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Subgroup: Reduce Water Demand

Chapter 3 Urban Water Use Efficiency

Urban water use efficiency involves technological and behavioral improvements in indoor and outdoor residential, commercial, industrial, and institutional water use that lower demand and result in benefits to water supply and water quality. Water use efficiency has multiple benefits. At the individual level, the benefits of water use efficiency are often small, incremental, and difficult to see. 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, escape of the applied chemicals into surface waters, production of green waste, and improved habitat value of urban landscapes
- Reduced groundwater overdraft
- Reduced air pollution
- Reduced groundwater contaminations
- 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.

The 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 are discussed in this strategy.

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 US District Judge Oliver Wanger's decision in *Natural Resources Defense Council v. Kempthorne* (E.D.Cal. 2007) State and federal agencies water projects were required to reduce their draw of water from the estuary under certain conditions to protect Delta smelt.

On December 15, 2008, the US Fish & Wildlife Services (USFWS) issued a biological opinion (BO) on the Long-Term Operational Criteria and Plan (OCAP) for coordination of the Central Valley Project and State Water Project. 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. The BO is 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. Affected species are winter- and spring-run salmon, Central Valley steelhead and green sturgeon. Under the rules, water diversions from the Sacramento-San Joaquin Delta must be cut 5 percent to 7 percent under certain conditions, reducing diversions from the 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 state's reservoir's carry-over supplies. 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, 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.

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

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

Urban Water Management Planning Act and Urban Best Management Practices

The Urban Water Management Planning Act 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. In 2000, cities and suburbs used about 8.7 million acre-feet (maf) of water. 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 reports in its *Urban Water Management Plan Update 2002-2003* that "water conservation continues to play an important part in keeping the city's water use equivalent to levels seen 20 years ago." This report indicates that, water use efficiency is contributing to meeting population growth water demand.

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). It 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 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.

With California's water future uncertain, California's largest water agencies and leading environmental groups signed a key 10-year agreement on December 18, 2008 to conserve water in the state. In 1997, a 10-year time frame for meeting conservation goals was set to end in 2008. By approving a new 10-year period, adding flexibility to the Best Management Practices and reorganizing them into programmatic groupings, California continued its role in leading 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 vote ratified 8 critical changes and additions to the Memorandum of Understanding 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.

The CUWCC's 14 BMPs are now organized into five categories. 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 the Council.

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

Box 3-2 Urban Best Management Practices.

BMP Naming Changes

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

There are three compliance options: Gallon per capita per day (GPCD), traditional BMP, and the Flex Track.

The GPCD target is 18% reduction by 2018 for the purpose of using the same timeframe as the CUWCC's MOU. The specific compliance method provided herein is not intended to be a one size fits all solution to the complex issue of GPCD reduction for a water agency. 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.

Flex Track Menu

In addition to the measures on the BMP List, the Flex Track menu options may be implemented to meet the savings goal for this BMP. 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.

Demand Management Measures Requirement

Assembly Bill 1420 enacted in 2007 (Chapter 628, Statutes of 2007-Laird) requires the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by Department of water Resources (DWR), the State Water Resources Control Board (SWRCB), or the California Bay-Delta Authority, with certain exceptions, to 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 SWRCB and CALFED and to solicit public comments to develop these requirements. In 2009, DWR adopted criteria for compliance with the AB 1420 requirements.

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 management of California's water to develop this more aggressive plan. Several agencies worked together to develop the plan, including DWR, the State Water Resources Control Board (SWRCB), the California Energy Commission (CEC), the Department of Public Health and the California Public Utilities Commission and US Bureau of Reclamation (USBR) .

The 20X2020 Agency Team 2009 draft report 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 campaign.
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.

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.

The Blue Ribbon Task Force recommended two foundational and co-equal goals: restore the Delta ecosystem and create a reliable water supply for California. 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 SWRCB'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 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 greenhouse gas 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 greenhouse gas emissions and the use of fossil fuels. This relationship is the key to the reduction of greenhouse gas 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 mitigate and adapt to climate change. Water conservation reduces water demand, wastewater discharges, and can reduce energy demand and greenhouse gas 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 State's model water efficient landscape ordinance are among strategies to be used to reduce urban demand for energy efficiency and GHG emission reduction.

