Urban Water Use Efficiency

Photo caption. Suburban yard with water efficient landscaping.

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Chapter 3. Urban Water Use Efficiency

Urban water use efficiency results in benefits to water supply and water quality through technological and behavioral improvements that decrease indoor and outdoor residential, commercial, industrial, and institutional water use. Water use efficiency has multiple benefits. At the individual level, the benefits of water use efficiency are often small, incremental, and difficult to see; but when Californians act together as a community to conserve water, the cumulative effect is clear and the benefits are widespread. Excessive urban water use results in urban runoff, groundwater overdraft, groundwater contamination, excessive flows to wastewater treatment plants, and increased green waste in the landfills. The volume and timing of surface water diversions to meet the excessive use of water can produce environmental impacts. The impacts have substantial economic and financial consequences for water suppliers and consumers.

The benefits of water use efficiency extend beyond the improvement of water supply reliability. The benefits may include:

- Increased energy conservation, deferred new energy generation and reduced peak energy demand
- Reduced greenhouse gas (GHG) emissions
- Reduced urban runoff
- Reduced operating costs for suppliers and consumers; delayed capital cost of new infrastructure to treat and deliver water, reduced demand for wastewater treatment, including capital and treatment costs
- Reduced impact on the environment
- Reduced use of fertilizers, pesticides, and herbicides; reduction in the amount of applied chemicals that escape into surface waters, reduced production of green waste, and improved habitat value of urban landscapes
- Reduced groundwater overdraft
- Reduced air pollution
- Reduced groundwater contamination
- Reduced strain on the electric grid
- Enhanced flexibility in water management and delivery systems, especially during dry periods
- Better capacity to meet the water demand of California's growing population.

This resource management strategy discusses recent institutional changes and the role of water use efficiency in addressing California's water supply challenges, benefits and costs of water use efficiency, and recommendations to achieve urban water use efficiency.

Box 3-1 Acronyms and Abbreviations

AB	California State Assembly bill
AF	acre-feet
AFY	acre-fee per year
ACWA	Association of California Water Agencies
AWMC	Agricultural Water Management Council
BA	biological assessment
BiOp	biological opinion
BMP	best management practices
BSC	California Building Standards Commission
CALFED	CALFED Bay-Delta Program
CARB	California Air Resources Board
CBDA	CALFED Bay-Delta Authority
CDPH	California Department of Public Health
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CII	Commercial, industrial and institutional
CIMIS	California Irrigation Management Information System
CPUC	California Public Utilities Commission
CUWA	California Urban Water Agencies
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DFG	California Department of Fish and Game
DMM	demand management measures
DOE	US Department of Energy
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EWMP	efficient water management practices
FAAST	financial assistance application submittal tool
GHG	greenhouse gas
gpcd	gallons per capita per day
IRP	integrated resource planning
IRWM	integrated regional water management
LADWP	Los Angeles Department of Water and Power
LEED	Leadership in Energy and Environmental Design
MAF	million acre-feet
Model Ordinance	Model Water Efficient Landscape Ordinance
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
MWh	megawatt hour
NAICS	North American Industry Classification System
NMFS	National Marine Fisheries Service
OCAP	Operational Criteria and Plan

Box 3-1 Acronyms and Abbreviations (continued)

OWUET	Office of Water Use Efficiency and Transfers
Panel	independent technical panel
PAYS	Pay As You Save®
POD	pelagic organism decline
Prop.	ballot proposition
PWSS	Public Water System Survey
Regional Water Board	Regional Water Quality Control Board
ROD	CALFED Programmatic Record of Decision
RPA	reasonable and prudent alternative
SB	California State Senate bill
SCWA	Sonoma County Water Agency
SWAN	Statewide Water Analysis Network
SWP	State Water Project
State Water Board	State Water Resources Control Board
ULFT	ultra low flush toilet
USBR	US Bureau of Reclamation
USFWS	US Fish & Wildlife Service
UWMP	urban water management plan
WSI	Water Supply Index
WUE	water use efficiency

Challenges to California's Urban Water Supply

Environmental Degradation

There has been a dramatic pelagic organism decline (POD) over the past several decades. Pelagic organisms live in the ocean or estuaries like the Delta and have the ability to swim around or move in some fashion. POD affects water supply for communities that rely on systems such as the State Water Project (SWP).

Legal and Regulatory Actions

In *Natural Resources Defense Council v. Kempthorne*, a case tried in 2007 in US District Court, Eastern District, Judge Oliver Wanger held that State and federal agencies water projects were required to reduce their draw of water from the estuary under certain conditions to protect Delta smelt (NRDC et al. v. Kempthorne, 2007).

On December 15, 2008, the US Fish & Wildlife Service (USFWS) issued a biological opinion (BiOp) on the Long-Term Operational Criteria and Plan (OCAP) for coordination of the Central Valley Project and State Water Project (USFWS, 2008; NMFS, 2009a). The USFWS has determined that the continued operation of these two

water projects as described in the Biological Assessment (BA) is likely to jeopardize the continued existence of the delta smelt and adversely modify its critical habitat (USBR, 2008). The BiOp was accompanied by a Reasonable and Prudent Alternative (RPA) intended to protect each life-stage and critical habitat of this federally protected species.

On June 4, 2009, the National Marine Fisheries Service released a biological opinion, in response to a lawsuit by environmental groups (NMFS, 2009b). The affected species are winter- and spring-run salmon, Central Valley steelhead and green sturgeon.

These rulings resulted in a reduction of water diversions from the Sacramento-San Joaquin Delta.

Climate Change

Climate change is having an impact on water resources as evidenced by changes in snowpack, river flows, and sea level rise. Climate change also affects water use.

Drought

Precipitation in Water Year 2009 was the third consecutive below average year for the state. Water Year 2007-08 resulted in 63 percent of average annual precipitation across the state, and Water Year 2008-09 resulted in 76 percent of average annual precipitation.

The current drought period, beginning in 2007, has left a significant deficit in the carry-over supplies of the state's reservoirs. Based on storage for key reservoirs at the end of the last three water years, the state entered the 2009-2010 Water Year (beginning October 1, 2009) with its key supply reservoirs at only 69 percent of average and 42 percent of capacity. Water Year 2008-09 ended with 65 percent of average statewide runoff, with the Sacramento region Water Supply Index (WSI) classified as "Dry" and San Joaquin River region WSI classified as "Below Normal". While the recent cumulative water supply deficits from below average rainfall and runoff are not as deep as some past severe droughts, California's upcoming winter season is uncertain, so the State continues to prepare for the possibility of a dry 2010.

Water Quality

Water quality degradation due to salinity or other constituents will result in more treatment costs or need for alternative sources of water supply.

Taken together, the POD, protracted drought on the Colorado River, California drought, legal and regulatory decisions, climate change, water quality, and population growth all present an unprecedented challenge to the security and reliability of California's water supply for urban water needs.

Urban Water Use Efficiency Actions in Response to California's Water Supply Challenges

In response to these challenges, California's government and water agencies have responded in different ways over the past decade and have made substantial progress in water conservation and in developing mechanisms for further water conservation by 2020. The major actions taken are the Governor's 2009 plan of 20 percent water use reduction target by 2020 which led to major water conservation legislation in 2009. Also of significance is the updating of the urban best management plans (BMPs) and the development of and requirements specified in the updated Model Water Efficient Landscape Ordinance, which is expected to result in significant water conservation in landscape irrigation. These and other major developments are described below.

Governor's 20 percent Reduction Target by 2020

On February 28, 2008, Governor Schwarzenegger sent a letter to Senators Perata, Machado, and Steinberg outlining key administrative elements of a comprehensive solution for the Sacramento-San Joaquin Delta. The first element identified was an aggressive new goal for water conservation in California. The Governor called for "A plan to achieve a 20 percent reduction in per capita water use statewide by 2020." To help develop the plan, DWR assembled a "20X2020 Team" of state agencies that play a role in the management of California's water to develop this more aggressive plan. Several agencies worked together to develop the plan, including the California Department of Water Resources, the State Water Resources Control Board (State Water Board), the California Energy Commission (CEC), the California Department of Public Health (CDPH), the California Public Utilities Commission (CPUC) and the Bureau of Reclamation (USBR) within the US Department of the Interior (20X2020, 2009).

The draft *20X2020 Water Conservation Plan* recommendations include:

1. Establish a foundation for a statewide conservation strategy
2. Reduce landscape irrigation demand
3. Reduce water waste
4. Reinforce efficiency codes and related BMPs
5. Provide financial incentives
6. Implement statewide conservation public information and outreach campaigns
7. Provide new or exercise existing enforcement mechanisms to facilitate water conservation

8. Investigate potential flexible implementation measures

9. Increase the use of recycled water and non-traditional sources of water

Water Conservation Legislation in 2009

Senate Bill (SB) x7 7, Water Conservation, enacted in the Seventh Extraordinary Session of the 2009-2010 Legislative Session, requires the State to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. The law establishes that the measure of increased efficiency is on a per capita basis. The law requires the State to make incremental progress towards this goal by reducing per capita water use by at least 10 percent on or before December 31, 2015. The law states that the retail water supplier's failure to meet the targets shall not be a violation of the law prior to January 1, 2021. The law requires each urban retail water supplier to develop urban water use targets and an interim urban water use target, in accordance with specified requirements, using one of the four methods described in the law. The urban retail water supplier may determine and report progress towards achieving these targets on an individual or regional basis and based on a calendar year or fiscal year basis.

