 2017 and beyond, as warmer winter temperatures driven by climate change reduce water supply held in mountain snowpack and result in drier soil conditions; and

WHEREAS these ongoing drought conditions and our changing climate require California to move beyond temporary emergency drought measures and adopt permanent changes to use water more wisely and to prepare for more frequent and persistent periods of limited water supply; and

WHEREAS increasing long-term water conservation among Californians, improving water use efficiency within the state's communities and agricultural production, and strengthening local and regional drought planning are critical to California's resilience to drought and climate change; and

WHEREAS these activities are prioritized in the California Water Action Plan, which calls for concrete, measurable actions that "Make Conservation a California Way of Life" and "Manage and Prepare for Dry Periods" in order to improve use of water in our state.

NOW, THEREFORE, I, EDMUND G. BROWN JR., Governor of the State of California, in accordance with the authority vested in me by the Constitution and statutes of the State of California, in particular California Government Code sections 8567 and 8571, do hereby issue this Executive Order, effective immediately.

IT IS HEREBY ORDERED THAT:

The orders and provisions contained in my January 17, 2014 Emergency Proclamation, my April 25, 2014 Emergency Proclamation, Executive Orders B-26-14, B-28-14, B-29-15, and B-36-15 remain in full force and in effect except as modified herein.

State agencies shall update temporary emergency water restrictions and transition to permanent, long-term improvements in water use by taking the following actions.

USE WATER MORE WISELY

1. The State Water Resources Control Board (Water Board) shall, as soon as practicable, adjust emergency water conservation regulations through the end of January 2017 in recognition of the differing water supply conditions across the state. To prepare for the possibility of another dry winter, the Water Board shall also develop, by January 2017, a proposal to achieve a mandatory reduction in potable urban water usage that builds off of the mandatory 25% reduction called for in Executive Order B-29-15 and lessons learned through 2016.
2. The Department of Water Resources (Department) shall work with the Water Board to develop new water use targets as part of a permanent framework for urban water agencies. These new water use targets shall build upon the existing state law requirements that the state achieve a 20% reduction in urban water usage by 2020. (Senate Bill No. 7 (7th Extraordinary Session, 2009-2010).) These water use targets shall be customized to the unique conditions of each water agency, shall generate more statewide water conservation than existing requirements, and shall be based on strengthened standards for:
 - a. Indoor residential per capita water use;
 - b. Outdoor irrigation, in a manner that incorporates landscape area, local climate, and new satellite imagery data;
 - c. Commercial, industrial, and institutional water use; and
 - d. Water lost through leaks.

The Department and Water Board shall consult with urban water suppliers, local governments, environmental groups, and other partners to develop these water use targets and shall publicly issue a proposed draft framework by January 10, 2017.

3. The Department and the Water Board shall permanently require urban water suppliers to issue a monthly report on their water usage, amount of conservation achieved, and any enforcement efforts.

ELIMINATE WATER WASTE

4. The Water Board shall permanently prohibit practices that waste potable water, such as:
 - Hosing off sidewalks, driveways and other hardscapes;
 - Washing automobiles with hoses not equipped with a shut-off nozzle;
 - Using non-recirculated water in a fountain or other decorative water feature;
 - Watering lawns in a manner that causes runoff, or within 48 hours after measurable precipitation; and
 - Irrigating ornamental turf on public street medians.
5. The Water Board and the Department shall direct actions to minimize water system leaks that waste large amounts of water. The Water Board, after funding projects to address health and safety, shall use loans from the Drinking Water State Revolving Fund to prioritize local projects that reduce leaks and other water system losses.
6. The Water Board and the Department shall direct urban and agricultural water suppliers to accelerate their data collection, improve water system management, and prioritize capital projects to reduce water waste. The California Public Utilities Commission shall order investor-owned water utilities to accelerate work to minimize leaks.
7. The California Energy Commission shall certify innovative water conservation and water loss detection and control technologies that also increase energy efficiency.

STRENGTHEN LOCAL DROUGHT RESILIENCE

8. The Department shall strengthen requirements for urban Water Shortage Contingency Plans, which urban water agencies are required to maintain. These updated requirements shall include adequate actions to respond to droughts lasting at least five years, as well as more frequent and severe periods of drought. While remaining customized according to local conditions, the updated requirements shall also create common statewide standards so that these plans can be quickly utilized during this and any future droughts.
9. The Department shall consult with urban water suppliers, local governments, environmental groups, and other partners to update requirements for Water Shortage Contingency Plans. The updated draft requirements shall be publicly released by January 10, 2017.

10. For areas not covered by a Water Shortage Contingency Plan, the Department shall work with counties to facilitate improved drought planning for small water suppliers and rural communities.