Drought

Governor Schwarzenegger issued a Drought Proclamation in February 2009 requiring DWR to prepare a Report by March 2009. DWR Report included a number of recommendations including water conservation. 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. The effort is intended to meet Gov. 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 educational and motivational programs to inform their customers and provide incentives for water conservation practices.

The Water Conservation in Landscaping Act of 2006

In 1990, California was in a fourth consecutive year of drought and Assembly Bill 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.

In 2001, a report by Western Policy Research concluded that nearly 90 percent of new development between 1992 and 1999 took place in agencies that had adopted a water efficient landscape ordinance. But researchers found deficiencies in AB 325 due to a lack of education about the ordinance, maintenance contractors rarely irrigating accurately, and "maintenance" as the weakest link in design, installation, and maintenance. Partly because of this report, Assembly Bill 2717 was proposed to address some of the deficiencies of AB 325.

Assembly Bill 2717 was passed in 2004 and requested the 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 to study the evapotranspiration adjustment factor as a part of updating the landscape model ordinance.

Landscape irrigation uses 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%) 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 2006 Water Conservation in Landscaping Act, (AB 1881, Laird- Chapter 559, Statutes 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 "Water Conservation in Landscaping 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 that is at least as effective by January 1, 2010.

DWR held public workshops and public hearings in adopting the regulation. DWR updated Model Ordinance became effective on September 10, 2009. More information on the updated Model Ordinance process including the rulemaking documents, is available at http://www.owue.water.ca.gov/landscape/ord/ord.cfm

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 required the California Energy Commission (Commission), to develop performance standards and labeling requirements for landscape irrigation equipment. However, the Commission 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 Commission decided to suspend the proceedings until such time as sufficient funding sources become available.

The Act also directs 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.

The Water Conservation Act of 2009

Senate Bill 7X-7 enacted in 2009 (Chapter 4, Statutes of 2009 Seventh Extraordinary Session) requires the state to achieve a 20% reduction in urban per capita water use by December 31, 2020. The state will be required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. 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. The law requires the department, in consultation with other state agencies, to develop single standardized water use reporting form. 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 conditions eligibility for certain water management grants or loans to an urban water supplier on the implementation of certain water demand management measures.

The 2009 Act

- Establishes a statewide water conservation program, in a new "Sustainable Water Use and Demand Reduction" part in the Water Code.
- Defines water use efficiency measures adopted in compliance with the law as "water conservation" measures that receive protection from loss of water rights for the conserved water, under the "use or lose" doctrine.
- Prohibits urban suppliers from requiring changes that reduce process water and allows urban water supplier to exclude process water from the development of the urban water target if substantial amount of its water deliveries are for industrial use, but allows for reductions in emergencies.
- States legislative intent regarding water conservation: including:
  a) that all water suppliers increase water use efficiency;
  b) establish consistent water use efficiency planning and implementation standards and methods for urban water suppliers.

The 2009 Act directs DWR to take the following actions for urban water conservation:

April 1, 2010	Convene a Task Force and in conjunction with CUWCC to develop alternative best management practices for Commercial, Industrial, and Institutional (CII).
posted on web by October 1, 2010	Develop technical methodologies and criteria for the consistent implementation and post on the Website
prior to December 31, 2010	In consultation with CBDA, DPH, and CPUC, and SWRCB 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
December 31, 2010	Develop an urban per capita target method that result in 20% reduction in per capita by December 31, 2020 and report to the Legislature
Prior to January 1, 2011	In consultation with the SWRCB revise UWMP, IRWMPs, grant and loan eligibility requirements, State or local permitting requirements; increased funding for research, feasibility studies and project construction; expand technical and educational support for local land use and water management agencies
January 1, 2011	Update targets as part of the California Water Plan. Propose new statewide targets or review and update existing statewide targets for regional water resources management practices
July 1, 2011	Grant extension of UWMP adoption to allow use of technical methodologies developed by DWR
April 1, 2012	Report to the Legislature on a review of multiple sectors within CII users and recommend water use efficiency standards for CII users
December 31, 2014	DWR shall update the urban per capita target methods and report to the Legislature
Prior to July 1, 2016	Revise grant/loan criteria so urban retail supplier not eligible for grant or loan unless supplier complies with this part
December 31, 2016	Review the 2015 UWMPs and Report to the Legislature on progress towards achieving 20X2020. Report shall include recommendations on changes to water efficiency standards or urban water use targets and reflect efficiency information and technology changes.
	Adopt regulation on the range of options to measure the volume of water delivered and for adopting a pricing structure based on quantity delivered.
Unspecified date	Adopt regulations for implementation of provisions related to process water in accordance with the Water Code subdivision (l) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26