The law requires DWR, in consultation with other state agencies, to develop a single standardized water use reporting form. The urban water suppliers are required to report to DWR on their progress in achieving their targets as part of their urban water management plan (UWMP); the data should be reported using the standardized form developed by DWR. The law, with certain exceptions, will provide that urban retail water suppliers, on and after July 1, 2016, are not eligible for State water grants or loans unless they comply with the water conservation requirements established by the law. The law repeals, on July 1, 2016, an existing requirement that eligibility for certain water management grants or loans to an urban water supplier is conditioned upon the implementation of certain water demand management measures.

The SBx7 7 requires DWR to undertake a number of actions listed below:

SBx7 7 Deadline	DWR Requirements
April 1, 2010	Section 10608.43—Convene a task force, and in conjunction with the California Urban Water Conservation Council (CUWCC), develop alternative best management practices for commercial, industrial and institutional (CII) programs.
Posted on Web by October 1, 2010	Section 10608.20(h)—Develop technical methodologies (for calculating base daily per capita water use, baseline CII water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscape area water use) and criteria for the consistent implementation of this part. Post on the DWR Web site.

SBx7 7 Deadline	DWR Requirements
Prior to December 31, 2010	Section 10608.52(a)—In consultation with the CALFED Bay-Delta Authority (CBDA), CDPH, CPUC, and the State Water Board, develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis and report progress toward interim targets (10608.24 and 10608.52(b)) and for agricultural water suppliers' compliance with the critical and locally cost effective efficient water management practices (EWMPs).
December 31, 2010	Section 10608.20(b)(4)—DWR shall develop an urban per capita target method through a public process that results in a 20 percent reduction in per capita water use by December 31, 2020 and report to the Legislature.
Prior to January 1, 2011	Section 10608.50—In consultation with the State Water Board, promote regional water resources management practices through increased incentives and removal of barriers. Changes may include: revised UWMPs, agricultural water management plans (AWMPs), integrated regional water management plans (IRWMPs), grant and loan eligibility requirements, State or local permitting requirements; increased funding for research, feasibility studies and project construction and expand technical and educational support for local land use and water management agencies.
January 1, 2011	Section 10608.50(b)—As part of the California Water Plan Update 2009, propose new statewide targets or review and update existing statewide targets for regional water resources management practices including recycling, brackish water desalination, infiltration and direct use of storm water runoff.
July 1, 2011	Section 10608.16(j)—Grant extension of UWMP adoption to July 1, 2011, to allow use of technical methodologies developed by DWR.
Report to the Legislature by December 31, 2011	Section 10608.64—In consultation with the Agricultural Water Management Council (AWMC), academics, and stakeholders, develop a methodology for quantifying the efficiency of agricultural water use based on crop type or irrigation system distribution uniformity and a plan for implementation, including implementation costs and type of data needed to support the methodology, and report to the Legislature.
April 1, 2012	Section 10608.43—The CII (commercial, industrial and institutional) Task Force and DWR shall report to the Legislature on a review of multiple sectors within CII users and recommend water use efficiency standards for CII users including metrics, evaluation of infrastructure for recycled water, barriers to recycled water and feasibility and costs of CII BMPs.
Prior to July 1, 2013	Section 10608.56(a)—Revise grant/loan criteria so an agricultural water supplier is not eligible for a grant or loan unless the supplier complies with this part.

SBx7 7 Deadline	DWR Requirements
December 31, 2013 (and thereafter in years ending in six and one)	Section 10608.48 (a)(b)(c)(d)(g)—Agricultural water suppliers shall implement critical and locally cost effective EWMPs and report to DWR on those EWMPs that have been implemented and plan to be implemented and estimates of water use efficiency improvements on a standardized form. DWR, in consultation with the State Water Board, shall report to the Legislature on the status of AWMPs and identify the outstanding elements, evaluate the effectiveness of the law in promoting efficient agricultural water management practices, and evaluate the recommendations relating to proposed changes to the law. DWR will also prepare reports and provide data for any legislative hearing designed to consider the effectiveness of the plans submitted.
December 31, 2013	Section 10608.48(g)—In consultation with the State Water Board, report to the Legislature on agricultural EWMPs that have been or are planned to be implemented, an assessment of how the implementation has and will affect agricultural operations, including water use efficiency improvements. Section 10608.48(h)—In consultation with AWMC, USBR, and the State Water Board, and through public hearings, DWR may update the locally cost effective EWPMs.
December 31, 2014	Section 10608.20(d)—DWR shall update the urban per capita target methods required by 10608.20(b)(4) and report to the Legislature.
Prior to July 1, 2016	Section 10608.48(g)—DWR will revise grant/loan criteria so that urban retail suppliers will not be eligible for grants or loans unless they comply with this part.
December 31, 2016	Section 10608.48(g)—DWR will report to the Legislature on AWMPs that have been or are planned to be implemented, an assessment of how the implementation has and will affect agriculture operations, including efficiency improvements.
December 31, 2016	Section 10608.42—Urban water suppliers shall report progress towards achieving the targets individually or on a regional basis (10608.20(a)(1)). Urban suppliers shall include in their UWMP daily per capita, urban water use target, interim target, and compliance daily per capita. DWR will review the 2015 UWMPs and report to the Legislature on progress towards achieving 20X2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets and reflect efficiency information and technology changes.
December 31, 2021	Section 10608.48(g)—DWR will report to the Legislature on agricultural EWMPs that have been or are planned to be implemented, an assessment of how the implementation has and will affect agriculture operations, including efficiency improvements. Section 10608.48(i)(1)—DWR will adopt regulations on the range of options to comply with 10608.48(b)(1) to measure the volume of water delivered and to adopt a pricing structure based on quantity delivered.
Unspecified date	Section 10608.16(i)(1)—DWR will adopt regulations for implementation of provisions related to process water in accordance with subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

Box 3-2 Urban Best Management Practices Naming Changes

Old BMP Number & Name	New BMP category
Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Programmatic: Residential
Residential Plumbing Retrofit	Programmatic: Residential
System Water Audits, Leak Detection and Repair	Foundational: Utility Operations—Water Loss Control
Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections	Foundational: Utility Operations—Metering
Large Landscape Conservation Programs and Incentives	Programmatic: Landscape
High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential
Public Information Programs	Foundational: Education—Public Information Programs
School Education Programs	Foundational: Education—School Education Programs
Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional
Wholesale Agency Assistance Programs	Foundational: Utility Operations—Operations
Retail Conservation Pricing	Foundational: Utility Operations—Pricing
Conservation Coordinator	Foundational: Utility Operations—Operations
Water Waste Prohibition	Foundational: Utility Operations—Operations
Residential ULFT Replacement Programs	Programmatic: Residential

Urban Best Management Practices

Urban water use is estimated to be 8.3 MAF for 2005. Significant accomplishments have been achieved over the past decade in urban water conservation. Such accomplishments are in part due to the implementation of water use efficiency practices that have been institutionalized through the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding (MOU) (CUWCC, 2009a). The MOU involves the active participation and united effort of urban water agencies, environmental interests, and the business community. They come together to plan, implement, and track a defined set of urban Best Management Practices (BMPs). As of November 2009 there were 398 signatories to the Urban MOU (227 water suppliers), representing 80 percent of all of the urban water supplied in California. Taken together, the progress of the past several decades has been substantial but is not sufficient to meet the MOU goals and objectives. Although the urban BMPs are voluntary for urban suppliers under the CUWCC MOU, the BMPs are mandated for the federal water contractors.

With California's water future uncertain, CUWCC revised the urban BMPs, adding flexibility to the best management practices and reorganizing them into programmatic groupings. In so doing, CUWCC became a leader in water conservation and innovation

in the United States. Water conservation is going to become even more important in California in the future. The new Best Management Practices will help to address an uncertain water future with potentially drier years ahead.

The CUWCC ratified eight critical changes and additions to the MOU and Best Management Practices. The revisions were designed to provide the hundreds of members who implement these BMPs across the state with the tools necessary to address the ongoing needs across the state by extending the life of the MOU, giving agencies more flexibility in achieving water conservation and by automatically updating as new technologies become available. The new BMPs became effective July 1, 2009, benefiting water providers, public advocate agencies and various other parties invested in water conservation in California.

CUWCC's 14 BMPs are now organized into five categories (See Box 3-2, Urban Best Management Practices Naming Changes). Two categories, Utility Operations and Education, are "Foundational BMPs", because they are considered to be essential water conservation activities by any utility and are adopted for implementation by all signatories to the MOU as ongoing practices with no time limits. The remaining BMPs are "Programmatic BMPs" and are organized into Residential, Commercial, Industrial, and Institutional (CII), and Landscape categories. The minimal activities required of each signatory are encompassed within each list, except for activities from which a utility is exempt from completing under the MOU and for which the utility has filed an exemption with CUWCC.

Foundational BMPs:
- BMP 1 —Utility Operations Programs
- BMP 2—Education Programs (formerly BMP 7)

Programmatic BMPs:
- BMP 3 Residential (formerly BMP 1)
- BMP 4 —Commercial, Industrial, and Institutional (formerly BMP 9)
- BMP 5—Landscape

There are three compliance options: traditional BMP, the Flex Track, and gallon per capita per day (GPCD).
- Traditional BMP accomplishes the specific measures as listed in each BMP. The specific compliance method is not intended to be a one size fits all solution to the complex issue of GPCD reduction for a water agency. Two approaches are available under this option. However, as one compliance method among others, it does provide an agency an opportunity, if appropriate, to use GPCD compliance as a simplified reporting mechanism.
- The Flex Track accomplishes a set of measures that achieve equal or greater water savings (referred to in this document as the Flex Track Menu). Agencies choosing the Flex Track option are responsible for achieving water savings greater than or equal to that which they would have achieved using only the BMP list items.