IMPROVE AGRICULTURAL WATER USE EFFICIENCY AND DROUGHT PLANNING

11. The Department shall work with the California Department of Food and Agriculture to update existing requirements for Agricultural Water Management Plans to ensure that these plans identify and quantify measures to increase water efficiency in their service area and to adequately plan for periods of limited water supply.
12. The Department shall permanently require the completion of Agricultural Water Management Plans by water suppliers with over 10,000 irrigated acres of land.
13. The Department, together with the California Department of Food and Agriculture, shall consult with agricultural water suppliers, local governments, agricultural producers, environmental groups, and other partners to update requirements for Agricultural Water Management Plans. The updated draft requirements shall be publicly released by January 10, 2017.

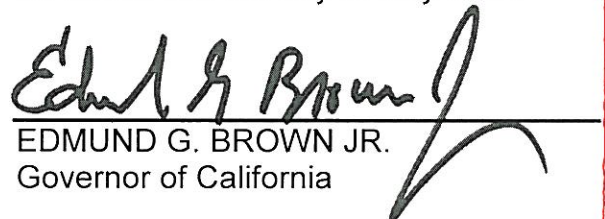
The Department, Water Board and California Public Utilities Commission shall develop methods to ensure compliance with the provisions of this Executive Order, including technical and financial assistance, agency oversight, and, if necessary, enforcement action by the Water Board to address non-compliant water suppliers.

This Executive Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its agencies, departments, entities, officers, employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this order be filed in the Office of the Secretary of State and that widespread publicity and notice be given of this order.



IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 9th day of May 2016.


EDMUND G. BROWN JR.
Governor of California

ATTEST:


ALEX PADILLA
Secretary of State

ATTACHMENT B:

Public Outreach and Stakeholder Engagement

On May 9, 2016 Governor Edmund G. Brown Jr. issued Executive Order B-37-16 directing State Agencies to establish a long-term framework for water conservation and drought planning that builds on the conservation accomplished during the historical drought and implementation of the Governor’s Water Action Plan. The named agencies include DWR, Water Board, CPUC, CDFA, and CEC (collectively, the EO Agencies). The full text of the EO can be found at the Governor’s Office Website, <https://www.gov.ca.gov/docs/5.9.16 Attested Drought Order.pdf>, or in Attachment A to this report.

The EO Agencies have developed a collaborative program to formulate the long-term framework for water conservation and drought planning called for by the EO with extensive public outreach and stakeholder engagement. In addition to public input throughout the process, the EO Agencies formed the Urban Advisory Group and Agricultural Advisory Group to provide input into the framework development. These advisory groups represent urban and agricultural water suppliers, local governments, professional associations, academics, environmental advocacy groups, and other interested parties. The framework development, associated public outreach and stakeholder engagement process, and public comments received are available at DWR’s website, <http://www.water.ca.gov/wateruseefficiency/conservation/>.

The following provides a list of public outreach and stakeholder engagement meetings throughout the process in developing the report (in chronological order) after the issuance of the EO on May 9, 2016.

Date	Event	Location
June 3, 2016	Listening Session #1 for the Directives of Executive Order B-37-16	Sacramento, CA
June 6, 2016	Listening Session #2 for the Urban Directives of Executive Order B-37-16	Los Angeles, CA
June 7, 2016	Listening Session #3 for the Listening Session Agricultural and County Drought Planning Directives of Executive Order B-37-16	Tulare, CA
August 15, 2016	EO B-37-16 Urban Advisory Group Meeting #1	Sacramento, CA
August 25, 2016	EO B-37-16 Agricultural Advisory Group Meeting #1	Sacramento, CA
August 31, 2016	EO B-37-16 Water Shortage Contingency Planning Workshop #1	Sacramento, CA
September 1, 2016	EO B-37-16 Water Shortage Contingency Planning Workshop #2	Fountain Valley, CA
September 6, 2016	EO B-37-16 Long-Term Water Use Targets Workshop #1	Oakland, CA
September 8, 2016	EO B-37-16 Long-Term Water Use Targets Workshop #2	Los Angeles, CA
September 19 and 20, 2016	EO B-37-16 Urban Advisory Group Meeting #2	Los Angeles, CA
September 26, 2016	EO B-37-16 Agricultural Advisory Group Meeting #2	Madera, CA

Date	Event	Location
October 3, 2016	EO B-37-16 Water Shortage Contingency Planning Technical Workshop #2	Sacramento, CA
October 5, 2016	State Water Resources Control Board Workshop on EO B-37-16 and Implementation	Sacramento, CA
October 11, 2016	CEC Staff Workshop Innovative Water Conservation and Water Loss Detection and Control Technologies	Sacramento, CA
October 13, 2016	EO B-37-16 Water Shortage Contingency Planning Workshop – Focus on Drought Planning for Small Water Suppliers and Rural Communities	Sacramento, CA
October 18, 2016	EO B-37-16 Agricultural Advisory Group Meeting #3	Sacramento, CA
October 20, 2016	EO B-37-16 Urban Advisory Group Meeting #3	Sacramento, CA
December 7, 2016	EO B -37-16 Agricultural Advisory Group and Urban Advisory Group Public Draft Report Meeting	Sacramento, CA
January 6, 2017	EO B -37-16 Agricultural Advisory Group Meeting #4	Sacramento, CA



Public meeting at California Department of Food and Agriculture, December 7, 2016.