Other Water-related Legislations:

SB 407 (Padilla), Chapter 587, Statutes of 2009 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 (Blumenfield), Chapter 444, Statutes of 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 (Lieu) Common Interest Developments – Water Use Efficiency Landscapes – Chapter 503, Statutes of 2009. 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 (Feuer) Chapter 527, Statutes of 2009. 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 (Hill), Chapter 534, Statutes of 2009, 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. 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 of 2006 (Goldberg) required DWR to adopt standards for dual plumbing in new buildings. DWR developed the standards and submitted to the California Building Standards Commission for review and approval. The Standards were approved by the CBSC on November 18, 2009. The standards will be published in January 2011.

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 a viable long-term supply option, saving considerable capital and operating costs for utilities and consumers, avoiding environmental degradation, and creating multiple benefits. Reduced water demands 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
- 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 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 Record of Decision, 2000). A state-sponsored study (Pacific Institute's "Waste Not, Want Not") indicated potential savings of 2 million to 2.3 million acre-feet per year from existing urban conservation technologies and practices.

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 Comprehensive Evaluation, 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.

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 grant program funding was evaluated at three levels. The first level assumed that grant program funding would consist only of the remaining Proposition 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)

Table 3-1 CBDA Estimates of 2030 urban conservation savings potential (demand reduction)						
			(Demands Reduction by Category) 1,000 Acre-Feet per year			
Projection Level	Assumed Local Agency Investment	Assumed CALFED Grant Funding	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	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 million acre-feet 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 million acre-feet and 2.1 million acre-feet 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 Proposition 50 would approximately reduce water demand between 200,000 and 250,000 acre-feet per year 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.

The estimates in Table 3-1 (CALFED estimates) 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 (2030 annual water savings potential by CALFED projection: recoverable and irrecoverable) shows the annual recoverable and irrecoverable flows for the six projection levels.

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

Table 3-2 2030 Annual water savings potential by CBDA projections: recoverable and irrecoverable flows			
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 by Comprehensive Evaluation Report

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 from this 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.

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 demands. 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 Statewide average unit cost of water savings by CALFED projection (2004 dollars). Costs range from $223 per acre-foot for projection level 5 to $522 per acre-foot for projection level 1 (California Bay-Delta Authority. *Water Use Efficiency Comprehensive Evaluation,* August 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. 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. 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.

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

Table 3-3 Statewide average unit cost of water savings by CBDA 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- Comprehensive Evaluation Report

The 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'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.

CALFED Report 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, 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.

Sidebar: A consistent and broadly acceptable method to evaluate cost-effectiveness and water savings has been developed by the CUWCC. A publication describing cost effectiveness and spreadsheets that calculate cost effectiveness by BMP have both been created, and are posted on the CUWCC's web site at www.bmp.cuwcc.org.

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 California Urban Water Agencies (CUWA) identified a number of these implementation challenges for urban water conservation programs. The CUWA-sponsored study recommends collaborative action by agencies, further research, and continued State or federal support in addressing 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.[1] 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 and the sufficient funding has not been available and the recent State budget deficits and delays in grant program implementation have contributed to a 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.

The Water Conservation Act of 2009 coupled with other requirements outlined earlier and the Water Bond bill of 2009, if approved by the 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 and reports to the Department of Public Health, the California Public Utilities Commission; and annual CUWCC BMP Reports submitted by MOU signatories; and Urban Water Management Plans 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 Urban Water Management Plans 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, Statues of 2007 required State Water Resources Control Board in

[1] Urban Water Conservation Implementation and Challenges and Opportunities. Prepared for the California Urban Water Agencies. Tom Chesnutt, Ph.D., David Pekelney, Ph.D. A&N Technical Services, Encintas, CA. September, 2004.

cooperation with DWR, Department of Public Health and California Bay Delta Authority to study feasibility of a coordinated database and report to the Governor by January 1, 2009. A report is under preparation by the SWRCB. If approved and funded, a coordinated database of water use information will be a significant accomplishment and resource for planning and implementation purposes.

Landscape uses significant amount of water. Without water meter or landscape dedicated water meter it is difficult to accurately assess landscape water use and implement appropriate programs to prevent water waste. AB 1404 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.