This approach will enable water suppliers to select water conservation measures that fit their regions and conditions. A signatory may elect to adopt additional or alternative measures, in part or in any combination, as described in the Flex Track Menus, provided that the demonstrated water savings in the Flex Track Menu activities are equal to or greater than the water savings that would be achieved by the BMP measures.

- Gallon per capita per day (GPCD) accomplishes set water savings goals as measured in gallons per capita per day consumption. The GPCD target is 18 percent reduction by 2018 for the purpose of using the same timeframe as the CUWCC's MOU.

AB 325 (1990)—The Water Conservation in Landscaping Act of 1990

In 1990, California was in a fourth consecutive year of drought and AB 325 "Water Conservation in Landscaping Act of 1990" was signed. This bill required DWR to appoint an advisory task force by February 1, 1991, to work with DWR in drafting a model water efficient landscape ordinance. After holding public hearings, and based on recommendations of the task force, DWR adopted the ordinance in 1992. By January 1993 local agencies were either to adopt a local water efficient landscape ordinance, adopt the State model water efficient landscape ordinance, or make a statement as to why the ordinance was not necessary. Prior to the ordinance, local agencies were not required to adopt an ordinance concerning landscape water conservation.

AB 2717 (2004)—California Urban Water Conservation Council: stakeholders

A 2001 report by Western Policy Research concluded that nearly 90 percent of new development between 1992 and 1999 took place in entities that had adopted a water efficient landscape ordinance (Bamezai, et al., 2001). But researchers found deficiencies in AB 325 due to a lack of education about the ordinance and inaccurate irrigation by maintenance contractors. Maintenance was found to be the weakest link in design, installation, and maintenance. Partly because of this report, AB 2717 was proposed and passed in 2004 to address some of the deficiencies of AB 325.

AB 2717 requested CUWCC to convene a stakeholder task force, composed of public and private agencies, to evaluate and recommend proposals by December 31, 2005, for improving the efficiency of water use in new and existing urban irrigated landscapes in California. The task force adopted a comprehensive set of 43 recommendations, many of which pertain to updating the AB 325 "Model Water Efficient Landscape Ordinance." The task force also recommended that DWR study the evapotranspiration adjustment factor as a part of updating the landscape model ordinance (AB 2717 Landscape Task Force, 2005).

AB 1881 (2006)—Water Conservation in Landscaping Act of 2006

Landscape irrigation uses a significant amount of water. DWR's estimate of residential water use for 2005 is 5.9 million acre-feet (MAF), of which an estimated 3.2 MAF (or 54 percent) is outdoor use. Because of the water savings potential in landscape irrigation and the need for both behavioral and irrigation system changes, DWR was directed by the Water Conservation in Landscaping Act of 2006 to update the Model Water Efficient Landscape Ordinance (Model Ordinance) in accordance with the recommendations of the AB 2717 task force, and adopt the updated Model Ordinance by January 1, 2009. The purpose is to specify requirements for the efficient use of water as authorized by Sections 65595 and 65596 of the 2006 Act. A local agency, including a charter city or charter county, is required to adopt the updated Model Ordinance or adopt its own local landscape ordinance, which is at least as effective, by January 1, 2010.

DWR held public workshops and public hearings as required prior to adopting the regulation. The DWR updated Model Ordinance became effective on September 10, 2009 (DWR, 2009a, 2009b

AB 1881 requires DWR, not later than January 31, 2011, to prepare and submit a report to the Legislature on the status of water efficient landscape ordinances adopted by local agencies.

The 2006 Act also required the California Energy Commission (CEC), to develop performance standards and labeling requirements for landscape irrigation equipment. However, CEC determined that there was insufficient technical data and analysis to substantiate specific standards or labeling requirements, and that significant additional time and resources were necessary to conduct needed studies and complete the analyses. The CEC decided to suspend the proceedings until such time as sufficient funding sources become available.

AB 1881 also directed water purveyors that serve more than 15 service connections, effective January 1, 2008, to require as a condition of new retail water service the installation of separate water meters to measure the volume of water used for landscape purposes. The requirement applies to connections with 5000 square feet of landscape. The requirement does not apply to single family residential connections.

AB 797 (1983, amended through 2004)—Urban Water Management Planning Act

The Urban Water Management Planning Act, amended through 2004, requires certain urban water suppliers to submit an urban water management plan to DWR every five years. About 450 urban suppliers submitted their UWMP in the 2005 cycle. DWR reviews the UWMP and prepares a report to the Legislature on the status of the UWMP, identifying outstanding elements of the UWMPs. Californians have made great progress on urban water use efficiency over the past few decades. As has been demonstrated in various regions of the state, an increase in population does not necessarily result in a proportionate increase in urban water use. For example, the Los Angeles Department

of Water and Power (LADWP) reports in its "2005 Urban Water Management Plan Update" that "water use today is equal to the annual use of about 20 years ago, despite a growth in population of more than 750,000 people. These significant accomplishments have resulted from the City's sustained implementation of effective water conservation programs, and the City's culture of conservation as a way of life" (LADWP, 2005, p. ES-5). This report indicates that water use efficiency is contributing to meeting population growth water demand.

AB 1420 (2007)—Water demand management measures: water management grant or loan funds. Independent Technical Advisory Panel

AB 1420 requires the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by DWR, the State Water Board, or the CBDA, with certain exceptions, be conditioned on the implementation of the water demand management measures (DMMs) described in the urban water management plan, as determined by DWR. It required DWR to develop eligibility requirements that consider the CUWCC BMPs and alternative approaches that provide equal or greater water savings; DWR was required to consult with the State Water Board and CALFED and to solicit public comments to develop these requirements. In 2009, DWR adopted criteria for compliance with the AB 1420 requirements.

AB 1420 also directed DWR, pending availability of funds, to convene an Independent Technical Panel to help it develop new DMMs, technologies, and approaches. The panel will prepare a report that provides information and recommendations to DWR and the Legislature on new demand management measures, technologies, and approaches. In the report, DWR will be required to identify water demand management measures that achieve water savings significantly above the levels DWR established to meet the requirements of the DMMs or BMPs. DWR has not convened the panel due to lack of resources.

Efficient Clothes Washers

On February 4, 2004, by a vote of 5-0, the CEC adopted water efficiency standards for clothes washers (CEC, 2006). It is a tiered standard based on the "water factor" of the clothes washer, which is the number of gallons per cubic foot of drum capacity. In 2007, the maximum water factor to be allowed was 8.5 per machine. By 2010, the standard would have been further reduced to 6.0. Conventional washers have a water factor of about 13.3, thus the standards would reduce per-load water use 36 percent by 2007 and 55 percent by 2010. Federal approval is still required, as the federal Energy Policy Act of 1992 allows only the federal government to regulate residential clothes washers unless a state waiver is approved. California is currently appealing before the Ninth Circuit US Court of Appeals the US Department of Energy's denial for a waiver of federal preemption for the State's water efficiency standards for residential clothes washers.

Delta Vision

On September 28, 2006, Governor Schwarzenegger signed Executive Order S-17-06 to initiate the Delta Vision and establish an independent Blue Ribbon Task Force to develop a durable vision for sustainable management of the Delta (Schwarzenegger, 2006).

The Blue Ribbon Task Force recommended two foundational and co-equal goals: restore the Delta ecosystem and create a reliable water supply for California (Governor's Blue Ribbon Task Force, 2008). It identified improving water diversion and use reporting, strengthening water rights accountability, and increasing water use efficiency as ways to ensure the sustainability of water supplies. The Task Force also recommended that legislation be enacted requiring urban water suppliers or regions to reduce their per capita water use sufficient to achieve a statewide average 20 percent reduction in per capita water use by 2020, to expand implementation of efficient water management practices in agriculture, to streamline the State Water Board's authority to take enforcement action, and to assess monetary penalties for the failure of water suppliers and users to achieve conservation targets and implement BMPs. It also recommended enactment of legislation as soon as possible to require urban and agricultural water suppliers to adopt more aggressive volumetric water pricing and to expand outreach and information programs.

Climate Change Strategy

DWR is beginning to address the impacts of climate change through mitigation and adaptation measures for better management of water supply in the future. Future water management activities must consider strategies to conserve water and energy and reduce greenhouse gas (GHG) emissions. Based on data from the draft *Statewide Assessment of Energy Used to Manage Water*, the CEC estimates at least 44 million metric tons of CO_2 emissions are expelled on average annually to provide the 44 MAF of urban and agricultural water used statewide.

Remedial action and local adaptation measures are needed to reduce the extent of climate change and to reduce the damage from the changes that are unavoidable. Water use efficiency enables us to both adapt to increased dryness and to mitigate GHG emissions by reducing water and energy use. Improving water use efficiency is an adaptive strategy that permits us to increase supply reliability by lowering demand, effectively stretching existing water supplies. Improved water use efficiency is a mitigation strategy because of the relationship between GHG emissions and the use of fossil fuels. This relationship is the key to the reduction of GHG emissions through water use efficiency.

The energy required to produce, convey, treat, and distribute water varies significantly among communities depending on their individual circumstances. There is also diversity among customers. For example, hot water consumption in tall buildings (which requires both heating and pressurization) is more energy intense than single and two-story

buildings. Because of this diversity, water use efficiency programs can emphasize locations and customer uses that have relatively higher energy intensity.

DWR's climate change strategies include a strategy of aggressively increasing water use efficiency. Using water efficiently is a foundational action for water management, one that serves to mitigate and adapt to climate change. Water conservation reduces water demand, wastewater discharges, and can reduce energy demand and GHG emissions. Efficient water use can help communities cope with water shortages that may result from climate change, thus reducing economic and environmental impacts of water shortages. Implementation of urban BMPs and the State's model water efficient landscape ordinance are among the strategies to reduce urban demand for energy efficiency and GHG emissions reduction.

The December 2008 California Air Resources Board (CARB) Climate Change Scoping Plan identified as a key recommendation: "Creating targeted fees, including a public goods charge on water use (CARB, 2008)." The fees would be used for funding investments in water management actions that improve water and energy efficiency and reduce GHG emissions. A public goods charge on water can be collected on water bills and then used to fund end-use water efficiency improvements, system-wide efficiency projects, water recycling, and other actions that improve water and energy efficiency and reduce GHG emissions. Depending on how the fee schedule is developed in a subsequent rulemaking process, a public goods charge could generate $100 million to $500 million. These actions would also have the co-benefit of improving water quality and water supply reliability for customers.

The Scoping Plan also contained a mechanism to make allowances available in a cap-and-trade program that could be used to provide additional incentives for local governments, water suppliers, and third party providers to bundle water and energy efficiency improvements.

Water system and water use efficiency and conservation measures recommendations included (under the green building strategy), "…these [2020 and 2030 targets for zero energy buildings] could be re-framed as a carbon footprint reduction goal for a 35 percent reduction in both energy and water consumption. For commercial buildings, a 2011 target should be established such that a quarter of all new buildings reduce energy and water consumption by at least 25 percent beyond code" (CARB, 2008, p. 58).

Drought Proclamation

Governor Schwarzenegger issued a Drought Proclamation in February 2009 requiring DWR to prepare a report by March 2009 (Schwarzenegger, 2009). The DWR report, "California's Drought: Water Conditions and Strategies to Reduce Impacts. Report to the Governor March 30, 2009," included a number of recommendations including water conservation (DWR, 2009c). In 2009, the Association of California Water Agencies (ACWA) and the Department of Water Resources launched a statewide public education

campaign—"Save Our Water" as a partnership between State and locals aimed to reduce water use and educate the public (ACWA, 2009). The effort is intended to meet Governor Arnold Schwarzenegger's call for a statewide program with a uniform water conservation message. In response to the call to prepare for drought, numerous water agencies have developed educational and motivational programs to inform their customers and provide incentives for water conservation practices.

Other Water-related Legislation

SB 407 (2009). Property transfers: plumbing fixtures replacement**.** ULFT Retrofits. This law requires the replacement of all non-water conserving plumbing fixtures, as defined, in commercial and residential properties built prior to 1994 with water-conserving fixtures by either 2017 or 2019, depending on the type of property.

AB 474 (2009). Contractual assessments: water efficiency improvements. This law authorizes the legislative body of any public agency to determine that it would be in the public interest to designate an area within which authorized city officials and free and willing property owners may enter into contractual assessments to finance the installation of water efficiency improvements that are permanently fixed to real property. This law will also require additional specified disclosures for a transfer of real property subject to a contractual assessment.

AB 1061 (2009). Common Interest Developments–Water Use Efficient Landscapes. This law provides that a provision of any of the governing documents of a common interest development shall be void and unenforceable if it prohibits, or includes conditions that have the effect of prohibiting, the use of low water-using plants as a group, or if it has the effect of prohibiting or restricting compliance with a local water-efficient landscape ordinance or water conservation measure that includes the use of low water-using plants as a group.

AB 1366 (2009). Residential Self-Regenerating Water Softeners**.** This law authorizes local agencies that own or operate a community sewer system or water recycling facility to control salinity inputs from residential self-regenerating water softeners, to protect the quality of the waters of the state, subject to certain conditions.

AB 1465 (2009). Urban water management planning. DMMs. This law will deem water suppliers that are members of the CUWCC and comply with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated December 10, 2008, as it may be amended, to be in compliance with the requirement to describe the supplier's water demand management measures in its urban water management plan (CUWCC, 2009a). It will allow MOU signatories to continue to comply with urban water management planning (UWMP) DMM requirements by submitting completed annual BMP reports as part of their UWMPs.

AB 371 (2006). Water Recycling Act of 2006. Required DWR to adopt standards for dual plumbing in new buildings. DWR developed the standards and submitted to the

California Building Standards Commission (CBSC) for review and approval. The Standards were approved by the CBSC on November 18, 2009. The standards will be published in January 2011.

AB 1404 (2007). Water Measurement Information. Requires the State Water Board, in consultation with DWR and CDPH, to conduct a feasibility study of a coordinated database and report to the Legislature by January 2009. The coordinated database is intended to streamline and make collection, submittal, management and maintenance of water-related data more efficient.

Senate Bills 610 and Senate Bill 221 (2001). Water supply planning and Land use: water supplies. These bills amended State law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 are companion measures which seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. Both statutes also required the detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. Both measures recognize local control and decision making regarding the availability of water for projects and the approval of projects.

SB 610 applies to residential projects with more than 500 units, and other projects as defined by the law, that are subject to the California Environmental Quality Act (CEQA). SB 221 applies, with certain exceptions, to residential development agreements for a project that includes a "subdivision" as a proposed residential development of more than 500 dwelling units.

Potential Benefits of Urban Water Use Efficiency

Drought preparedness

The primary benefit of improving water use efficiency is the lowering of demand and the ability to cost-effectively stretch existing water supplies. Once viewed and invoked primarily as a temporary source of water supply in response to drought or emergency water shortage situations, water use efficiency and conservation approaches have become viable long-term supply options, saving considerable capital and operating costs for utilities and consumers, avoiding environmental degradation, and creating multiple benefits. Reduced water demand will free up water in normal and wet years. Saved water can be carried over to another time if a supplier has surface or groundwater storage, or stores water by agreement with an agency that maintains a groundwater bank and returns it for use during drought years. Translating water use efficiency savings into specific water supply reliability benefits will depend on the water system involved, the level of savings, and the variations in water savings from one year to the next as well as throughout the year.

Sustainability

Water use efficiency is a foundational action for water use sustainability. In order to ensure that water uses are sustainable, water management at all levels—State, federal, regional, and local—must be based on three foundational actions: **use water efficiently, protect water quality, and support environmental stewardship**.

Potential Water Savings

The Water Plan Update 2005 estimates of potential water savings from water use efficiency were developed from a CALFED study, the CALFED Programmatic Record of Decision. CALFED estimated that applied water savings of urban water use efficiency efforts would range between 0.8 million and 1 million acre-feet per year by 2030 (CALFED, 2000). A state-sponsored study indicated potential savings of 2 million to 2.3 MAF per year from existing urban conservation technologies and practices (Gleick et al., 2003).

CALFED sponsored a study of urban water conservation potential as part of its comprehensive review of the Water Use Efficiency Element of the CALFED Bay-Delta Program (CALFED, 2006). This study evaluated urban water savings potential from three sources: (1) operation of efficiency codes that require certain water using appliances and fixtures to meet specified levels of efficiency; (2) local water agency implementation of urban conservation BMPs specified in the Memorandum of Understanding Regarding Urban Water Conservation in California (Urban MOU), as well as other locally cost-effective conservation measures; and (3) additional urban conservation measures funded through CALFED grant programs (CUWCC, 2009).

Estimates of urban savings potential were developed for six different projections. These projections employed different assumptions about local water agency implementation of conservation measures and funding levels for CALFED grant programs. Two different levels of local water agency implementation of conservation measures were considered. The first level assumed implementation of BMPs would occur at the average rate of implementation observed during the first 13 years of the Urban MOU. The second level assumed that local water agencies would implement all BMPs and other conservation measures that were locally cost-effective from the perspective of the implementing agency. CALFED's grant program funding was evaluated at three levels. The first level assumed that grant program funding would consist only of the remaining Prop. 50 funds available for urban conservation implementation. The second level assumed $15 million per year of funding for urban conservation implementation grants. The third level assumed $40 million per year of funding for 2005-2014 and $10 million per year for the period probable at the time the study was undertaken. The sixth projection measured the water savings potential of the conservation measures under evaluation assuming 100 percent adoption and existing technologies. This last projection served as a reference point from which to evaluate the other five. CALFED estimates of 2030 urban conservation potential for the six projections are shown in Table 3-1.

Table 3-1 CALFED estimates of 2030 urban conservation savings potential (demand reduction)

Projection Level	Assumed Local Agency Investment	Assumed CALFED Grant Funding	(Demands Reduction by Category) 1,000 Acre-Feet per year			
			Required by Code	Local Agency Cost Effective	Grant Funded	Total Annual Potential
1	Historic Rate	Prop. 50 only	970	172	11	1,153
2	All Locally cost-effective	Prop. 50 only	970	881	11	1,862
3	Historic Rate mil./yr.	Prop. 50 + $15 mil/yr.	970	172	257	1,399
4	All Locally cost-effective	Prop. 50 + $15 mil/yr.	970	881	257	2,108
5	All Locally cost-effective	Prop. 50 + $40 mil./yr. (2005-2014); $10 mil./yr. (2015-2030)	970	881	224	2,075
6[1]	N/A	N/A	N/A	N/A	N/A	3,096

[1]Projection 6 represents the technical potential of the urban conservation measures evaluated by CBDA. It assumes 100% adoption statewide of these measures using existing technologies and provides a reference point for the other five projection levels.