Although State and federal agencies as well as water purveyors, CUWCC and other entities have contributed to public knowledge and awareness about importance of water use efficiency and have various educational and technical assistance programs, more effort is needed in public education, outreach, training, and technical assistance.

(Insert) Box XX-X 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 a 14.4 to 17.4 percent reduction in water use during the months of July through September, 2009 compared to the same months in 2008. It is unlikely that customers will be able to sustain such large reductions during the winter months when outdoor usage typically declines. These accomplishments are not soley 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 by CUWCC for use by 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: 1. How to model a drought cut-back ordinance as a short-term conservation measure. 2. Which end-uses can still be reduced in a drought. 3. How short-term and long-term end use reductions interact. 4. Typical magnitudes of demand hardening as a function of the amount of long-term conservation implemented or planned. 5. Realistic expectations for customer cut-backs in droughts in say 2025, after aggressive long-term conservation programs have been implemented.

Recommendations to Achieve Urban Water Use Efficiency

The State agencies and the 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 the new legislations including SB 7X-7 specifying water use reduction targets and other requirements. Inadequate funding, authority, educational and outreach programs has delayed achieving greater urban water conservation levels.

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

1. **Funding**. State and federal funding will provide incentives for implementation of BMPs and other water conservation measures. Propositions 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. The Water Bond bill of 2009 was signed by the Governor in November of 2009. If approved by the California voters it provides significant funding for water conservation.

Agencies should provide ample opportunities for small districts, 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 with 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.

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. 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.

Metropolitan Water District of Southern California, (MWD) has implemented a highly successful region-wide commercial, industrial, and institutional program for the past seven years (Be Waterwise.com. http://www.bewaterwise.com/icp.html). In July 2007, 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.

These examples are intended to show actions that can be taken by local agencies but sustainable funding is needed to achieve water conservation.

2. Implementation Programs

Urban BMPs. Through CUWCC compliance options, water suppliers should implement the urban BMPs. The Water Code (AB 1420) requires urban water suppliers to implement urban BMPs to be eligible for State water management loans and grants. State should enforce this requirement and DWR should have programs in place for timely review of the water suppliers UWMP for compliance with the AB 1420 criteria. DWR should review the UWMP identifying the outstanding elements of the UWMP and report it to the Legislature.

20 Percent Water Use Reduction Target by 2020. The 2009 Act requires the urban water agencies to reduce water use by 20% by the year 2020. 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 target, and methodologies for determining other criteria such as population, landscape area as specified in the Act. 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 2009 Act process and in taking further steps in urban water conservation.

Water Efficient Landscapes. The Model Water Efficient Landscape Ordinance was adopted by 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.

Other Legislatively Required Water Use Efficiency Measures- State should provide incentives and local governments should implement the requirements of the Water Code , Chapter 587, Statutes of 2009 (SB 407- ULFT retrofits) and Chapter 444, Statutes of 2009 (AB 474- contractual assessments to finance installation of water efficiency improvements). SB 407 (Padilla), Chapter 587, Statutes of 2009 ULFT Retrofits into law on October 11, 2009. 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. This law requires that plumbing fixtures throughout the state be systematically be 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% 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 (Blumenfield), Chapter 444, Statutes of 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.

Retail water suppliers should implement landscape dedicated water meter installation requirements of AB 1404. 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.

Local agencies should implement the requirements of the SB 610 and 221. Senate Bills 610 (Chapter 643, Statutes of 2001) and Senate Bill 221 (Chapter 642, Statutes of 2001) 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 require 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 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.

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

Innovative Actions:

- **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 on common area 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 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 Senate Bill 610 and Senate Bill 221 may create an incentive for developers to implement voluntary offset programs to create new water supplies for their projects. State should assist in preparing guidelines for water districts who are interested in implementing the conservation offset.

- **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.
- **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 GPCD.

- **Gray Water and Rain Water Capture** - The State should provide incentives for 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 of 2008 to 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.

- **Community Involvement** – State should take appropriate actions for the following collaborative efforts:
    - 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.
    - Encourage the formation of employee and management "Green Teams" in commercial, industrial, and institutional customers to promote sustainable resource use.
    - Encourage property owners and landscape managers to increase water use efficiency in large landscapes.

- 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. 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
- Encourage the Green*Plumbers*® organization to assist plumbers in changing consumer behavior through the use of energy efficient and water saving technologies.
- 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.
- 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, communicate the benefits, provide incentives, and gain commitment from all involved.

3. 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:

Water Use Report Forms- State should develop a standardized form for urban water use reporting and for monitoring performance of implementation of the requirements of the Water Conservation Act of 2009.

Information Exchange- DWR's SWAN Program should improve upon the analytical capabilities in support of water management and improve information exchange among UWMPs and other sources of data in support of the local, regional and statewide planning.

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 SWRCB.

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 1404 for landscapes greater than 5000 square feet, except single family

residential) for compliance with the Maximum Applied Water Allowance of the Water Efficient Landscape Ordinance.

- State should provide incentives for accelerated metering of all urban customers and bill by volume of use, and install sub-meter 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.
- CDPH should evaluate the inclusion of funding for water meters for each water system service connection for all drinking water projects under the Proposition 50 and 84 programs.

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.

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

BMP Reporting Upgrades- Agencies should continue to support the CUWCC and participation of other stakeholders, to improve upon BMP 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).

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

4- Education and Motivation

Public Outreach- DWR and ACWA should continue the "Save Our Water" program and undertake similar programs to educate and inform the public of necessities of water waste prevention.

Model Ordinance Outreach- DWR should continue its outreach effort and establish educational programs in support of Water Efficient Landscape Ordinance.

Certification Program- 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. Information is available at: http://www.clca.us/water/.

Public Information and Training Provide comprehensive public information, education, training, and technical assistance programs to foster a lasting water use efficiency ethic.

5. **Technical Assistance**

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 California Irrigation Management Information System- CIMIS), workshops, guidebooks, analytical tools and technical assistance programs.

DWR should update its Urban Water Management Planning Guidebook and hold workshops to help water suppliers in preparing the 2010 cycle of UWMPs.

DWR should also assist water suppliers in achieving the 20% reduction target by providing data, methodologies, guidebooks, informational workshops, and tools.

DWR Near-term Core Programs

- Implement the provisions of AB 1420 (Laird 2007) water suppliers' compliance determination with implementation of the demand management measures as a condition for eligibility for certain grants or loans..
- Update UWMP Guidebook for the 2010 cycle of the UWMP and review the UWMP submitted to DWR.
- Work with the CUWCC for urban water use information reporting.
- 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.
- Continue to provide financial assistance for water management programs, including special assistance and incentives to disadvantaged communities. Senate Bill x2-1includes more than $180 million in Proposition 84 Integrated Regional Water Management funds that will be used to support water management programs including long-term drought relief projects. Integrated Regional Water Management (IRWM) Grant Program provides grant funding to project 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.
- Promote the updated Model Water Efficient Landscape Ordinance, assist local agencies to adopt an ordinance and implement and enforce its requirements.

- Pending availability of resources, implement DWR's mandates of the Water Conservation Act of 2009 and work with other State agencies, CUWCC and other entities to assist water purveyors to achieve their reduction targets through developing the methodologies for determining 20% reduction target, holding workshops, developing guidebooks, tools, and other means..
- 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.
- 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
- Conduct outreach effort informing the public of the new standards for dual plumbing for buildings.
- Continue management and monitoring of the grant funded projects for grant effectiveness.

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Box 3-1 Abbreviations and Acronyms

Acre-foot (AF)
Association of California Water Agencies (ACWA)
Best Management Practices for Urban Water Conservation (BMPs)
CALFED Bay-Delta Program (CALFED
California Landscape Contractors Association (CLCA)
California Urban Water Agencies (CUWA)
California Urban Water Conservation Council's (CUWCC)
Memorandum of Understanding (MOU)
California Energy Commission (CEC)
California Public Utilities Commission (CPUC)
California Environmental Quality Act (CEQA)
Department of Fish and Game (DFG)
Department of Public Health (DPH)
Gallons Per Capita Per Day (GPCD)
Greenhouse gas emissions (GHG)
Integrated Resource Planning (IRP)
Integrated Regional Water Management Plan (IRWMP)
Leadership in Energy and Environmental Design (LEED)
Model Water Efficient Landscape Ordinance (Model Ordinance)
Metropolitan Water District (MWD)
North American Industry Classification System (NAICS)
Pay As You Save®" (PAYS)
Pelagic organism decline (POD)
State Water Resources Control Board (SWRCB)
Sonoma County Water Agency (SCWA)
Statewide Water Analysis Network (SWAN)
US Bureau of Reclamation (USBR)
US Department of Energy (DOE)