Source—2006 Final Report Water Use Efficiency Comprehensive Evaluation

The estimates show the reduction in annual applied urban water use expected from each savings source as well as the total annual water savings. The technical potential, shown by projection 6, is about 3.1 MAF per year. Advances in water-saving technology, which the CALFED analysis did not evaluate, potentially could push savings beyond the levels shown in Table 3-1. Total annual savings potential for projections 1 through 5 ranges between 1.2 MAF and 2.1 MAF per year, or about 40 percent to 70 percent of technical potential. Water savings from efficiency codes, which include metering of currently unmetered connections, are significant, accounting for about 45 percent to 85 percent of total savings shown for projections 1 through 5. Water savings from local agency implementation are sharply affected by the assumed local investment. Potential savings are approximately five times greater if agencies are assumed to invest in all locally cost-effective measures than if they are assumed to invest at the historic rate of BMP implementation. Analysis results also show that continuing grant programs beyond Prop. 50 would approximately reduce water demand between 200,000 and 250,000 AFY by 2030. Realization of a greater proportion of technical potential than shown by projections 1 through 5 would require higher rates of local, State, and federal investment in urban conservation than considered by the CALFED analysis. Increasing BMP coverage requirements and higher levels of State/federal investment could allow the State to realize a greater amount of technical potential. However, achieving the technical potential savings may not be economical because of diminishing returns on investments.

Table 3-2 2030 annual water savings potential by CALFED projection: recoverable and irrecoverable

Projection Level	Water Savings Potential 1,000 Acre-Feet Per Year		
	Irrecoverable Flow	Recoverable Flow	Total Savings Potential
1	729	423	1,153
2	1,285	575	1,862
3	818	578	1,399
4	1,375	729	2,108
5	1.368	702	2,075
6	1,980	1,110	3,096

Source—2030 Urban Water Conservation Savings Potential (CALFED, 2006, p. 125)

The estimates in Table 3-1 represent changes in applied urban water use. This reduction in applied use includes both recoverable and irrecoverable flows. Recoverable flow is the portion of applied water that would return to a usable surface or groundwater body, making it available for reuse. Irrecoverable flow is the portion of applied water that would evaporate or return to an unusable surface or groundwater body and would not be available for reuse. Table 3-2 shows the annual recoverable and irrecoverable flows for the six projection levels.

Environmental Benefits

Reducing both recoverable and irrecoverable flows through conservation of urban applied water can benefit urban water users. Reducing both types of flow may also result in increased stream flows and water quality benefits. Reducing irrecoverable flows through conservation has the added benefit of increasing the amount of developed water available for human uses at no added cost to other users or the environment. The timing of such additional flow is often critical to maintaining endangered habitats. Water use efficiency can also reduce peak demand, curb runoff from landscape irrigation, and reduce green waste caused by inefficient watering of landscape.

Economic and Financial Benefits

One way to assess the benefits of a conservation measure is to compare the cost of producing an acre-foot of water supply savings implemented under the measure to the cost of acquiring and using one more acre-foot of supply. The avoided costs of developing a new supply, including the cost of distribution systems, water supply treatment facilities, and wastewater treatment facilities are benefits at the water agency level. Cost can also be avoided at the water user level, including on-site treatment costs for process water and wastewater disposal costs, for example. These avoided costs include energy costs, which can be a substantial component of water development, delivery, treatment, and use costs.

Table 3-3 Statewide average unit cost of water savings by CALFED projection (2004 dollars)

Projection Level	Assumed Local Agency Investment	Average Unit Cost of Water Savings Per Acre-Foot
1	Historic Rate	$522
2	Locally cost-effective	$223
3	Historic Rate	$395
4	Locally cost-effective	$227
5	Locally cost-effective	$233
6	A unit cost for projection 6 was not developed by CBDA because of uncertainty about how implementation costs would change as measure adoption rates approached 100%	

Source—Water Use Efficiency Comprehensive Evaluation. CALFED Bay-Delta program water use efficiency element, 2006

Water agencies with limited budgets can benefit financially by avoiding or delaying infrastructure investments, which can benefit users by helping to keep water rates lower than would otherwise be the case.

This approach acknowledges that there are essentially two, and often compatible, approaches water agencies can use to meet their water demand. They can increase supplies and/or lower demand. Ratepayers benefit when water agencies use an integrated resource planning (IRP) approach to invest in the mix of supply—and demand-management strategies capable of meeting resource management objectives with the lowest overall cost and impacts.

Potential Costs of Urban Water Use Efficiency

The average cost (in 2004 dollars) to realize an acre-foot of water savings for CALFED projections 1 through 5 are shown in Table 3-3. Costs range from $223 per acre-foot for projection level 5 to $522 per acre-foot for projection level 1 (CALFED, 2006). The assumed local investment has a significant impact on the average costs. The average costs for projections that assume water agencies invest in all locally cost-effective conservation measures are approximately 40 percent to 60 percent lower than the other projections. It is important to note that the cost estimates in Table 3-3 are statewide averages and results for individual regions or water agencies could vary significantly. Conservation's role in urban water management depends on a variety of regional and local considerations that are best addressed through an integrated resources planning framework. The unit costs in Table 3-3 suggest, however, that for most urban areas, conservation will likely become an increasingly important part of their water resource management. The unit costs in Table 3-3 are currently lower than other urban supply options such as recycling, desalination, or new surface water development. The State

Recycled Water Task Force, for example, estimated that California could achieve the Task Force's recycled water objectives at an average cost of $600 per acre-foot (RWTF, 2003, p. 14). A similar task force examining ocean desalination estimated average costs $661 to $834 per acre-foot, not including the cost of delivery to the customer (Keene, 2003)). Because conservation investments generally reduce customer end uses of water, the average costs shown in Table 3-3 are equivalent to a cost to deliver treated water to the customer tap.

Average unit costs were calculated for Projections 1 through 5, as shown in Table 3-3. The method for calculating the unit costs shown in the figure is discussed in Appendix 2D of the Water Use Efficiency Comprehensive Evaluation, CALFED Bay-Delta program water use efficiency element (CALFED, 2006). These unit costs do not reflect end user costs associated with cost sharing or efficiency code compliance, other than metering, which is a water supplier cost. The costs shown in Table 3-3 are average costs. Many of the conservation measures have unit costs that exceed these amounts, and several have costs that are less than these amounts. The marginal cost of investment varies by region and time period, and therefore cannot be easily summarized. Table 3-3 suggests that policies only emphasizing State/federal grant funding (Projections 1 and 3) result in higher average unit costs compared to policies that also promote aggressive investment in locally cost-effective conservation measures (Projections 2, 4, and 5). To ensure consistency, the unit costs also do not account for the water savings from efficiency codes other than metering either. Thus, the unit costs reflect only the costs and water savings resulting from direct water supplier and state/federal investment.

The Programmatic Record of Decision (ROD) for the CALFED Bay-Delta Program assumed that the average cost of urban conservation measures would be between $150 and $450 per acre-foot (CALFED, 2000). CALFED's analysis of urban conservation potential suggests somewhat higher average costs, ranging, when rounded, between $220 and $530 per acre-foot. Both estimates indicate that investment in urban conservation can be a very cost-effective strategy for addressing growing urban demand for water.

The CALFED ROD estimates that the investment for water savings is of three types: (1) direct investment by water agencies in locally cost-effective conservation measures; (2) investment by CALFED through grants; and (3) additional investment by water agencies leveraged by grants from CALFED. Approximately 60 percent to 90 percent of the annual investment costs are direct investments by local agencies in locally cost effective measures. The remaining 10 percent to 40 percent of investment comes from grants and grant-leveraged local investment.

Major Issues Facing Urban Water Use Efficiency

Funding

Even in less challenging times it has been difficult to secure funding on the scale required to reap the full water supply and the economic and environmental benefits

of water use efficiency. Funds dedicated to water use efficiency have fallen below commitments made in 2000 through the CALFED ROD that called for a State and federal investment of $1.5 billion to $2 billion during Stage 1 from 2000-2007. For example, by 2003, investments lagged projected expenditures by $235 million. Through the CUWCC MOU, local agencies have committed to funding locally cost-effective BMPs. State and federal programs have also provided funding for the BMPs beyond the MOU level for actions that may not be locally cost effective. Given the financial situations of the state, it is not realistic to assume that the funding goals can be achieved.

Grant programs often miss the opportunity to fund worthwhile projects in small and disadvantaged communities. It is often difficult for these communities to compete for limited grant funds, although their needs are often great.

A consistent and broadly acceptable method to evaluate cost-effectiveness and water savings has been developed by the CUWCC. The organization has also sponsored a publication describing cost effectiveness and spreadsheets that calculate cost effectiveness by (A & N Technical Services, Inc., 2005; CUWCC, 2009b).

Prop. 218, which was approved by the voters in 1996, added Article XIII C (taxes) and D (fees and assessments) to the California Constitution. Prop. 218 may apply to how a water supplier sets assessments and fees. Assessments and fees can be a source of funding, but may create revenue instability for some agencies.

Program Implementation

While the CUWCC BMPs have provided an effective way for agencies to identify and implement locally cost effective urban water conservation programs, not all water suppliers have signed on to the agreement and not all of the signatories are fully implementing those practices. There are a number of challenges faced by agencies when implementing urban water conservation programs. A study sponsored by the California Urban Water Agencies (CUWA) identified a number of these implementation challenges for urban water conservation programs (Chestnutt, et al., 2004). The CUWA-sponsored study recommends collaborative action by agencies, further research, and continued State or federal support to address the implementation challenges. The CUWA study concludes that the program should be as easy as possible for customers; its design should be simple; it should provide customers with guidance on water efficient fixtures; it should be coordinated with other agencies regarding permitting or potential funding; and it should emphasize a high level of customer service. Language, lack of incentives, skill sets and reliable water savings data are among identified barriers.

Implementation of urban water conservation measures requires local and State investment in not only changing the traditional water use fixtures and technologies to more water efficient and advanced technologies, but changing water use behaviors by customers. These actions require substantial investments, but sufficient funding has not been available and the recent State budget deficits and delays in grant program implementation have contributed to slow implementation. Changing water use habits

requires public education, outreach, incentives and disincentives. While State agencies and water suppliers have implemented various programs, the existing programs have not been sufficiently aggressive to achieve the goals and recommendations of the 2005 Water Plan Update.

SBx7 7 (2009), Water Conservation, coupled with other requirements outlined earlier, and the Safe, Clean, and Reliable Drinking Water Supply Act of 2010, if approved by voters, can significantly contribute to advancing water conservation to the levels required by the act.

Data Collection

Easily retrievable, standardized, and comprehensive baseline data about California urban water use are not available. Present information sources include annual Public Water System Survey (PWSS) reports to DWR; reports to the CDPH, CPUC, and annual CUWCC BMP reports submitted by MOU signatories; and UWMPs that are updated every five years. Documentation and evaluation of the achievements attributable to water use efficiency projects and programs—vital elements of successful water use efficiency efforts—need to be improved. Tracking water use in order to document savings is necessary to gain an accurate understanding of the full cost, value, impact, and direction of urban water use efficiency strategies. The measurement of water use and providing it to the water user are essential to efficient water management. The quantification of benefits for many projects lacks the necessary level of scientific rigor.

Most urban areas are metered, but several metropolitan areas, mostly in the Central Valley and foothill regions, remain unmetered. DWR staff estimates that about 700,000 water users remain unmetered.

DWR has organized a statewide network of people to improve California's analytical capabilities in support of water management decisions and investments. Improving these analytical capabilities will require significant participation by local, State, and federal agencies, organizations and governments. DWR will collaborate with interested stakeholders to improve analytical tools and share data through a Statewide Water Analysis Network (SWAN). Due to lack of data integration among various planning efforts, in cooperation with the SWAN, DWR agreed to begin the effort of improving information exchange by exploring how information produced for UWMPs could be used more effectively to support regional and statewide planning efforts.

A coordinated database doesn't exist for urban water use collection, management and maintenance. AB 1404 (2007) required the State Water Board, in cooperation with DWR, CDPH and CBDA, to study the feasibility of a coordinated database and report to the Governor by January 1, 2009. A report is under preparation by the State Water Board. If approved and funded, a coordinated database of water use information will be a significant accomplishment and resource for planning and implementation purposes.

Box 3-3 Demand Hardening

Most water use efficiency programs rely on plumbing and appliance retrofits and changes in the consumer's water use that takes place on a consistent, predictable basis. Once most of the retrofits have been completed, it becomes difficult to further reduce water use during water shortages. This phenomenon is known as "demand hardening." The Los Angeles Department of Water and Power (LADWP) experience in the summer of 2009 demonstrates that customers will reduce water use during short-term water shortages as a result of an aggressive public education program, mandatory restrictions on outdoor water use, and a tiered pricing structure that costs customers for excessive water use. LADWP's customers achieved an 18.4 percent reduction in water use during the months of June through October, 2009 compared to the same months in 2007. According to the President of the Los Angeles Board of Water and Power Commissioners, "It used to be that we could say that Angelenos use the same amount of water today as they did 25 years ago, despite a million more customers, but with this extraordinary conservation, we can now say Los Angeles uses **less** water today than we did 25 years ago." These accomplishments are not solely due to public education but other incentives and disincentive programs.

Many water agencies are encouraging their customers to change outdoor water usage by planting California-friendly plants, removing turf grass, and installing efficient irrigation timers. When plumbing and appliance retrofits and landscape practices have been fully implemented, and customers routinely use less water, achieving additional savings will be dependent on behavioral changes by customers.

One tool available from the California Urban Water Conservation Council for water suppliers to examine the potential for demand hardening is the Least Cost Planning Demand Management Decision Support System or DSS model, an end use cost-benefit tool. The tool provides:

- How to model a drought cut-back ordinance as a short-term conservation measure.
- Which end-uses can still be reduced in a drought.
- How short-term and long-term end use reductions interact.
- Typical magnitudes of demand hardening as a function of the amount of long-term conservation implemented or planned.
- Realistic expectations for customer cut-backs in droughts in say 2025, after aggressive long-term conservation programs have been implemented.

Landscape uses significant amount of water. Without a water meter or a landscape dedicated water meter, it is difficult to accurately assess landscape water use and implement appropriate programs to prevent water waste. AB 1881 (2006) requires that retail water suppliers require a dedicated water meter for landscapes with area greater than 5000 square feet for all but single family residential new connections. This requirement will allow monitoring and collection of water use data for local agencies' implementation and enforcement of the agency's landscape ordinance.

More effort is needed in public education, outreach, training, and technical assistance in addition to the existing efforts by State and federal agencies, water purveyors, CUWCC and other entities to provide various educational and technical assistance programs and increase public knowledge and awareness about the importance of water use efficiency. See also, Box 3-3, Demand Hardening.

Recommendations to Achieve Urban Water Use Efficiency

State agencies and water suppliers, in cooperation with CUWCC, ACWA, CUWA, and other organizations and entities individually and collaboratively, have made progress in furthering urban water conservation recommendations of the 2005 Water Plan Update and other local or regional programs. Progress has been made in some areas including commitment of grant funding for urban projects, update and revisions of the CUWCC urban BMPs, commitment of SWAN for data management, feasibility study of a coordinated database, development of the draft 20X2020 plan to reduce per capita water use, adoption of the AB 1420 criteria for grant and loan eligibility, adoption of an updated Model Water Efficient Landscape Ordinance and passage of new legislation including SBx7 7 of 2009 specifying water use reduction targets and other requirements. Inadequate funding, authority, educational and outreach programs have delayed achieving greater urban water conservation levels.

The following recommendations reflect some of the possible approaches to achieve water conservation.

Funding

1. State and federal funding will provide incentives for implementation of best management practices and other water conservation measures. Props. 50 and 84 provide funding for water conservation. The State should secure additional funding to support incentive programs, both implementation and data collection and utilize the recommendations of the Urban Water Use Efficiency Strategy to identify and establish priorities for future grant programs and other incentives. If the Safe, Clean, and Reliable Drinking Water Supply Act of 2010 is approved by California voters in November 2010, it will provide significant funding for water conservation.

2. Agencies should provide ample opportunities for small districts and economically disadvantaged communities to benefit from incentive programs. With recent grants, special workshops have been conducted for Tribes. Tribes and disadvantaged communities have also been invited to regular public workshops. Several cooperative agreements are in place for disadvantaged communities. DWR's Government and Community Liaison staff member works to reach and inform Tribes and disadvantaged communities about the availability of funds. Announcements have been included in Tribal newsletters about the process. In addition, two contracts were developed by DWR to provide assistance to Tribes and disadvantaged communities. These efforts should continue.

3. Innovative approaches undertaken by water agencies should be explored and implemented, if feasible. For example, in response to funding challenges, a number of individual water suppliers have developed innovative approaches to the problem

of funding programs. Some examples are presented and other opportunities are discussed below:

One approach is a no-interest revolving loan program that could provide funds to urban water suppliers based on the avoided cost of new supply alternatives. Once the loan is repaid, all future savings will accrue to the supplier and its customers. One example of a no-interest loan program was the "Unconserved Water Using Air Conditioner Replacement Program" established by Fresno. The program made customers with water-using air conditioners, who paid a surcharge based on the estimated water use of the devices, eligible to replace them with new non-water using, energy efficient units. It applied the surcharge paid by participating customers to loan repayment for the program.

In 2006, the San Francisco Public Utilities Commission launched a 2-year pilot program called Water Savers that offers payments for projects that provide long-term water savings through replacement of existing equipment or processes with new, high-efficiency equipment or systems.

The Metropolitan Water District of Southern California (MWD) and its member agencies have implemented a highly successful region-wide commercial, industrial, and institutional program for the past seven years (bewaterwise, 2009). In July 2007, the MWD board authorized development of a program for rebates for residential customers. There are many benefits in a region-wide rebate program, including time savings, financial savings, and the ability to do consistent advertising.

4. Legislative funding should be sustained as shown in the following examples of and approaches to legislation that enable local agencies to achieve water conservation:

AB 2882 (2008)—Allocation-based conservation water pricing. This law authorizes a public entity to adopt allocation-based conservation water pricing meeting certain requirements. The law requires that revenues derived from allocation-based conservation water pricing not exceed the reasonable cost of water service, including basic costs and incremental costs, as defined. This law clarifies the legal requirements for implementing tiered rate structures under the Constitutional mandate and authority for reasonable use of water, but in a manner that complies with Prop. 218. It provides an option—not a mandate—for Prop. 218 compliance of water rate structures that encourage water conservation, by determining a "basic use allocation" and charging more for increments of metered use above that allocation, to pay the costs of conservation measures and overuse. This "allocation-based" conservation rate is one form of tiered pricing that promotes conservation. The bill requires that the "basic use allocation" provide "a reasonable amount of water for the customer's needs and property characteristics." It also preserves local agencies' authority to impose fixed charges for fixed costs.

California law requires that water suppliers provide an analysis of the expected revenue effects of reduced sales during shortages (2008 Urban Drought Guidebook, DWR, 2008). Well-designed rate structures can reduce the potential financial effects of water shortages. Water suppliers can implement new water pricing structures during water shortages. In metered areas, raising rates on the quantity used will result in water use reductions. A water supplier can expect rapid and significant water use reductions to result from large per billing unit price increases. Combining a large billing unit price increase with significant excess use charges can guarantee that the targeted reduction is achieved. Water rates should be set to enable the supplier to recover its purchase, treatment, and delivery costs as well as the additional costs related to the water shortage response program and replenishing the drought emergency fund. Make pricing changes a part of a water shortage contingency plan and adopt them as part of the plan. This can reduce the rate change approval from months to weeks.

The Irvine Ranch Water District (IRWD) sponsored a study by Kennedy/Jenks, "Analyses of Water Conservation after Rate Structure Implementation" in August 2008. The Kennedy/Jenks study concluded that the average residential water use dropped 8.8 percent from 1998 to 2006, following implementation of the allocation based conservation rate structure. Average annual landscape water use declined 31.5 percent over the same period. All of the reductions in water use during the post-intervention period are statistically significant at a 95 percent confidence level.

AB 811 (2008)—Contractual assessments: energy efficiency improvements. This law will further the public interest of addressing climate change through energy conservation efforts by authorizing cities to provide up-front financing to property owners to install solar or other renewable energy-generating devices or make specified energy efficiency improvements to their properties through a system of contractual assessments. Contractual assessments are authorized in current law for certain types of public works projects. The property owner or owners within a designated area choose to assess themselves for the cost of a public works project (i.e., undergrounding of power lines or installation of streetlights). The local government then provides the up-front funds for the project, and the property owners pay an annual assessment until those funds, plus interest, are repaid. The underlying purpose is to create a means by which a project that provides both a public benefit and an incidental benefit to particular property owners can be financed without imposing the cost on property owners in other parts of the city who derive no benefit.

AB 474 (2009)—Contractual assessments: water efficiency improvements. This law is similar to AB 811 and amended existing law to authorize the legislative body of any public agency to determine that it would be in the public interest to designate an area within which authorized city officials and free and willing property owners may enter into contractual assessments to finance the installation of water efficiency improvements that are permanently fixed to real property. This law will also

require additional specified disclosures for a transfer of real property subject to a contractual assessment.

Implementation Programs

5. **Urban Best Management Practices.** Through California Urban Water Conservation Council (CUWCC) compliance options, water suppliers should implement the urban BMPs. Assembly Bill 1420 (2007) requires urban water suppliers to implement urban Demand Management Measures (or BMPs if they are a member of the CUWCC) to be eligible for State water management loans and grants. The State should enforce this requirement and the Department of Water Resources (DWR) should have programs in place for timely review of the water supplier's urban water management plan (UWMP) for compliance with the AB 1420 criteria and for compliance with the requirements of the SBx7 7. DWR should review the UWMP identifying the outstanding elements of the UWMP and report it to the Legislature.

6. **20 Percent Water Use Reduction Target by 2020.** SBx7 7requires the urban water agencies to reduce water use by 20 percent by the year 2020. The Department of Water Resources (DWR) should develop the technical methodologies and the method to determine reduction target, update targets, develop alternative best management practices (BMPs) for commercial, industrial and institutional CII) and adopt regulation for both CII process water and adopt regulations on the range of options to measure the volume of water delivered and for adopting a pricing structure based on quantity delivered. The State should provide assistance to local agencies to meet these requirements through financial assistance, when available, and technical assistance including workshops, guidebooks, a method of establishing water use reduction targets, and methodologies for determining other criteria as specified in SBx7 7. DWR should review the urban water management plan (UWMP) and progress of the retail water suppliers on achieving their target for compliance with the requirements of the law, and for loan and grant eligibility and reporting to the Legislature. DWR and other agencies involved in the 20X2020 Plan and urban water suppliers should use the 20X2020 Plan recommendations to inform the implementation of the SBx7 7 process and in taking further steps in urban water conservation.

7. **Water Efficient Landscapes.** The Model Water Efficient Landscape Ordinance was adopted by the Department of Water Resources (DWR) in September 2009 to help improve landscape irrigation and will result in outdoor water conservation. DWR should have an aggressive outreach effort to assist cities and counties to adopt and implement a water efficient landscape ordinance to comply with the requirements of the Model Water Efficient Landscape Ordinance. Cities and counties, including charter cities and counties, are required to adopt the Model Ordinance or a local ordinance and report to DWR. DWR is required to prepare a report to the Legislature by January 1, 2011, on the status of the adoption of the ordinance by local agencies.

8. **Other Legislatively Required Water Use Efficiency Measures.**

- The State should provide incentives and local governments should implement the requirements of SB 407 (2009)—ULFT retrofits and AB 474 (2009)—Contractual Assessments to Finance Installation of Water Efficiency Improvements. SB 407 requires the replacement of all non-water conserving plumbing fixtures, as defined, in commercial and residential properties built prior to 1994 with water-conserving fixtures by either 2017 or 2019, depending on the type of property. This law requires that plumbing fixtures throughout the state be systematically modernized, saving billions of gallons of water in the process. SB 407 requires that inefficient and wasteful plumbing fixtures including toilets, showerheads, and bathroom faucets be replaced with high efficiency fixtures. This is critical if California is going to meet the Governor's stated goal of a 20 percent reduction in water use by the year 2020. This law is modeled closely after successful programs in the cities of Los Angeles, San Diego and San Francisco. These cities have seen positive results from their programs. For example, within the City of Los Angeles, over 1.3 million water wasting toilets have been replaced, saving the city over 14 billion gallons of water each year.

- **AB 474 (2009)—Contractual Assessments: Water Efficiency Improvements.** This law authorizes the legislative body of any public agency to determine that it would be in the public interest to designate an area within which authorized city officials and free and will property owners may enter into contractual assessments to finance the installation of water efficiency improvements that are permanently fixed to real property. This law will also require additional specified disclosures for a transfer of real property subject to a contractual assessment. This law will harness market forces by increasing water conservation by residential commercial, agricultural and industrial property owners by authorizing cities, counties, water districts and municipal utilities to offer up-front financing to property owners who wish to install water conservation systems. Local agencies should implement these requirements.

- **AB 1881 (2006)—Water Conservation in Landscaping Act of 2006.** Retail water suppliers should implement the landscape dedicated water meter installation requirements of AB 1881. The Legislature should establish a requirement for all public water systems to install a meter on each service and charge based on actual volume of use.

9. The California Department of Water Resources should encourage use of recycled water by providing technical and financial assistance.

10. Local agencies and water suppliers, as appropriate, should implement the requirements of the other legislations described in this strategy (SB 610 and 221, AB 1061, AB 1366, AB 1465, and AB 371).

Innovative Actions

The following innovative actions are recommended:

11. **Conservation Offset.** Conservation offset refers to the actions that urban water suppliers take where a developer, in order to obtain approval for a proposed project, must implement or financially contribute to actions that will save water at or above the demand level of the project. Developers have installed or paid for the retrofit installation of dual flush toilets, low flush toilets, high efficiency clothes washers, Xeriscape residential landscaping, water efficient landscaping in common areas and street medians, ET irrigation controllers, artificial turf, use of recycled water for all large turf irrigation, hot water recirculation demand systems, pre-rinse spray valves, and even farm irrigation improvements. Offset programs in Cambria, on the California coast, have included farm irrigation improvements such as drip irrigation.

    Some water districts implementing an offset program require the developer to implement actions that save two or more times the projected water demand for their projects. While an offset program can be a useful part of a tool kit for a water supplier's conservation actions, the concept has not been widely used despite its successes. However, the requirements for documenting a reliable water supply over a 20-year period created by SB 610 and SB 221 may create an incentive for developers to implement voluntary offset programs to create new water supplies for their projects. The State should assist in preparing guidelines for water districts who are interested in implementing the conservation offset.

12. **Using Ambient Information Systems to Change Water Use Behavior.** A growing number of utilities are using fixed receivers to gather water use information from two to six times per day. These systems can convey real-time water resource impact and use data directly to consumers on dedicated in-home, wirelessly connected, ambient display devices. The information can be used to motivate consumers by actively comparing data gathered from automated meter reading systems to household water use goals. It provides an incentive to change behavior to reduce water use or to identify potential leaks in a household.

13. **Peak Demand Water Use.** In many areas, water use doubles when customers start to irrigate their landscapes. Many unmetered utilities implement restricted water days and/or hours during a prolonged drought or when water reservoirs run low. This approach can be practiced all year on an on-going basis to improve water conservation and reduce gallons per capita per day used.

14. **Gray Water and Rain Water Capture.** The State should provide incentives for the use of gray water systems where conditions permit and cistern systems to capture storm water where appropriate. The benefits of rainwater harvesting include: conserving water, improving water quality and reducing flood flows and risks. The responsibility for adoption of residential graywater standards has been transferred by Senate Bill 1258 (2008) to the Building Standards Commission. The California

Building Standards Commission (BSC) on July 30, 2009, adopted new code for residential graywater use that took effect on August 4, 2009. This rulemaking modifies the California Plumbing Code, Title 24, Part 5, Chapter 16A, Part I. The language eases permitting requirements for certain types of graywater systems and allows for much less expensive systems to be created by residents of the state. These changes do allow for cities or counties to adopt more restrictive standards, at their discretion. Overall, the new code is more "performance based" rather than prescriptive, and allows for much less expensive systems to be created by residents of the state. Local agencies should encourage use of the new standards and the State should provide support for local agencies' implementation.

15. **Community Involvement.** The State should take appropriate actions for the following collaborative efforts:
    a. Encourage builders, manufacturers and others to establish a "Water Star Homes" program for new and existing homes and performance standards for fixtures and appliances in order to reduce residential water use.
    b. Encourage the formation of employee and management "Green Teams" in commercial, industrial, and institutional customers to promote sustainable resource use.
    c. Encourage property owners and landscape managers to increase water use efficiency in large landscapes.
    d. Support the implementation of technologies that exist today to enable new buildings to use less energy. The US Green Building Institute has developed LEED design standards for existing building remodels and retrofits. These standards call for measures such as rain water harvesting systems, graywater reuse systems, the reduction of overall irrigation demand and other measures. Executive Order S-20-04 ordered that State agencies, departments, and other entities under the direct executive authority of the Governor design, construct and operate all new and renovated State-owned facilities paid for with State funds as "LEED Silver" or higher certified buildings (Schwarzenegger, 2004). The California Green Building Standards Code for all new construction statewide will be voluntary until 2010, when its provisions are expected to become mandatory. The Code sets targets for energy efficiency, water consumption, and dual plumbing systems for potable and recyclable water, the reduction of overall irrigation demand
    e. Encourage the Green*Plumbers*® organization to assist plumbers in changing consumer behavior through the use of energy efficient and water saving technologies.
    f. Recommend examination of "Pay As You Save®" (PAYS®), a market-based system that eliminates barriers to the purchase and installation of proven, cost effective water and energy efficient measures in multi-family housing.
    g. Encourage community-based strategies for conservation activities to foster water use efficiency, with the participation of the water industry,

environmental interests, and the business communities. Identify and overcome barriers, including people behavior; communicate the benefits, provide incentives, and gain commitment from all involved.

Data Collection

State agencies and local agencies and water suppliers should give data collection, management, and maintenance a higher priority. Urban water use efficiency-related data are essential for planning, implementation, water management, water system operation, technology development, public education, regulation, and new legislation. The following actions are recommended:

16. **Water Use Report Forms.** The State should develop a standardized form for urban water use reporting and for monitoring performance of implementation of the requirements of SBx7 7.

17. **Information Exchange.** The California Department of Water Resources's (DWR) Statewide Water Analysis Network (SWAN) Program should improve upon the analytical capabilities in support of water management and improve information exchange among urban water management plans and other sources of data in support of local, regional and statewide planning.

18. **Coordinated Database.** State agencies should follow up on the recommendations of the AB 1404 feasibility study report for a coordinated database, being developed by the State Water Board.

19. **Water Meters.** Measurement and collection of water use data is critical to water management. Accelerated installation of water meters should be encouraged through incentives and other local decisions.
    - Local agencies should collect landscape water use data from dedicated landscape water meters (required per AB 1881 for landscapes greater than 5000 square feet, except single family residential) for compliance with the Maximum Applied Water Allowance of the Model Water Efficient Landscape Ordinance.
    - The State should provide incentives for accelerated metering of all urban customers and bill by volume of use, and install sub-meters for new multifamily residential construction. Support "smart" metering of urban customers (meters that automatically collect data, transfer it to a central database for analysis, billing and conservation purposes).
    - Public water systems that provide flat rate water service should strongly consider moving to a metered water rate structure to discourage waste. In addition, water systems that have water meters on some customers and not all connections, should consider providing water meters to all customers.
    - The California Department of Public Health should evaluate the inclusion of funding for water meters for each water system service connection for all drinking water projects under the Prop. 50 and 84 programs.

20. **Model Ordinance Monitoring.** Local agencies should monitor water use and utilize the requirements and recommendations of the Model Water Efficient Landscape Ordinance to assess outdoor water use.

21. **Grant effectiveness.** State agencies should work with State and federal grant recipients to obtain useful and consistent data from funded projects and other activities.

22. **Best Management Practices Reporting Upgrades.** Agencies should continue to support the California Urban Water Conservation Council and participation of other stakeholders, to improve upon best management practices reporting and standardize utility billing and reporting systems by customer type and units of measure and identify industrial water use customers by North American Industry Classification System (NAICS).

23. **Climate Change.** State and local agencies should collect data on the water-energy relationship and on the impacts of climate change on water use and water use efficiency.

24. **Scientific Methods.** The State should employ scientific methods to research, monitor, and evaluate existing and new water use efficiency technologies and management practices, including people behavior and the positive and potentially negative effects of these practices and real world challenges to implementation.

Education and Motivation

25. **Public Outreach.** The California Department of Water Resources and the Association of California Water Agencies should continue the "Save Our Water" program and undertake similar programs to educate and inform the public of necessities of water waste prevention.

26. **Model Ordinance Outreach.** The California Department of Water Resources should continue its outreach effort and establish educational programs in support of the Model Water Efficient Landscape Ordinance.

27. **Certification Program.** The State should support efforts to encourage education training and certification programs for landscape water managers. The most common source of irrigation mismanagement is the period after the installation. It is necessary to identify research and develop ideas for programs and services to reach out to the public and professionals alike. The California Landscape Contractors Association's Water Management Certification Program is an example of a program that was developed in cooperation with California's urban water agencies. This innovative program certifies landscape water managers who pass a written test and irrigate a project below an assigned water budget for a 12-month period (CLCA, 2009).

28. **Public Information and Training.** Provide comprehensive public information, education, training, and technical assistance programs to foster a lasting water use efficiency ethic, social marketing and extension of WaterSense. It is a partnership program sponsored by the US Environmental Protection Agency that makes it easy for Americans to save water and protect the environment. It provides links to learn about WaterSense labeled products, saving water, and how businesses and organizations can partner with WaterSense.

Technical Assistance

29. State and federal agencies should encourage and assist water suppliers and local agencies and governments in fully developing, implementing, and sustaining water conservation programs including development and implementation of local water conservation programs through dissemination of user friendly weather data for irrigation scheduling (via the California Irrigation Management Information System), workshops, guidebooks, analytical tools and technical assistance programs.

30. The California Department of Water Resources should update its Urban Water Management Planning Guidebook and hold workshops to help water suppliers in preparing the 2010 cycle of urban water management plans.

31. The California Department of Water Resources should continue collaboration with the California Urban Water Conservation Council in providing technical assistance to water suppliers in advancing water use efficiency.

32. The California Department of Water Resources should also assist water suppliers in achieving the 20 percent reduction target by providing data, methodologies, guidebooks, informational workshops, and tools.

DWR Near-term Core Programs

33. Implement the provisions of AB 1420 (2007) water suppliers' compliance determination with implementation of the demand management measures (and urban BMPs for California Urban Water Conservation Council members) as a condition for eligibility for certain grants or loans.

34. Update the Urban Water Management Plan (UWMP) Guidebook for the 2010 cycle of the UWMP and review the urban water management plan submitted to the California Department of Water Resources.

35. Work with other agencies for urban water use information reporting.

36. Use the recommendations of the Urban Water Use Efficiency Strategy, as appropriate, to inform the Proposal Solicitation Programs for future grant cycles and its technical assistance programs.

37. Continue to provide financial assistance for water management programs, including special assistance and incentives to disadvantaged communities. SBx7 8 (Water Diversion and Use/Funding) appropriates $546 million from Props. 1E and 84, for purposes that include $250 million (Prop. 84) for integrated regional water management grants and expenditures for projects to reduce dependence on the Delta. The Integrated Regional Water Management Grant Program provides grant funding to projects that help meet the long term water needs of the state, including the delivery of safe drinking water and the protection of water quality and the environment. SBx7 2, the Safe, Clean, and Reliable Drinking Water Supply Act of 2010, will, if approved by the voters, provide $250 million for direct expenditures, grants, and loans for water conservation and water use efficiency plans, projects, and programs.

38. Promote the updated Model Water Efficient Landscape Ordinance, assist local agencies to adopt an ordinance and implement and enforce its requirements.

39. Pending availability of resources, implement the California Department of Water Resources's mandates in SBx7 7 (2009), Water Conservation, and work with other State agencies, the California Urban Water Conservation Council and other entities to assist water purveyors to achieve their reduction targets through developing the methodologies for determining 20 percent reduction target, holding workshops, developing guidebooks, tools, and other means.

40. Complete upgrades to the California Irrigation Management Information System to improve system reliability, facilitate use of a new generation of irrigation controllers, and improve access to data.

41. Carry out a range of water use efficiency measures, including core measures focused on reducing water use, as well as measures specifically aimed at developing information about the water-energy relationship and implementing water conservation programs that optimize energy conservation for reducing water use and GHG emission

42. Conduct outreach efforts informing the public of the new standards for dual plumbing for buildings.

43. Continue management and monitoring of the grant funded projects for grant effectiveness.

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